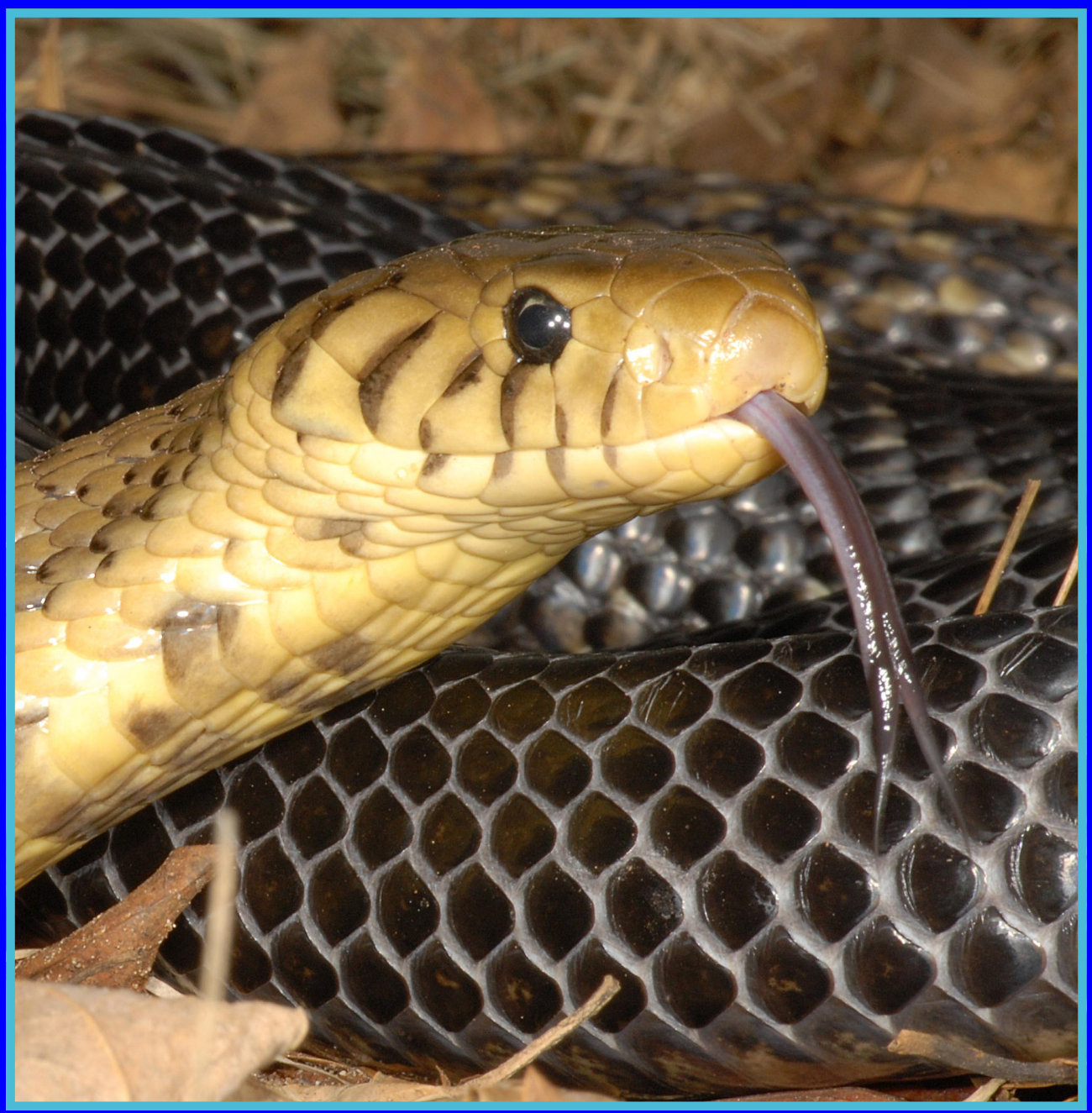
ISSUE 20, PUBLISHED 10 JULY 2013

ISSN 1836-5698 (Print)
ISSN 1836-5779 (Online)

# Australasian Journal of Herpetology



Contents on page two.

# Australasian Journal of Herpetology

## Issue 20, 10 July 2013

## Contents

ISSN 1836-5698 (Print)
ISSN 1836-5779 (Online)



### *Australasian Journal of Herpetology*

Publishes original research in printed form in relation to reptiles, other fauna and related matters, including the subjects of classification, ecology, public interest, legal, captivity, exposure of frauds, "academic misconduct", etc. It is a peer reviewed printed journal published in hard copy for permenant public scientific record in accordance with the Zoological Code (Ride *et al.* 1999), with a sizeable print run and has a global audience.

Full details of acquiring copies, either printed or in identical form online, editorial policies, publication procedure, author submission guidelines, peer review guidelines, legal matters, advantages of publication in this journal and the like can be found by following links from:

http://www.herp.net

**Published by Kotabi Pty Ltd**
**PO Box 599**
**Doncaster, Victoria, 3108.**
**Australia.**

ISSN 1836-5698 (Print)
ISSN 1836-5779 (Online)



**Online journals (this issue) do not appear for a month after the actual and listed publication date of the printed journals. Minimum print run of first printings is always at least fifty hard copies.**

*Australasian Journal of Herpetology* **20:3-7.**
**Published 10 July 2013.**

**ISSN 1836-5698 (Print)**
**ISSN 1836-5779 (Online)**

# Two new species of True Cobra in the genus *Boulengeria* Dollo, 1886 from West Africa and South Africa (Serpentes: Elapidae).

**RAYMOND T. HOSER**

**488 Park Road, Park Orchards, Victoria, 3114, Australia.**
***Phone*: +61 3 9812 3322 *Fax*: 9812 3355 *E-mail*: snakeman@snakeman.com.au**
**Received 4 April 2013, Accepted 2 May 2013, Published 10 July 2013.**

## ABSTRACT

The African True Cobras, have been a source of newly described species in recent times.

Since 2000, three new species have been formally named. These are: *Spracklandus nubiae* (Wüster and Broadley, 2003), *Spracklandus ashei* (Wüster and Broadley, 2007) and *Uraeus senegalensis* (Trape, Chirio, Broadley and Wüster, 2009) all the result of division of widespread taxa.

This paper names a fourth and fifth new species from Africa. The first species is from the forested zone west of the Dahomey Gap. *Boulengeria jackyhoserae sp. nov.* is formally named according to the Zoological Code (Ride *et al.* 1999). It had been long confused with the morphologically similar and closely related species *Boulengeria melanoleuca* (Hallowell, 1857), (also more widely known as *Naja melanoleuca* Hallowell, 1857) from forested areas of central Africa east of the Dahomey gap.

Another species confused with *Boulengeria melanoleuca*, namely *B. adelynhoserae sp. nov.* from South Africa and immediately adjacent areas, is also formally described according to the Zoological Code.
The new species *Boulengeria jackyhoserae sp. nov.* is most readily separated from the species *Boulengeria melanoleuca* (Hallowell, 1857) in the field by obvious differences in labial and ventral markings, in particular those of the fore-body.

All three species are allopatric.

**Keywords:** Taxonomy; True Cobras, Africa, *Naja*, *Boulengeria*; *Spracklandus*; new species; *jackyhoserae*; Liberia; Sierra Leone, Ghana, Ivory Coast; Dahomey Gap; *adelynhoserae*; Kwazulu Natal; South Africa, Zimbabwe, Mozambique.



### INTRODUCTION

The African True Cobras, remain a source of newly described species in recent times.

Since 2000, three new species have been formally described and named, namely *Spracklandus nubiae* (Wüster and Broadley, 2003), *Spracklandus ashei* (Wüster and Broadley, 2007) and *Uraeus senegalensis* Trape, Chirio, Broadley and Wüster, 2009 all the result of division of widespread taxa and the naming of well-known regionally distinct forms.

Also, well-known variants have also been resurrected from synonymy of better known species both in Africa and in terms of Asian Cobra taxa.

Hoser 2009, reclassified the African True Cobras at the generic level, dividing *Naja* as then known into four groups based on divergence times as indicated below, these being:

1 - Asian True Cobras (*Naja* Laurenti, 1768) 25 MYA (million years ago) (minimum 16 MYA);

2 - Spitting Cobras (*Spracklandus* Hoser, 2009) 23 MYA;

3 - African Non-spitting Cobras (*Wellsus* Hoser, 2009) 21 MYA;

4 - *Boulengerina* group (*Boulengerina* Dollo, 1886) 21 MYA.

*Wellsus* Hoser, 2009 is in fact a junior synonym for *Uraeus* Wagler, 1830 and so the latter name should be used for that group; as done within this paper.

Notwithstanding the last identified error in terms of the nomenclature of Hoser, 2009, the proposed classification of Hoser, 2009 remains the best fit model for the True Cobras and so is the basis of the higher-level nomenclature within this paper. This is especially when an attempt is made to have consistent genus-level classification across the Serpent genera.

In 2009, while conducting fieldwork and inspections of collections in Africa, it became apparent that one or more regional variants of the Forest Cobra *Boulengeria melanoleuca* (Hallowell, 1857), (also more widely known as *Naja melanoleuca* Hallowell, 1857) came in a number of apparently regionally distinct colour phases.

The best known variants were the so-called brown phase from South Africa and nearby and the so-called black-phase, with distinct labial bands from the forested areas of West and Central Africa, the distribution centre of the species as (then) recognized.

Inspection of large numbers of preserved specimens, live specimens and photos of live specimens from all known parts of the range of the taxon identified as "*Naja melanoleuca* Hallowell, 1857" showed a most significant division being that between those west of the Dahomey Gap (being essentially within Togo and Benin) and the nominate form found east of there, both being so-called black or dark forms.

While there were a number of trend differences between the two dark coloured forms identified by myself, the most obvious and consistent differences between the two forms is the colouration of the upper labial scales and also the size and shape of some of the head shields.

Due to the fact that the key traits separates those specimens West of the Dahomey Gap from all others found across a wide swathe of western, central and even into southern Africa, it is apparent that the western specimens do in fact consist of an undescribed species-level taxon being more divergent and distinct than all the rest.

On this basis I herein describe the new taxon as a species according to the Zoological Code (Ride *et al.* 1999) below.

Specimens of *B. melanoleuca* from South Africa and adjacent parts of Zimbabwe and Mozambique also have consistent differences in general body colouration, ventral markings and labial markings to those from further north, as well as different habitat preferences.

While the latter may in part be due to local environmental conditions as opposed to any other difference in terms of the snakes themselves, the physical differences between the said snakes is significant, and also worthy of recognition at the species level.

Like the population from west of the Dahomey Gap, this South African form does not have an available name under the Zoological Code (Ride *et al.* 1999).

As a result, this taxon is also formally named below as a new species, named *B. adelynhoserae sp. nov.* in accordance with the Zoological Code.

I should also comment that both newly named species herein fit within the more popular definitions of a species as accepted in zoology at the present time (see comments on the subject by Wilkins (2003, 2007, 2009a, 2009b, 2010) and sources cited therein.

The published material relevant to *Boulengeria melanoleuca* (Hallowell, 1857) and the newly described taxa below (identified until now as the former species) is extensive and relevant material in terms of these two and similar True Cobra species include the following: Barnett (2001), Barnett and Emms (2003), Böhme *et al.* (2001), Boulenger (1896, 1906), Branch (1993), Broadley (1959, 1962, 1968, 1991), Broadley and Cotterill (2004), Burger *et al.* (2004), Capocaccia (1961), Chifundera (1990), Chirio and Ineich (2006), Cimatti (2005), Dobiey and Vogel (2007), Fischer (1885), Gossmann *et al.* (2002), Haagner *et al.* (2000), Hallowell (1857), Hofer (2002), Hoogmoed (1980), Jackson (2008), Jackson and Blackburn (2007), Jackson *et al.* (2007), Jacobsen (2009), Jacobsen *et al.* (2010), Lanza (1990), Largen and Spawls (2010), Laurent (1955), Leaché *et al.* (2006), Loveridge (1929, 1936, 1956), Marias (2004), Marias and Jubbe (2010), Matschie (1893), Ota and Hikida (1987), Pauwels and David (2008), Pauwels and Vande Weghe (2008), Pauwels *et al.* (2002, 2007), Peters (1876), Rasmussen (1981), Rödel and Mahsberg (2000), Rödel *et al.* (1999), Schmidt (1923), Schmitz *et al.* (2000), Segniagbeto *et al.* (2011), Spawls *et al.* (2001), Trape and Mane (2000, 2004, 2006), Trape and Roux-Esteve (1995), Trape *et al.* (2009), Trutnau (1984), Tyron (1979), Wüster and Broadley (2003, 2007), Wüster *et al.* (2007), Yeomas (2011) and material cited therein.

***BOULENGERINA JACKYHOSERAE SP. NOV.***

**Holotype:** A specimen at the American Museum of Natural History, in New York, USA, specimen number: AMNH Herpetology 104366, from Grand Gedeh, Liberia, Africa. The American Museum of Natural History, in New York, USA is a government-owned facility that allows access to its specimens by scientists.

**Paratypes:**

Three specimens at the Museum of Comparative Zoology, Harvard, USA.

These are:

MCZ Herp R-51634 from 3 miles northeast of Suacoco, Gbanga, Liberia, Africa.
MCZ Herp R-51815 from Cuttington College, Suacoco, Liberia, Africa, and

MCZ Herp R-5709, from Cape Palmas, Liberia, Africa.

The Museum of Comparative Zoology, Harvard, USA is a facility that allows access to its specimens by scientists.

**Diagnosis:** Until now the species *Boulengeria jackyhoserae sp. nov.* would have been identified as a regional variant of the Forest Cobra *Boulengeria melanoleuca* (Hallowell, 1857), (also more widely known as *Naja melanoleuca* Hallowell, 1857) from West Africa in forested areas west of the Dahomey Gap, namely Ghana, Ivory Coast, Liberia and Sierra Leone.

*Boulengeria jackyhoserae sp. nov.* is most readily separated from the species *Boulengeria melanoleuca* (Hallowell, 1857) by obvious differences in upper (and lower) labial markings.

One of the diagnostic traits of *B. melanoleuca* is a barring of the labials. In this taxon the side of the head is a light brown colour. At the rear of each of the upper labials, number 2 and further back, there is a well defined section of black pigment on each labial giving the distinct barred appearance. The anterior part of each labial is however immaculate in terms of the light colouration.

By contrast in *B. jackyhoserae sp. nov.* the pigment at the rear of each upper labial is a dark brownish black as opposed to black. More importantly, and diagnostic for this species, the lighter pigment anterior to this is not immaculate. Instead there is extensive and very obvious flecking or peppering of the lighter sections of the labials, sometimes presenting as blotches or obvious marks. The same applies to the lower labials, although to a lesser extent.

The fore-belly of *B. melanoleuca* is immaculate and yellowish for a number of subcaudals (usually about 18-20) before being broken with an immaculate black crossband across the belly. By contrast in *B. jackyhoserae sp. nov.* there is intense dark speckling commencing on the first ventrals and intensifying, so that by ventral number 10, the belly has the appearance of being a dusky grey colour.

In common with *B. melanoleuca* from east of the Dahomey Gap, *B. jackyhoserae sp. nov.* is a mainly blackish coloured snake in terms of overall dorsal colouration.

However in *B. melanoleuca* from east of the Dahomey Gap and elsewhere the tip of the snout is light in colour, or rarely with a small number of well-defined dark flecks. By contrast *B. jackyhoserae sp. nov.* has a completely dark upper head and snout, or rarely peppered with lighter flecks towards the sides.

In *B. jackyhoserae sp. nov.* the prefrontals, rostral and first upper labials are all dark or dominantly dark in colour. The reverse is the case for *B. melanoleuca.*

Ventral and subcaudal counts for both species are similar and cannot be reliably used to differentiate the two species taxa.

However the configuration of the upper labial scales between the two species are consistently different.

Because of differences in the third and fourth upper labials in the two taxa, the fourth one presents quite differently in each.

In *B. melanoleuca* the fourth upper labial is more-or-less triangular in shape, versus more-or-less square in *B. jackyhoserae sp. nov.*. In *B. jackyhoserae sp. nov.* the seventh upper labial is usually broken into two, giving the species 8 supralabials, as opposed to 7 being the usual state in *B. melanoleuca.*

*B. adelynhoserae sp. nov.* (formerly classified as *B. melanoleuca* and formally described below) is most easily separated from the other two species by colouration of the labials and fore-body. To a large extent *B. adelynhoserae sp. nov.* lacks the labial barring seen in the other two species and dorsally is mainly brown in colour at the front half of the body, versus dark or black in the other two taxa.

*B. jackyhoserae sp. nov.*, *B. adelynhoserae sp. nov.* (described below) and *B. melanoleuca* are diagnosed by the following suite of characters: 19-21 dorsal mid-body rows, 201-214 ventrals, single anal, 63-72 divided subcaudals. 7 or 8 upper labials (see above), with numbers 3 and 4 entering the orbit. One or two pre-oculars, 3 postoculars (rarely 2), 8 lower labials and variable temporals.

*B. jackyhoserae sp. nov.*, *B. adelynhoserae sp. nov.* (described below) and *B. melanoleuca* are allopatric in distribution. *B. jackyhoserae sp. nov.* is found in the forested zone west of the Dahomey Gap, from Ghana, west and into Sierra Leone. *B. melanoleuca* is found East of the Dahomey Gap, including at least some of the forested areas within the Dahomey Gap, in an area stretching from Togo and Benin, east, through central Africa, including the main forested areas and as far east as Tanzania, extending south as far as Angola in the west. *B. adelynhoserae sp. nov.* is confined to a region including north-east South Africa and nearby parts of Zimbabwe and Mozambique.

**Distribution:** *B. jackyhoserae sp. nov*. is found in West Africa in forested areas west of the Dahomey Gap, including Ghana, Ivory Coast, Liberia and Sierra Leone.

**Etymology:** Named in honour of my younger daughter, Jacky Hoser, aged 12 as of 2013, for her immense efforts and work towards wildlife conservation and education in the first 12 years of her life, including volunteering to take bites from dozens of surgically devenomized snakes (venomoids) to shatter the deliberate lies of a number of animal haters, who were falsely claiming that these snakes had regenerated venom (see for example Coghlan 2008 or Jenkins 2012) and disseminating an added lie that “dry bites”, as in a bite from a venomous snake that does not inject venom are common in venomous snakes.

In terms of the latter lie, a number of people have believed the judgments of Coghlan and Jenkins, as widely posted by Wolfgang Wüster and other truth haters, subsequently failed to get treatment for venomous snake bites and died as a result. For case details see Hoser (2013).

As it happens, it was Jacky’s older sister, Adelyn, who in 2011 was videotaped taking bites from the said snakes in a public display at a shopping mall, the video being made by ourselves to shatter the obvious deliberate lie peddled by the animal hating truth haters.

Contrary to news reports, I can state as a matter of fact that my daughter Adelyn was not killed as reported on Melbourne radio (in 2013) from the venomoid snake bites. Contrary to news reports and material on a Wikipedia hate page edited by Wolfgang Wüster and others, Adelyn was not put in a coma as a result of the venomoid bites (Wüster *et al.* 2013).

In fact as would be expected, nothing happened.

Contrary to material on the Wikipedia hate page edited by Wolfgang Wüster and others, Adelyn was not in any way subject to trauma and suffering from the bites, bearing in mind that in her previous 12 years of life, she had been bitten by non-venomous reptiles many times and knew the pain was insignificant.

However I do note that Adelyn and Jacky were both traumatized after being unlawfully arrested at gunpoint twice in a week in August 2011 at the behest of corrupt Victorian Wildlife Officers in an attack strongly supported and endorsed by truth haters Wolfgang Wüster and Mark O’Shea (both of the UK) as posted on their Facebook blogs.

This included an illegal arrest of each young girl at gunpoint on one occasion in their own home and another when both were frogmarched out of their classrooms at school in front of the other similarly traumatized children.

***BOULENGERINA ADELYNHOSERAE SP. NOV.***

**Holotype:** Specimen number 50938 at the United States National Museum (USNM), Washington DC, United States of America, collected from Ubombo, ‘in the dry berth of the Umsundusi River’ at KwaZulu Natal, South Africa. The United States National Museum (USNM), Washington DC, United States of America is a government-owned facility that allows access to its specimens by scientists for study purposes.

**Paratype:** Specimen number 50939 at the United States National Museum (USNM), Washington DC, United States of America, collected from Ubombo, ‘in the dry berth of the Umsundusi River’ at KwaZulu Natal, South Africa. The United States National Museum (USNM), Washington DC, United States of America is a government-owned facility that allows access to its specimens by scientists for study purposes.

**Diagnosis:** The taxon *B. adelynhoserae sp. nov.* would as a matter of course have been diagnosed as *B. melanoleuca* until now. It is most easily separated from both *B. melanoleuca* and *B. jackyhoserae sp. nov.* by colouration, including the fact that there is reduced dark pigment on the top of the head, neck and fore-body, giving the snake a brownish colouration for the dorsal fore-body.

As a rule, specimens also lack the distinct labial bars running from the upper lip into the eye or top of the head, as seen in *B. melanoleuca* and *B. jackyhoserae sp. nov.*.

In some young specimens, the dark posterior (bar) of the fourth supralabial is markedly thicker than all others (which are effectively indistinct, in contrast to that in the other two species) and this one creates a thick line running to the bottom of the eye from the jawline in contrast to the other dark posterior sections (if present) and which are markedly thinner and do not reach the eye.

In *B. melanoleuca* and *B. jackyhoserae sp. nov*. the dark posterior parts of each supralabial beyond number two are of similar thickness to one another, or at least with two or more of the middle ones having dark areas of similar thickness and at least two or more dark strips entering the orbit or dark markings on the head.

In *B. adelynhoserae sp. nov.* the fore-body is light to medium brown with numerous dark flecks, intensifying as one moves posteriorly, so that the rear end of the snake is effectively reversed, being near black with just a few lighter brown flecks. In contrast to both *B. melanoleuca* and *B. jackyhoserae sp. nov*. there is no black pigment on the top of the head in front of the eye and these are the only other taxa likely to be confused with this newly named species.

In common with *B. jackyhoserae sp. nov*. the anterior ventrals of *B. adelynhoserae sp. nov.* have distinct peppering on the scales, but in this species the belly remains a brownish yellowish colour for most of its length, as opposed to being dark in colour a short distance from the beginning of the neck as seen in *B. jackyhoserae sp. nov.*.

*B. jackyhoserae sp. nov.* (described above), *B. adelynhoserae sp. nov.* (described here) and *B. melanoleuca* are diagnosed by the following suite of characters: 19-21 dorsal mid-body rows, 201-214 ventrals, single anal, 63-72 divided subcaudals. 7 or 8 upper labials (see above), with numbers 3 and 4 entering the orbit. One or two pre-oculars, 3 postoculars (rarely 2), 8 lower labials and variable temporals.

*B. jackyhoserae sp. nov.* (described above), *B. adelynhoserae sp. nov.* (described here) and *B. melanoleuca* are allopatric in distribution. *B. jackyhoserae sp. nov.* is found in the forested zone west of the Dahomey Gap, from Ghana, west and into Sierra Leone. *B. melanoleuca* is found East of the Dahomey Gap, including at least some of the forested areas within the Dahomey Gap, in an area stretching from Togo and Benin, east,

through central Africa, including the main forested areas and as far east as Tanzania, extending south as far as Angola in the west. *B. adelynhoserae sp. nov.* is confined to a region including north-east South Africa and nearby parts of Zimbabwe and Mozambique.

**Comment:** A number of internet sites identify the taxon *B. adelynhoserae sp. nov.* erroneously as *Naja melanoleuca subfulva*, including for example the following url:

http://www.venomstreet.com/Naja%20melanoleuca%20subfulva.htm (Ciuros 2013).

This is not the case. The taxon "*subfulva*" (Laurent, 1955) refers to a different animal with a type locality of Lwiro, Kivu, Zaire (in fact a variant of the same form as holotype *B. melanoleuca*). All other taxon names synonymised with *Naja melanoleuca*, do in fact refer to the main population of the species and so were not available for either species named within this paper.

I note that a large number of websites, including http://www.venomdoc.com (Fry *et al.* 2009) do provide erroneous information in this regard in terms of alleged species and subspecies relevant to *B. melanoleuca* and appropriate available names.

**Distribution:** *B. adelynhoserae sp. nov.* is confined to far north-eastern South Africa, near the coast (KwaZulu Natal) and adjacent parts of Mozambique and Zimbabwe, in two main population areas. In turn these appear to be isolated from the main population centre further north for the species *B. melanoleuca.*

**Etymology:** Named in honour of my eldest daughter, Adelyn Hoser, aged 14 as of mid 2013. See also for the etymology of *B. jackyhoserae sp. nov.* above.

**REFERENCES CITED**


Barnett, L. K. 2001. The herpetofauna of Abuko Nature Reserve, the Gambia. *Herpetological Bulletin* (77):5-1.

Barnett, L. K. and Emms, C. 2005. Common reptiles of The Gambia. Rare Repro, Hailsham, East Sussex:24 pp.

Böhme, W., Rödel, M., Brede, C. and Wagner, P. 2011. The reptiles (Testudines, Squamata, Crocodylia) of the forested southeast of the Republic Guinea (Guinée forestière), with a country-wide checklist. *Bonn zoological Bulletin* 60(1):35-61.

Boulenger, G. A. 1896. *Catalogue of the snakes in the British Museum, Vol. 3. London* (Taylor and Francis):xiv+727 pp.

Boulenger, G. A. 1906. Report on the reptiles collected by the late L. Fea in West Africa. *Ann. Mus. civ. Stor. Nat. Genova* (3)2:196-216.

Branch, W. R. 1993. *A Photographic Guide to Snakes and Other Reptiles of Southern Africa.* Cape Town: Struik Publishers:144 S.

Broadley, D. G. 1959. The herpetology of Southern Rhodesia. Part I:The snakes. *Bull. Mus. Comp. Zool. Harvard* 120(1):1-100.

Broadley, D. G. 1962. On some reptile collections from the North-Western and North-Eastern Districts of Southern Rhodesia 1958-1961, with descriptions of four new lizards. *Occ. Pap. Nat. Mus. South. Rhodesia* 26(B):787-843.

Broadley, D. G. 1968. A review of the African cobras of the genus *Naja* (Serpentes: Elapinae). Arnoldia (Rhodesia) (ser. 3) 29:1-14.

Broadley, D. G. 1991. The Herpetofauna of Northern Mwinilunga Distr., Northw. Zambia. *Arnoldia Zimbabwe* 9(37):519-538.

Broadley, D. G., Doria, C. T. and Wigge, J. 2003. *Snakes of Zambia. An Atlas and Field Guide.* Edition Chimaira, Frankfurt:280 pp.

Broadley, D. G. and Cotterill, F. P. D. 2004. The reptiles of southeast Katanga, an overlooked 'hot spot'. *African Journal of Herpetology* 53(1):35-61.

Burger, M., Branch, W. R. and Channing, A. 2004. Amphibians and Reptiles of Monts Doudou, Gabon: Species Turnover Along an Elevational Gradient. *California Academy of Sciences Memoir* 28:145-186.

Capocaccia, L. 1961. Contributo allo studio dei serpenti delle isole del Golfo di Guinea. *Ann. Mus. civ. Stor. nat. Genova,* 72:285-309.

Chifundera, K. 1990. Snakes of Zaire and their bites. *Afr. Stud. Monogr.* (Kyoto) 10(3):137-157.

Chirio, L. and Ineich, I. 2006. Biogeography of the reptiles of the Central African Republic. *African Journal of Herpetology* 55(1):23-59.

Ciuros, R. 2013. Venom street Naja m. subfulva. Url at: http://www.venomstreet.com/Naja%20

melanoleuca%20subfulva.htm downloaded on 4 March 2013.

Coghlan, A. 2008. Judgement: Hoser v Department of Sustainability and Environment (Occupational and Business Regulation) [2008] VCAT 2035 (30 September 2008).

Cimatti, E. 2005. Zanzibar - Zala Zoological Park. *Reptilia* (GB) (39):62-68.

Dobiey, M. and Vogel, G. 2007. *Venomous Snakes of Africa/ Giftschlangen Afrikas.* Terralog 15, Edition Chimaira, Frankfurt am Main:150 pp.

Fischer, J. G. 1885. Ichthyologische und herpetologische Bemerkungen. V. Herpetologische Bemerkungen. *Jahrb. Hamburg. Wiss. Anst.* 2:82-121.

Fry, B. G. 2009. Cobra's. Website posts from 2009 at: http://www.venomdoc.com/forums/viewtopic.php?p=26572&sid=72c44ae01

d91c2a652fc9a29f4e1a433 downloaded on 4 March 2013.

Gossmann, V., Lötters, S., Obame, F. and Böhme, W. 2002. Zur Herpetofauna Gabuns. Teil II: Kommentierte Artenliste der gefundenen Reptilien, Bemerkungen zur Artenvielfalt. *Herpetofauna* 24(136):19-33.

Haagner, G. V., Branch, W. R. and Haagner, A. J. F. 2000. Notes on a collection of reptiles from Zambia and adjacent areas of the Democratic Republic of the Congo. *Annals of the Eastern Cape Museum* 1:1-25.

Hallowell, E. 1857. Notes of a collection of reptiles from the Gaboon country, West Africa, recently presented to the Academy of Natural Sciences of Philadelphia, by Dr. Herny A. Ford. *Proc. Acad. Nat. Sci. Philadelphia* 9:48-72.

Hofer, D. 2002. *The São Tomé and Principé Handbook.* D. Hofer Verlag, Bern:152 pp.

Hoogmoed, M. S. 1980. Herpetologische waarnemingen in Ghana. *Lacerta* 38(9):88-95.

Hoser, R. T. 2009. A reclassification of the True Cobras; species formerly referred to the genera *Naja*, *Boulengerina* and *Paranaja. Australasian Journal of Herpetology* 7:1-15.

Hoser, R. T. 2013. The science of herpetology is built on evidence, ethics, quality publications and strict compliance with the rules of nomenclature. *Australasian Journal of Herpetology* 18:2-79.

Jackson, K. 2008. *Mean and lowly things:Snakes, Science, and Survival in the Congo.* Harvard University Press:336 pp.

Jackson, K. and Blackburn, D. C. 2007. The amphibians and reptiles of Nouabale-Ndoki National Park, Republic of Congo (Brazzaville). *Salamandra* 43(3):149-164.

Jackson, K., Zassi-Boulou, A., Mavoungou, L. and Pangou, S. 2007. Amphibians and Reptiles of the LacTélé Community Reserve, Likouala Region, Republic of Congo (Brazzaville). *Herp. Cons. Biol.* 2(2):75-86.

Jacobsen, N. H. G. 2009. A contribution to the herpetofauna of the Passendro Area, Central African Republic. *Afr. Herp News* (47):2-20.

Jacobsen, N. H. G., Pietersen, E. W. and Pietersen, D. W. 2010. A preliminary herpetological survey of the Vilanculos Coastal Wildlife Sanctuary on the San Sebastian Peninsula, Vilankulo, Mozambique. *Herpetology Notes* 3:181-193.

Jenkins, P. 2012. Judgement: Hoser v The Department of Sustainability and Environment (Occupational and Business Regulation) [2012] VCAT 264 (9 March 2012).

Lanza, B. 1990. Amphibians and reptiles of the Somali Democratic Republic: check list and biogeography. *Biogeographia*, 14:407-465.

Largen, M. J. and Spawls, S. 2010. *Amphibians and Reptiles of Ethiopia and Eritrea*. Edition Chimaira, Frankfurt:694 pp.

Laurent, R. F. 1955. Diagnoses preliminaires des quelques Serpents venimeux. *Rev. Zool. Bot. Afr*., 51:127-139.

Leaché, A. D., Rödel, M. O., Linkem, C. W., Diaz, R. E., Hillers, A. and Fujita, M. K. 2006. Biodiversity in a forest island: reptiles and amphibians of the Togo Hills, Kyabobo National Park, Ghana Amphibian and Reptile Conservation 4(1):22-45.

Loveridge, A. 1929. East African reptiles and amphibians in the United States National Museum. *Bull. US Natl. Mus*. (151):1-135.

Loveridge, A. 1936. African reptiles and amphibians in the Field Museum of Natural History. *Zool. Ser. Field Mus. Nat. Hist., Chicago*, 22(1):1-122.

Loveridge, A. 1956. On snakes collected in the Anglo-Egyptian Sudan by J.S. Owen, Esq. *Sudan Notes Rec*. 36:37-56.

Marias, J. 2004. *A Complete Guide to Snakes of Southern Africa*. South Africa: Struik Publishers:312 pp.

Marias, J. and Jubbe, W. 2010. *Naja melanoleuca* (Hallowell, 1857) *Afr. Herp News* (52):24-25.

Matschie, M. 1893. Mitth. *Deutsch. Schutzgeb.*, 6:214.

Ota, H. and Hikida, T. 1987. On a small collection of lizards and snakes from Cameroon, West Africa. *African Study Monographs* 8(2):111-123.

Pauwels, O. S. G. and David, P. 2008. Miscellanea Herpetologica Gabonica I. *Hamadryad* 32 (1):13-18.

Pauwels, O. S. G. and Vande Weghe, J. P. 2008. *Les reptiles du Gabon.* Smithsonian Institution, Washington:272 pp.

Pauwels, O. S. G., Kamdem Toham, A. and Chimsunchart, C. 2002. Recherches sur l'herpétofaune du Massif du Chaillu, Gabon. *Bull. Inst. Roy. Sci. Nat. Belgique* (*Biologie*) 72:47-57.

Pauwels, O. S. G., Albert, J. L., Vande Weghe, G. and Gramentz, D. 2007. Neue Reptiliennachweise von Franceville, Südost-Gabun. *Elaphe* 15(3):63-66.

Peters, W. C. H. 1876. Eine zweite Mittheilung über die von Hrn. Professor Dr. R. Buchholz in Westafrica gesammelten Amphibien. *Monatsber. königl. Akad. Wiss. Berlin* 1876 (Februar):117-123.

Rasmussen, J. B. 1981. The snakes from the rainforest of the Usambara Mountains, Tanzania: a checklist and key. *Salamandra* 17(3/4):173-188.

Ride, W. D. L. (ed.) *et al.* (on behalf of the International Commission on Zoological Nomenclature) 1999. *International code of Zoological Nomenclature*. The Natural History Museum, Cromwell Road, London, SW7 5BD, UK (also commonly cited as "ICZN 1999").

Rödel, M. O. and Mahsberg, D. 2000. Vorläufige Liste der Schlangen des Tai-Nationalparks/Elfenbeinküste und angrenzender Gebiete. *Salamandra* 36(1):25-38.

Rödel, M. O., Kouadio, K, and Mahsberg, D. 1999. Die Schlangenfauna des Comoé-Nationalparks, Elfenbeinküste: Ergänzungen und Ausblick. *Salamandra* 35(3):165-180.

Schmidt, K. P. 1923. Contributions to the herpetology of the Belgian Congo based on the collection of the American Museum Congo Expedition, 1909-1915. Part II. Snakes, with field notes by Herbert Lang and James P. Chapin. *Bull. Amer. Mus. nat. Hist.* 49(1):1-146.

Schmitz, A., Euskirchen, O. and Böhme, W. 2000. Zur Herpetofauna einer montanen Regenwaldregion in SW-Kamerun (Mt. Kupe und Bakossi-Gergland).III. Einige bemerkenswerte Vertreter der Familien Lacertidae, Scincidae, Varanidae, Elapidae und Viperidae. *Herpetofauna* 22(124):16-27.

Segniagbeto, G. H., Trape, J. F., David, P., Ohler, A., Dubois, A. and Glitho, I. A. 2011. The snake fauna of Togo: systematics, distribution and biogeography, with remarks on selected taxonomic problems. *Zoosystema* 33 (3): 325-360.

Spawls, S., Howell, K., Drewes, R. C. and Ashe, J. 2001. *A field guide to the reptiles of East Africa*. Academic Press:543 pp.

Trape, J. -F. and Mane, Y. 2000. Les serpents des environs de Dielmo (Sine-Saloum, Sénégal). *Bull. Soc. Herp. France* 95:19-35.

Trape, J. -F. and Mane, Y. 2004. Les serpents des environs de Bandafassi (Sénégal oriental). *Bull. Soc. Herp. France* 109:5-34.

Trape, J. -F. and Mane, Y. 2006. Guide des serpents d'Afrique occidentale. Savane et désert. IRD Editions, Paris:226 pp.

Trape, J. -F. and Roux-Esteve, R. 1995. Les serpents du Congo: liste commentée et clé de détermination. *Journal of African Zoology* 109(1):31-50.

Trape, J. F., Chirio, L., Broadley, D. G. and Wüster, W. 2009. Phylogeography and systematic revision of the Egyptian cobra (Serpentes: Elapidae: *Naja haje*) species complex, with the description of a new species from West Africa. *Zootaxa* 2236:1-25.

Trutnau, L. 1984. Erfahrungen bei der Pflege und Nachzucht von zwei afrikanischen Naja-Arten: der Schwarzweißen Hutschlange *Naja melanoleuca* Hallowell, 1857 und der Kapkobra *Naja nivea* (Linnaeus, 1758). *Herpetofauna* 6(31):15-26.

Tryon, B. W. 1979. Reproduction in Captive Forest Cobras, *Naja melanoleuca* (Serpentes: Elapidae). *Journal of Herpetology* 13(4):499-504.

Wilkins, J. S. 2003. How to be a chaste species pluralist-realist: The origins of species modes and the Synapomorphic Species Concept. *Biology and Philosophy* 18:621-638.

Wilkins, J. S. 2007. The Concept and Causes of Microbial Species. Studies in History and Philosophy of the Life Sciences. *History and Philosophy of the Life Sciences*, 28:389-408.

Wilkins, J. S. 2009. *Species: a history of the idea, Species and Systematics*. Berkeley: University of California Press.

Wilkins, J. S. 2009. *Defining species: a sourcebook from antiquity to today*, *American University Studies. V, Philosophy.* New York: Peter Lang.

Wilkins, J. S. 2010. What is a species? Essences and generation. *Theory in Biosciences*, 129:141-148.

Wüster, W. and Broadley, D. G. 2003. A new species of spitting cobra (*Naja*) from north-eastern Africa (Serpentes: Elapidae). *Journal of Zoology* 259:345-359.

Wüster, W. and Broadley, D. G. 2007. Get an eyeful of this: a new species of giant spitting cobra from eastern and north-eastern Africa (Squamata: Serpentes: Elapidae: *Naja*). *Zootaxa* 1532:51-68.

Wüster, W., Crookes, S., Ineich, I., Mané, Y., Pook, C. E. and Trape, J. F. 2007. The phylogeny of cobras inferred from mitochondrial DNA sequences: Evolution of venom spitting and the phylogeography of the African spitting cobras (Serpentes: Elapidae: *Naja nigricollis* complex). *Molecular Phylogenetics and Evolution* 45:437-453.

Wüster *et al.* 2013. Raymond Hoser. Webpage at: http://en.wikipedia.org/wiki/Raymond_Hoser downloaded on 12 February 2013.

Yeomas, L. 2011. Die Schwarzweiße Kobra, *Naja melanoleuca*. Teil 1. Reptilia (Münster) 16 (89):35-38.

**CONFLICT OF INTEREST**

The author has no conflicts of interest in terms of this paper or conclusions within.

**Hard copy of this paper was first published on 10 July 2013.**

*Australasian Journal of Herpetology* 20:8-10.
Published 10 July 2013.

ISSN 1836-5698 (Print)
ISSN 1836-5779 (Online)

# A new subspecies of Rinkhals *Hemachatus haemachatus* (Bonnaterre, 1790) from Southern Africa. (Serpentes: Elapidae).

**RAYMOND T. HOSER**

**488 Park Road, Park Orchards, Victoria, 3134, Australia.**
***Phone*: +61 3 9812 3322 *Fax*: 9812 3355 *E-mail*: snakeman@snakeman.com.au**
**Received 2 May 2013, Accepted 15 June 2013, Published 10 July 2013.**

## ABSTRACT

The dangerously venomous Rinkhals *Hemachatus haemachatus* (Bonnaterre, 1790) of South Africa and upland areas of the Zimbabwe and Mozambique border area are well-known to herpetologists and are commonly kept captive in herpetoculture. For many years regional variants have been known, the most obvious differences between areas being colouration. However until now, no one has quantified consistent differences between the forms.

The two main population groups are the dominantly dark and greyish forms from the south and upland areas of South Africa, including the inland plateau, and the generally reddish and/or heavily banded forms from the coastal north east of South Africa including nearby hills and those from the Zimbabwe/Mozambique border area.

Using consistent head-scale characteristics the two groups are divided. The generally reddish and usually well banded form is herein formally named as a new subspecies according to the Zoological Code (Ride *et al.* 1999).

**Keywords:** Taxonomy; Rinkhals; *Hemachatus*; *haemachatus*; new subspecies; *macconchiei.*

### INTRODUCTION

The dangerously venomous Rinkhals *Hemachatus haemachatus* (Bonnaterre, 1790) are an icon elapid of the cooler, wetter and non-arid parts of South Africa and upland areas of the Zimbabwe and Mozambique border area.

Endemic to the region, they are common in the east and north-east of South Africa (their stronghold) and get rarer as one moves west in their range to Cape Town, where they are now regarded as uncommon, having allegedly declined in number there in the latter part of the 1900's (Smith 2011).

These snakes are common in built up areas of cities such as Johannesburg where they shelter in rubbish piles and the like (Smith 2011).

They are well-known to herpetologists and are commonly kept captive. For many years regional variants have been known, the most obvious differences between areas being colouration. However due the degree of colour variation even within a small area, and at times even within a single litter of snakes, people have until now been unable to quantify consistent differences between the forms.

The two main population groups are the dominantly dark and greyish forms from the south and upland areas of South Africa, including the inland plateau, and the generally reddish and banded forms from the coastal north east of South Africa including nearby hills and those from the Zimbabwe/ Mozambique border area.

Using consistent head-scale characteristics the two groups are divided with the generally reddish and banded forms herein formally named as a new subspecies according to the Zoological Code (Ride *et al.* 1999).

The decision to inspect specimens of the species from across their range was made in 2009, when I was doing fieldwork in South Africa. At that time I found and/or was shown typical south-west specimens of the generally greyish and dull morph as well as the brighter banded forms from the north-east of South Africa.

It soon became apparent that these different forms were found in well-defined regions and so I set about examining specimens to ascertain differences between colouration as well as looking for specimens that may be deemed "intermediate" in form or colour.

Specimens intermediate in form were found, but invariably they had been born as a result of captive matings.

I did not however find any wild snakes that appeared to be intermediate in form, although a number of local snake collectors assured me that because distribution between the two forms was continuous, intermediates must in fact exist.

Due to fading of museum specimens and general deterioration, they did not make good subjects for examination in terms of determining colour differences.

Notwithstanding this difficulty, what did emerge upon examination of large numbers of live animals, dead animals and photos with good accurate locality data was consistent trends in the differences in head scalation between regional variants.

In summary, I did not agree with the widely put proposition that the north-eastern form was a different species at that level.

However there was no doubt that it did in fact deserve formal taxonomic recognition which is what is done herein at the subspecies level according to the Zoological Code (Ride *et al.* 1999). The taxon is defined according to the criteria given below.

The need for taxonomic recognition of this variant of the Rinkhl is heighted by the fact that captive breeding of these snakes by hobbyists will only aid conservation efforts if gene pools are kept intact and divergent genetic lineages are kept that way.

Besides inspection of numerous specimens, I also drew upon advice from herpetologists in South Africa and Zimbabwe as well as reviewing important literature on this species.

Important references in terms of the species *Hemachatus haemachatus* (Bonnaterre, 1790) and the taxonomy of it include Alexander *et al.* (2012), Bonnaterre (1789, 1790), Boulenger (1887), Boycott (1992), Branch (1993), Broadley (1962), Ditmars (1911), Dobiey and Vogel (2007), Duméril *et al.* (1854), Gadow (1909), Golay *et al.* (1993), Haagner (1991), Hallermann (2006), ICZN (2005), Lacepède (1789), Marias (2004), McDiarmid *et al.* (1999), Merrem (1820), Schmidt (2012), Smith (1826), Smith (2011), Spawls and Branch (1995), Sternfeld (1910), Winchell (2011), and sources cited therein.

***HEMACHATUS HAEMACHATUS MACCONCHEI SUBSP. NOV.***

**Holotype:** A specimen at the California Academy of Science (CAS) specimen number: CAS HERP 156718, from Rosetta, KwaZulu-Natal, South Africa. The California Academy of Science is a government-owned facility that allows access to specimens by scientists.

**Diagnosis:** *Hemachatus haemachatus macconchei subsp. nov.* is separated from the nominate subspecies *Hemachatus h. haemachatus* by colouration in that with the exclusion of up to three ventral crossbands on the forebelly, the lighter crossbars on the back do not extend onto the belly as usually seen in the nominate subspecies.

Generally in *Hemachatus h. macconchei subsp. nov.* the colouration is yellow to reddish-brown with chocolate-brown crossbands, or occasionally simply light reddish-brown with indistinct darker crossbands, this being an amelanistic form that is common in some locations.

By contrast, *Hemachatus h. haemachatus* is generally olive, greyish, greyish-brown to nearly black, with darker dorsal crossbands, which are often indistinct, or less often with somewhat indistinct white crossbands.

One variant of *Hemachatus h. haemachatus* is a whitish-grey form, common in the Johannesburg area.

*Hemachatus h. macconchei subsp. nov.* is also separated from the nominate subspecies by head scalation. In *Hemachatus h. haemachatus* the second supralabial is triangular at the top. This is not the case for *Hemachatus h. macconchei subsp. nov.* where the apex is noticeably chopped with a smallish bite-mark (not quite a "C'" shape at the top) in terms of the shaping of the upper part of the scale. In *Hemachatus h. macconchei subsp. nov.* the third supralabial widens considerably at the top. In *Hemachatus h. haemachatus* the widening is only slight.

In *Hemachatus h. macconchei subsp. nov.* the top anterior temporal is noticeably oval to rectangular in shape, versus a squareish shape in *Hemachatus h. haemachatus* .

In *Hemachatus h. macconchei subsp. nov.* the anterior prefrontals are markedly larger than the posterior pair. By contrast, in *Hemachatus h. haemachatus* the difference is only slight.

Both *Hemachatus h. macconchei subsp. nov.* and *Hemachatus h. haemachatus* are defined by the following suite of characters: Adults average a metre, but specimens more than 1.5 metres occur.

The dorsal scales are keeled with 17-19 dorsal mid-body rows, 116-150 ventrals, single anal and 30-47 divided subcaudals. There are 7 supralabials with numbers 3 and 4 entering the eye and 7-9 lower labials; 1 (rarely 2) preoculars, 3 postoculars, the middle being the largest. Temporals are 2+3, 2+2 or 2+4.

Colour is variable, but is usually olive to dark brown or dull black above in *Hemachatus h. haemachatus* usually with indistinct or occasionally whitish irregular cross-bands.

In *Hemachatus h. macconchei subsp. nov.* the colour is variable, but usually with distinct irregular cross-bands of yellow, orange, pink or red, and upper bands do not extend on the belly beyond the distinct bands across the fore body, or occasionally simply light reddish-brown with indistinct darker cross-bands, this being an amelanistic form that is common in some locations.

**Distribution:** *Hemachatus h. macconchei subsp. nov.* is found in KwaZulu-Natal and the Eastern Cape of South Africa and also the cool hilly zone on the Zimbabwe/Mozambique border.

The nominate form is found in most other parts of South Africa, except the arid north-west.

**Etymology:** The subspecies is named in honour of Donvale, Victoria, Australia lawyer, Lachlan McConchie for his public interest legal work, often going beyond the call of duty or financial gain to assist in public benefit court cases. This includes cases where corruption whistleblowers were being attacked by the corrupt government departments exposed by the whistleblowers via frivolous and vexatious legal proceedings designed to bankrupt and discredit the whistleblowers.

In 2012-2013 he defended a group of activists who were improperly facing criminal charges after publicly exposing Victorian wildlife officers employed by the Department of Sustainability and Environment (DSE) for illegally killing endangered ducks by recklessly shooting them on farmland near the Murray River of Northern NSW.

The activists had rescued the ducks that had been shot and left to die in agony by drunken Department of Sustainability and Environment (DSE) employees who were being paid to stop poaching of native wildlife.

Instead these individuals went on a drunken rampage shooting killing the wildlife they were supposed to be protecting and at the same time putting the lives of local farm workers at risk from death by being hit by stray bullets.

After filming the incident, the activists were charged with a series of bogus wildlife offences themselves in a case which saw McConchie defending them.

Also in early 2013, on 14 February, two other DSE employees, Katie Peters and Steven Kadar killed themselves when hooning about in taxpayer funded DSE motor vehicle while supposedly on firefighting duty, at Harrietville also in northern Victoria.

Of course the failure of DSE management to protect the safety of their own staff is a culpable criminal offence, but no one from the government would ever charge their own for "industrial manslaughter" or "workplace manslaughter" as the charge is known, as would have been the case had such an incident occurred in a non-government workplace.

In March 2012 the same DSE bureaucrats responsible for the deaths detailed above, did in conjunction with a corrupt VCAT Judge Pamela Jenkins, close down the reptile education business, Snakebusters.

These people falsely alleged Raymond Hoser and the company were unsafe.

In June 2012, two Supreme Court judges overturned the illegal DSE action, noting at the time the perfect safety record of Snakebusters and further that Snakebusters were alone in the venomous snake education business able to guarantee safety of all, as only Hoser and the company had the expertise to have devenomized (venomoid) snakes (Nettle and Buchanan, 2012).

On 7 February 2009, DSE and the associated government entity, called the Country Fire Authority, or "CFA", were directly culpable for most of the 172 deaths arising from the man-made bushfire disaster known as "Black Saturday".

No one from either government department was charged or

punished in any way over their role in the massacre and the series of events causing it.

In 2013, and in order to "re-badge" a government department which in Victoria had a reputation worse than that of Hitler's Nazi's, the minister in charge, Ryan Smith presided over a name-change to "Department of Environment and Primary Industries" or DEPI, so that he could allege that the corrupt and badly managed DSE had been shut down.

Of course the staff and running of the new department were unchanged from the former. All they did was change the signage!

**LITERATURE CITED**


Alexander, G., Shirley, J., Hanrahan, A. and Mitchell, D. 2012. Assimilation efficiency and gut passage time in an African elapid snake, *Hemachatus haemachatus African Journal of Herpetology* 61(1):3-13.

Bonnaterre, P. J. 1789. *Tableau encyclopédique et méthodique des trois règnes de la nature, . . . Erpétologie*. Panckoucke, Paris, xxviii+71 pp.

Bonnaterre, P. J. 1790. *Ophiologie, in Tableau encyclopédique et méthodique des trois règnes de la nature.* Panconoke, Paris, XLIV+76 pp+43 plates

Boulenger, G. A. 1887. Synopsis of the snakes of South Africa. *The Zoologist*, London, (3)11:171-182.

Boycott, R. C. 1992. *An Annotated Checklist of the Amphibians and Reptiles of Swaziland*. The Conservation Trust of Swaziland, 1992; online at http://www.sntc.org.sz/checklst/sdreptam.html.

Branch, W. R. 1993. *A Photographic Guide to Snakes and Other Reptiles of Southern Africa.* Struik Publishers, Cape Town, South Africa:144 S.

Broadley, D. G. 1962. On some reptile collections from the North-Western and North-Eastern Districts of Southern Rhodesia 1958-1961, with descriptions of four new lizards. *Occ. Pap. Nat. Mus. South. Rhodesia* 26(B):787-843.

Ditmars, R. L. 1911. Reptiles of all lands. *National Geographic* 22(7):601-633.

Dobiey, M. and Vogel, G. 2007. *Venomous Snakes of Africa/ Giftschlangen Afrikas. Terralog 15*, Edition Chimaira, Frankfurt am Main, Germany:150 pp.

Duméril, A. M. C., Bibron, G. and Duméril, A. H. A., 1854. *Erpétologie générale ou histoire naturelle complète des reptiles. Tome septième. Deuxième partie, comprenant l'histoire des serpents venimeux*. Paris, Librairie Encyclopédique de Roret: i-xii + 781-1536

Gadow, H. 1909. *Amphibia and Reptilia.* MacMillan, London:668 pp.

Golay, P., Smith, H. M., Broadley, D. G., Dixon, J. R., McCarthy, C., Rage, J. C., Schatti, B. and Toriba, M. 1993. *Endoglyphs and other major venomous snakes of the world. A checklist.* Aire-Genève, Azemiops S. A. Herpetological Data Center: i-xv+1-478.

Haagner, G. V. 1991. Life History Note: *Hemachatus haemachatus*: Reproduction. *Jour. Herp. Ass. Afr.* (39):26-26.

Hallermann, J. 2006. Die von LACEPEÌDE (1756-1825) in die Herpetologie eingefu¨hrten Taxa und ihr Schicksal. *Sekretär* 6(2):26-29.

ICZN 2005. Opinion 2104 (Case 3226). Lacepède, B. G. É. de la V., 1788, Histoire Naturelle des Quadrupèdes Ovipares: rejected as a non-binominal work. *Bulletin of Zoological Nomenclature* 62(1).

Lacepède, B. G. E. 1789. *Histoire Naturelle des Quadrupèdes Ovipares et de Serpens. Vol.2*. Imprimerie du Roi, Hôtel de Thou, Paris:671 pp.

Marias, J. 2004. *A complete guide to the snakes of southern Africa*. Struik, South Africa:312 pp.

McDiarmid, R. W., Campbell, J. A. and Touré, T. A. 1999. *Snake species of the world. Vol. 1.* Herpetologists' League:511 pp.

Merrem, B. 1820. *Versuch eines Systems der Amphibien I (Tentamen Systematis Amphibiorum).* J. C. Kriegeri, Marburg:191 pp.

Nettle, G. A. A. and Buchanan, P. 2012. Judgement, Hoser V Department of Sustainability and Environment and Pamela Jenkins (Victorian Civil and Administrative Tribunal), 8 June.

Ride, W. D. L. (ed.) *et al.* (on behalf of the International Commission on Zoological Nomenclature) 1999. *International code of Zoological Nomenclature*. The Natural History Museum - Cromwell Road, London SW7 5BD, UK (also commonly cited as "ICZN 1999").

Schmidt, D. 2012. Giftbisse von giftigen und „harmlosen" Schlangen. Teil 1. Terraria *Elaphe* 2012(2):78-82.

Smith, A. 1826. On the snakes of Southern Africa. *Edinburgh New Philos. J.* 1:248-254.

Smith, G. 2011. The status of the Rinkhals *Hemachatus haemachatus* in the city of Cape Town metropolitan area, Western Cape, South Africa. *Afr. Herp News* (53):13-16.

Spawls, S. and Branch, B. 1995. *The Dangerous Snakes of Africa*. Blandford, London:192 pp.

Sternfeld, R. 1910. Die Fauna der deutschen Kolonien: Die Schlangen Deutsch-Südwestafrikas. Berlin, R. Friedländer and Sohn:45 pp.

Winchell, S. 2011. Kobras. *Reptilia* (Münster) 16(89):16-22.


**CONFLICT OF INTEREST**

The author has no conflicts of interest in terms of this paper or conclusions within.


## *Australasian Journal of Herpetology*

Publishes original research in printed form in relation to reptiles, other fauna and related matters, including the subjects of classification, ecology, public interest, legal, captivity, exposure of frauds, "academic misconduct", etc. It is a peer reviewed printed journal published in hard copy for permenant public scientific record in accordance with the Zoological Code (Ride *et al.* 1999), with a sizeable print run and has a global audience.

Full details of acquiring copies, either printed or in identical form online, editorial policies, publication procedure, author submission guidelines, peer review guidelines, legal matters, advantages of publication in this journal and the like can be found by following links from:

http://www.herp.net

**Published by Kotabi Pty Ltd**
**PO Box 599,**
**Doncaster, Victoria, 3108.**
**Australia.**

**ISSN 1836-5698 (Print)**
**ISSN 1836-5779 (Online)**




**Online journals (this issue) do not appear for a month after the actual and listed publication date of the printed journals. Minimum print run of first printings is always at least fifty hard copies.**

*Australasian Journal of Herpetology* **20:11-19.**
**Published 10 July 2013.**

**ISSN 1836-5698 (Print)**
**ISSN 1836-5779 (Online)**

# A further division of the African Burrowing Asps, *Atractaspis* Smith 1849 with the erection of a new genus and two new subgenera.

**RAYMOND T. HOSER**

**488 Park Road, Park Orchards, Victoria, 3114, Australia.**
***Phone*: +61 3 9812 3322 *Fax*: 9812 3355 *E-mail*: snakeman@snakeman.com.au**
**Received 28 April 2013, Accepted 12 May 2013, Published 10 July 2013.**

**ABSTRACT**

The so-called Burrowing Asps or Mole Vipers, Atractaspididae Günther, 1858 are endemic to Africa and the Middle-east. As of early 2012, all were placed within a single genus *Atractaspis* Smith, 1849.

However Hoser (2012b) used morphological and molecular data to remove species with smaller dorsal scales and a divergent venom apparatus (*microlepidota* and *andersoni*) from the genus and place them into a new genus *Hoseraspea*, Hoser, 2012.

The genus *Atractaspis* as defined as of start 2013 consists of about 20 recognized species, including quite morphologically diverse forms.

This paper now removes other divergent species from *Atractaspis*, based on both molecular and morphological evidence, placing them into the genus *Georgekonstandinouous gen. nov.* in turn placed in a new tribe Georgekonstandinouiini *tribe nov*., being within the family Homoroselapidae Hoser, 2012, thereby necessitating a redefinition of the family Homoroselapidae and tribe Homoroselapiini Hoser, 2012 (Hoser, 2012a), as well as refinement to the diagnosis for the family Atractaspididae.

*Georgekonstandinouous gen. nov.* is further divided in three, with the creation of the subgenera *Slatteryaspus subgen. nov.* and *Wellingtonaspus subgen. nov*.

The species *Atractaspis boulengeri* Mocquard, 1897, is divergent relative to the remaining species within the genus, both morphologically and based on molecular studies. As a result it is placed in a new subgenus *Benjaminswileus subgen. nov.*.

The divergent species *A. duerdeni* Gough, 1907 is also placed in a monotypic subgenus *Lowryus subgen. nov.*.

All new taxon groups are defined according to the Zoological Code (Ride *et al.* 1999).

The species *A. engaddensis* Haas, 1950; *A. fallax* Peters, 1867; *A. magrettii* Scortecci, 1928; *A. phillipsi* Barbour, 1913; *A. watsoni* Boulenger, 1908 are transferred to *Hoseraspea* Hoser, 2012.

While as a result of the actions within this paper about 10 species remain within *Atractaspis* Smith, 1849, further investigations may lead to a further re-arrangement of the genus in the future both in terms of generic placement of existing species and also potential recognition and/or descriptions of similar species.

**Keywords:** Taxonomic revision; Atractaspididae; Homoroselapide*; Atractaspis;* new tribe; Georgekonstandinouiini; Homoroselapiini; new genus; *Georgekonstandinouous*; new subgenus; *Slatteryaspus; Wellingtonaspus*; *Benjaminswileus; Lowryus*; species; *microlepidota; andersoni; Hoseraspea*; Hoseraspini*;* Atractaspidini; *bibroni; boulengeri*; *duerdeni*; *irregularis*; *battersbyi*; *congica*; *engdahli; reticulata*; asp; small-scaled burrowing asp; burrowing asp; stiletto snake; mole viper; side-stabbing snake; harlequin snake.



**INTRODUCTION**

The so-called Burrowing Asps or Mole Vipers, Atractaspididae are endemic to Africa and the Middle-east. As of early 2012, all were placed within a single genus, *Atractaspis* Smith, 1849.

However Hoser (2012b) used morphological and molecular data as cited within the paper as a basis to remove the highly divergent two species with smaller dorsal scales and a divergent venom apparatus (*microlepidota* and *andersoni*) from the genus and place them into a new genus *Hoseraspea* Hoser, 2012.

The genus *Atractaspis* Smith, 1849 as defined at the time preceding publication of this paper, consisted/consists of about 20 recognized species, including quite morphologically diverse forms.

Published studies relevant to the taxonomy of the genus

*Atractaspis* as widely recognized, include Auerbach (1987), Bauer *et al.* (1995), Boulenger (1896, 1897, 1901, 1905a, 1905b, 1908, 1910), Bourgeois (1968), Branch (1993), Broadley (1991a, 1991b, 1998), Broadley *et al.* (2003), Cadle (1994), Chifundera (1990), Chippaux (2006), Chirio and Ineich (2006), Chirio and Lebreton (1997), Corkill, and Kirk, (1954), Deufel and Cundall (2003), de Witte (1959), Dobiey and Vogel (2007), Duméril *et al.* (1854), Gough (1907), Gravlund (2001), Griffin *et al.* (1989), Günther (1866, 1872, 1888), Kochva (2002), Kochva *et al.* (1967), Kurnic, *et al.* (1999), Lanza (1990), Largen and Spawls (2010), Laurent (1945, 1950, 1956), Lönnberg and Andersson (1913), Minton (1968), Mocquard (1897), Moyer and Jackson (2011), Pauwels and Mierte (1996), Pauwels and Vande weghe (2008), Perret (1960, 1961), Peters (1877), Pfeffer (1893), Pyron *et al.* (2011, 2013), Rasmussen and Hughes (1896), Reinhardt (1843), Schmidt (1923, 1943), Segniagbeto *et al.* (2011), Shine *et al.* (2006), Sjöstedt (1896), Smith (1849), Spawls and Branch (1995), Spawls *et. al.* (2001), Trape and Roux-Esteve (1995), Trape *et al.* (2006), Underwood and Kochva (1993), Wagner *et al.* (2009), Warrall, *et al.* (1976), Werner (1897, 1899), sources cited within and others. Between them, their evidence provided a compelling argument to remove the species-level taxa *Atractaspis microlepidota* Günther, 1866 and the closely related *A. andersonii* Boulenger, 1905 (long regarded as a subspecies of the former) from genus *Atractaspis* (type species being *A. inornatus* Smith 1849, a synonym of *A. bibroni*) and this was in fact done by Hoser (2012b), with the creation of the new genus *Hoseraspea* Hoser, 2012.

Inadvertently the similar taxa *A. engaddensis* Haas, 1950, *A. fallax* Peters, 1867, *A. magrettii* Scortecci, 1928, *A. phillipsi* Barbour, 1913 and *A. watsoni* Boulenger, 1908 at times regarded as a synonyms of *H. microlepidota* (Günther, 1866) were left in *Atractaspis* by Hoser (2012b) and so are transferred to the new genus (*Hoseraspea* Hoser, 2012) herein.

Another taxon that has been placed within the genus *Atractaspis* is the species known as the Variable Burrowing Asp, originally described as *Elaps irregularis* Reinhardt, 1843 and placed within *Atractaspis* by most authors since commencing with Pfeffer in 1893.

Morphological differences between this species and other *Atractaspis*, including the type species *A. bibroni* has been known for some time and it has even been asserted that the species *Elaps irregularis* Reinhardt, 1843 is in fact more closely related to *Homoroselaps* Jan, 1858 than *Atractaspis* as seen from the molecular data presented in the online paper by Pyron, Burbrink and Weins (2013).

As a result of this, the species is now placed in a new genus named *Georgekonstandinouous gen. nov.* and tribe, Georgekonstandinouiini *tribe nov.* named in accordance with the Zoological Code (Ride *et al.* 1999).

Simultaneously, four other similar species, sharing relevant morphological traits not seen in the remaining species within *Atractaspis* are transferred to the same genus, but then also placed in two new subgenera, namely *Slatteryaspus subgen. nov.* and *Wellingtonaspus subgen. nov.*, also obviously within the same tribe.

The species *Atractaspis boulengeri* Mocquard, 1897, is divergent relative to the remaining species within the genus, the rest apparently forming a well-defined group, both morphologically and based on molecular studies. As a result *Atractaspis boulengeri* is placed in a new subgenus *Benjaminswileus subgen. nov..*

Up-to-date diagnoses are given for all of the four tribes now assigned within the Atractaspidiidae and Homoroselapide after the descriptions of the component genera and subgenera.

**FAMILY ATRACTASPIDIDAE GÜNTHER, 1858**

**(Terminal taxon: *Atractaspis inornatus* Smith 1849)**

**Diagnosis:** *Atractaspis* has to date been recognized as a genus of venomous snakes found in Africa and the middle-east.

In terms of this paper, there are about 15 recognized species within the genus as now defined, although some are obviously composite, with either undescribed species or subspecies currently recognized likely to be elevated to full species status in the future.

They are found mostly in sub-Saharan Africa, with the center of species distribution around the vicinity of Congo, with a limited distribution in the Middle-east.

They are recognized under various common names including: Burrowing Vipers, Burrowing Asps, Mole Vipers, Stiletto Snakes, Side-stabbing Snakes, all of which relate to their appearance, venomous bites or burrowing habits.

They are smallish snakes, rarely exceeding 1 metre in total length and usually mature at about 45 cm.

The venom apparatus and fangs in particular are well developed and the snakes can often bite from the side, which reflects in one of their common names. This unusual feature makes these snakes risky to handle by using the usual “hand gripping neck” methods, due to the heightened risk of “needle-stick” wound from one of the sideways oriented fangs..

There are a few teeth on the palatines, none on the pterygoids; mandibles edentulous anteriorly, with 2 or 3 very small teeth in the middle of the dentary bone. There’s no postfrontal bone. The head is small and indistinct from the neck and covered with large symmetrical shields; nostril is set between 2 nasals; no loreal; eye is minute, with a round pupil and one or two labials entering the orbit. The body is cylindrical and of similar thickness along its entire length; the dorsal scales smooth and shiny, without apical pits, in 17 to 27 dorsal mid-body rows, ventrals are rounded. Tail short.

The subcaudals are always single, except for the species *A. boulengeri* Mocquard, 1897, and the anal plate is always single.

The single anal plate separates morphologically similar snakes, formally placed in this family and as of this paper, removed from the family and placed in Homoroselapidae Hoser, 2012, within the newly erected genus *Georgekonstandinouous gen. nov.*, being five species formerly placed within the genus *Atractaspis* Smith, 1849.

These snakes are designed for a burrowing existence and are usually drab in appearance, being typically a blackish colour.

**Content:** *Atractaspis* Smith 1849; *Hoseraspea* Hoser, 2012.

**GENUS *ATRACTASPIS* SMITH, 1849.**

**Type species:** *Atractaspis inornatus* Smith 1849.

Currently more widely known as *Atractaspis bibroni* Smith, 1849.

**Diagnosis:** *Atractaspis* has to date been recognized as a genus of venomous snakes found in Africa and the Middle-east.

In terms of this paper, there are now presently about 15 recognized species although final resolution as to the exact number of species involved is likely to take some time and will in part depend on access to the areas species occur, noting the political instability in some areas and the fact that a number of recognized subspecies will almost certainly be elevated to full species status at later dates.

They are found mostly in sub-Saharan Africa, with the center of species distribution around the vicinity of Congo, with a limited distribution in the middle-east.

These snakes are recognized under various common names including: Burrowing Vipers, Burrowing Asps, Mole Vipers, Stiletto Snakes, Side-stabbing Snakes, all of which relate to their appearance, venomous bites or burrowing habits.

They are smallish snakes, rarely exceeding 1 metre in total length and usually mature at about 45 cm.

The venom apparatus and fangs in particular are well developed and the snakes can often bite from the side, which reflects in one of their common names. This unusual feature makes these snakes risky to handle by using the usual “hand gripping neck”

methods, due to the heightened risk of "needle-stick" wound from one of the sideways oriented fangs.

There are a few teeth on the palatines, none on the pterygoids; mandibles edentulous anteriorly, with 2 or 3 very small teeth in the middle of the dentary bone. There's no postfrontal bone. The head is small and indistinct from the neck and covered with large symmetrical shields; nostril is set between 2 nasals; no loreal; eye is minute, with a round pupil and one or two labials entering the orbit. The body is cylindrical and of similar thickness along its entire length; the dorsal scales smooth and shiny, without apical pits, in 17-27 rows (and also see the redescription of *Hoseraspea* Hoser, 2012 below); ventrals are rounded. Tail short; subcaudals are either single in all species (or sometimes with some divided only) except for *A. boulengeri* Mocquard, 1897 which has all divided subcaudals and is diagnostic for the species and subgenus it is placed in (*Benjaminswileus subgen. nov.*).

Diagnostic for all members of the genus and family (including *A. boulengeri* Mocquard, 1897) is a single anal plate.

These snakes are designed for a burrowing existence and are usually drab in appearance, being typically a blackish colour.

**Content:** *A. bibronii* Smith, 1849 (type species); *Atractaspis aterrima* Günther, 1863; *A. boulengeri* Mocquard, 1897; *A. coalescens* Perret, 1960; *A. corpulenta* (Hallowell, 1854); *A. dahomeyensis* Bocage, 1887; *A. duerdeni* Gough, 1907; *A. leucomelas* Boulenger, 1895; *A. micropholis* Günther, 1872; *A. scorteccii* Parker, 1949.

**SUBGENUS *BENJAMINSWILEUS SUBGEN. NOV.***

**Type species:** *Atractaspis boulengeri* Mocquard, 1897.

**Diagnosis:** The subgenus *Benjaminswileus subgen. nov.* is unique in the genus *Atractaspis* in that the subcaudals are all divided. For all other members of the genus *Atractaspis* subcaudals are either all or mainly single.

This subgenus has normal-sized venom glands, as opposed to the enlarged ones sometimes seen in other *Atractaspis* (e.g. *A. micropholis* Günther, 1872).

Also diagnosed by the following suite of characters: a medium-sized, fairly thick-bodied snake (large adults often very stout), adults average 30-50 cm long in total length and rarely exceed 60 cm; wide and rounded snout and a rostral two times wider than high. There are a few teeth on the palatines, none on the pterygoids; mandibles edentulous anteriorly, with 2 or 3 very small teeth in the middle of the dentary bone. There's no postfrontal bone. The head is small and indistinct from the neck and covered with large symmetrical shields; nostril is set between 2 nasals; no loreal; eye is minute, with a round pupil and supalabials 3 and 4 entering the orbit. Five supralabials in total. The body is cylindrical and of similar thickness along its entire length; the dorsal scales smooth and shiny, without apical pits, in 23 midbody rows (and also see the redescription of *Hoseraspea* Hoser, 2012 below); ventrals are rounded and range from 185 to 201 and most commonly in the vicinity of 191-195. Tail short; subcaudals are all divided and from 65-72 and being divided is diagnostic for the species and subgenus it is placed in (*Benjaminswileus subgen. nov.*).

Diagnostic for all members of the genus and family (including *A. boulengeri* Mocquard, 1897) is a single anal plate and separates these snakes from the family Homoroselapidae Hoser, 2012 identified by a divided anal plate.

These snakes are designed for a burrowing existence and are usually drab in appearance, being typically a blackish, brown or gray above although specimens of this subgenus occasionally have some form of transverse bands or flecks dorsally. The venter is lighter, being usually a whitish color

For the diagnosis of the genus *Atractaspis*, see the earlier description within this paper.

**Distribution:** *Benjaminswileus subgen. nov.* is known from Gabon, Cameroon, Democratic Republic of Congo (Zaire), Congo (Brazzaville) and the Central African Republic. It may also occur in other adjacent countries.

**Etymology:** Named in honour of Benjamin Swile of Athlone, (Cape Town), South Africa in recognition of his valuable contributions to the herpetology of Africa. Of potential interest is that Swile is an African word that means "hairy feet"!

**Content:** *Atractaspis* (*Benjaminswileus*) *boulengeri* Mocquard, 1897.

**SUBGENUS *LOWRYUS SUBGEN. NOV.***

**Type species:** *Atractaspis duerdeni* Gough, 1907.

**Diagnosis:** Separated from all other species within the genus *Atractaspis* by the following suite of characters either alone or in combination/s: The snout has a sharp horizontal angle at the tip. There are 23-25 dorsal mid body rows of scales, 193-228 ventrals, 19-27 single subcaudals and single anal plate; 5-6 upper labials, with the entire top of numbers 3 and 4 entering the orbit; 6 (occasionally 5 or 7) lower labials; 1 preocular and 1-2 postoculars, the postocular/s of which (combined) are larger than the eye (versus about the same size as the eye in most other *Atractaspis*) and variable temporals. The colour is a uniform grey to black and the belly is a uniform white which extends onto the flanks.

**Distribution:** Two populations are known. These are one in south-eastern Botswana and adjacent Transvaal and another in central Namibia. The western form is separated from the Eastern one by having 200-209 ventrals in males and 217-228 ventrals in females, versus 195-202 in males and 209-216 in females for the nominate Eastern form.

Branch (1998) reported that the Western form was being described as a new taxon, but no description was published.

**Etymology:** Named in honour of Andrew Lowry of Cheltenham, Victoria, Australia, formerly of Mentone, Victoria, Australia for his many contributions to herpetology in Australia spanning three decades.

**Content:** *Atractaspis (Lowryus*) *duerdeni* Gough, 1907.

**GENUS *HOSERASPEA* HOSER, 2012**

**Type species:** *Atractaspis microlepidota* Günther, 1866.

**Diagnosis:** The genus *Hoseraspea* Hoser, 2012 is separated from all species in the genus *Atractaspis* by having 29 to 37 mid body rows (of dorsal scales) (versus 27 or less in all *Atractaspis* and *Georgekonstandinouous gen. nov.* as described in this paper), a number higher than seen in any species of *Atractaspis:* there are 212-245 ventrals; single anal and 26-37 single subcaudals, there are six supralabials, numbers 3 and 4 entering the orbit.

They are smallish snakes, never exceeding 75 cm total length and usually mature at about 45 cm.

*Hoseraspea* develops long venom glands, whereas *Atractaspis* develops short venom glands.

The venom apparatus and fangs in particular are well developed and the snakes can often bite from the side, which reflects in one of their common names. This unusual feature makes these snakes risky to handle by using the usual "hand gripping neck" methods, due to the heightened risk of "needle-stick" wound from one of the sideways oriented fangs.

There are a few teeth on the palatines, none on the pterygoids; mandibles edentulous anteriorly, with 2 or 3 very small teeth in the middle of the dentary bone. There's no postfrontal bone. The head is small and indistinct from the neck and covered with large symmetrical shields; nostril is set between 2 nasals; no loreal; eye is minute, with a round pupil.

The body is cylindrical and of similar thickness along it's entire length; the dorsal scales smooth and shiny, without apical pits, ventrals are rounded. Tail is short.

These snakes are designed for a burrowing existence and are usually drab in appearance, being typically a blackish colour.

**Distribution:** The distribution of the genus includes the Middle-

east and north-central Africa.

The distribution of each species within the genus is given separately below:

*Hoseraspea microlepidota* is found in West Africa including Nigeria, Benin and Togo, extending east towards East Africa in Sudan.

*H. andersoni* is found in southwestern Saudi Arabia and Oman.

*H. engaddensis* is found in Israel, Sinai, Jordan, Saudi Arabia, Jordan and Lebanon.

*H. fallax* is found in Ethiopia, Somalia and Kenya.

*H. magrettii* is found in Ethiopia, Eritrea and southern Sudan.

*H. phillipsi* is found in southern Sudan

*H. watsoni* is found in central and western Africa including: Mauritania, Senegal, Mali, Burkina Faso, Niger, Nigeria, Cameroon, Chad, the Central African Republic and Benin.

**Common name:** Small-scaled burrowing Asp.

Other common names (less used): Small-scaled Stiletto Snake, Small-scaled Side Stabbing Snake, Small-scaled Mole Viper, Small scaled-burrowing Adder.

The common name Small-scaled Burrowing Asp, is particularly apt as the smaller scales (reflecting in a higher mid-body scale row count) differentiates this genus from *Atractaspis.*

**Etymology:** Named in honour of the long-suffering wife of the author Raymond Hoser, namely Shireen Hoser, who happens to come from the same part of the world where the Burrowing Asps come from, namely Africa.

**Content:** *Hoseraspea microlepidota* (Günther, 1866) (type species); *H. andersoni* (Boulenger, 1905); *H. engaddensis* Haas, 1950; *H. fallax* Peters, 1867; *H. magrettii* Scortecci, 1928; *H. phillipsi* Barbour, 1913; *H. watsoni* Boulenger, 1908.

**FAMILY HOMOROSELAPIDAE HOSER, 2012.**

**(Terminal Taxon: *Homoroselaps lacteus*)**

**Diagnosis:** Separated from all other Elapids, Colubrids and Atractaspididae by the following suite of characters best defined as one or other of:

A/ Never more than 75 cm total length as an adult, usually averaging 20-50 cm; very thin with a build bordering on cylindrical with body thickness being very thin and very similar along the entire length of the body to near the tail; head small, relatively short and marginally distinct from the neck;15 dorsal mid body rows, 160-239 ventrals, divided anal plate (versus single in Atractaspididae), 22-43 paired subcaudals (all are single (or mainly so) in Atractaspididae, except in the divergent taxon *Atractaspis boulengeri* Mocquard, 1897), tail medium to short in length; 6 upper labials, numbers 3 and 4 entering the eye, 5-6 lower labials, as well as one pre-ocular and one post-ocular, temporals are either 0+1 or 1+1; while colour is somewhat variable, the pattern and configuration is quite unlike any other snake; it invariably is glossy and blackish on top, with orange running along the mid dorsal line either broken or unbroken, often running on top of a dorsal pattern of large black blotches etched with thick yellow reticulations, the pattern sometimes being reduced to black with a white spot in the centre of each scale, or somewhere between the two configurations listed, or alternatively mainly black dorsally with a thick yellow or orange line running along the spine, commencing at the snout and yellow or orange along the flanks, separated from the black by a well-defined boundary on the mid flanks; in all cases the yellow or orange mid-dorsal line commences on the head from in front of the eye, even if broken by black (Tribe Homoroselapiini Hoser, 2012), or;

B/ They are smallish snakes, rarely exceeding 1 metre in total length and usually mature at about 45 cm. The venom apparatus and fangs in particular are well developed and the snakes can often bite from the side, which reflects in one of their common names. This unusual feature makes these snakes risky to handle by using the usual “hand gripping neck” methods, due to the heightened risk of “needle-stick” wound from one of the sideways oriented fangs.

There are a few teeth on the palatines, none on the pterygoids; mandibles edentulous anteriorly, with 2 or 3 very small teeth in the middle of the dentary bone. There’s no postfrontal bone. The head is small and indistinct from the neck and covered with large symmetrical shields; nostril is set between 2 nasals; no loreal; eye is minute, with a round pupil and one or two labials entering the orbit. The body is cylindrical and of similar thickness along its entire length; the dorsal scales smooth and shiny, without apical pits, in 19-27 dorsal mid body rows; ventrals are rounded. Tail short; subcaudals and anal plate are all divided. These snakes are designed for a burrowing existence and are usually drab in appearance, being typically a blackish colour (Tribe Georgekonstandinouiini *tribe nov.*).

**Further notes:** All possesses fangs and venom; are oviparous, with clutches up 16 eggs recorded, although less than half this number is more common; recorded diet consists exclusively of smaller reptiles.

Homoroselapidae is separated from Atractaspidiidae by the presence of a divided anal plate.

Furthermore, with the exception of *Atractaspis boulengeri*, all Atractaspidiidae have all or mainly single subcaudals, as opposed to divided in all Homoroselapidae.

**Content:** *Homoroselaps* Jan, 1858; *Georgekonstandinouous gen. nov.*

***GEORGEKONSTANDINOUOUS GEN. NOV.***

**Type species:** *Elaps irregularis* Reinhardt, 1843.

Currently most widely known as *Atractaspis irregularis* (Reinhardt, 1843).

**Diagnosis:** The molecular evidence published in the online paper by Pyron, Burbrink and Weins (2013) indicated that this genus as defined herein is more closely associated with *Homoroselaps* Jan, 1858 than *Atractaspis* Smith, 1849.

Morphological evidence also supports this view.

As a result, this genus as defined herein is placed within the family Homoroselapide Hoser, 2013 (not Atractaspidiidae Günther, 1858) and also in a separate tribe to the genus *Homoroselaps* Jan, 1858.

The family Homoroselapide Hoser, 2013, including the genera *Georgekonstandinouous gen. nov.* and *Homoroselaps* Jan, 1858 are readily separated from the superficially similar genera *Atractaspis* Smith, 1849 and *Hoseraspea* Hoser, 2012 by the divided subcaudals, as opposed to all or mainly single in *Atractaspis* Smith, 1849 (with the exception of the species *boulengeri*) and also single in *Hoseraspea* Hoser, 2012.

Homoroselapide Hoser, 2013 are separated from Atractaspidiidae Günther, 1858 by the presence of a divided anal as opposed to a single one in Atractaspidiidae Günther, 1858.

Within the family Homoroselapide Hoser, 2012, the genus *Georgekonstandinouous gen. nov.* is separated from *Homoroselaps* Jan, 1858 by having 19-27 midbody rows, versus 15 in *Homoroselaps* Jan, 1858.

*Georgekonstandinouous gen. nov.* is further separated from *Homoroselaps* Jan, 1858 by having a postocular present; one pair of sublinguals and three-five gulars (rather than two pairs of sublinguals).

*Homoroselaps* Jan, 1858 is also readily separated from *Georgekonstandinouous gen. nov.* by the liberal amount of yellow and/or orange on the upper body, in the form of a striped, spotted or semi-banded pattern. By contrast *Georgekonstandinouous gen. nov.* are generally a uniform glossy purple-brown to black above. *Homoroselaps* Jan, 1858 are further separated by distinct yellow markings on the upper or lower labials, either not seen in *Georgekonstandinouous gen. nov.* or if so, only to a tiny extent.

**Distribution:** Widespread in sub-Saharan Africa from Guinea and South Sudan in the North to the Caprivi Strip, Namibia.

**Etymology:** Named in honour of George Konstandinou of Park Orchards and Doncaster in Victoria, Australia in recognition of his hard work as a mechanic keeping the Snakebusters reptile education motor vehicles on the road, including doing major repairs at short or no notice. The vehicles are used by myself and staff to conduct Australia's best reptile education displays, field research and other essential tasks and without George's efforts over the past decade the contribution to conservation by the Snakebusters team would simply not have happened.

The spelling of the genus and lower tribe names is deliberate and should not be changed unless mandated by the Zoological Code or an ICZN ruling.

**Content:** *Georgekonstandinouous irregularis* (Reinhardt, 1843) (type species); *G. battersbyi* (De Witte, 1959); *G. congica* (Peters, 1877). *G. engdahli* (Lönnberg and Andersson, 1913); *G. reticulata* (Sjöstedt, 1896).

***WELLINGTONASPUS SUBGEN. NOV.***

**Type species:** *Atractaspis engdahli* Lönnberg and Andersson, 1913.

**Diagnosis:** The genus *Georgekonstandinouous gen. nov*. consists of three quite distinct groupings of snakes. These are most easily separated from one another on the basis of their mid-body scale row counts and combined total of ventrals and subcaudals.

The nominate subgenus *Georgekonstandinouous subgen. nov*. has 21-23 dorsal mid-body rows.

Other diagnostic features of *Georgekonstandinouous subgen. nov*. are as follows: divided anal, 219-240 ventrals; 20-32 divided subcaudals, head small and not distinct from neck; snout very short and rounded; rostral is visible from above; internasals are smaller than the prefrontals, suture between the internasals and between the prefrontals are of equal length; hexagonal frontal is as broad as it is long or a little longer, much longer than the small supraocular, shorter than the large parietals which are about one and half times longer; sometimes up to three occipital shields; large to enormous wedge-shaped anterior temporal that almost separates the fourth and fifth upper labials; temporals 1+3 or 1+4, sometimes a single post temporal; five upper labials with numbers 3 and 4 entering the orbit and 2 and 3 in contact with the post nasal; 3 and 4 are long (eye to lip), 6 (rarely 5 or 7) lower labials; eye minute and pupil round; scales smooth and without apical pits; body cylindrical; tail is stumpy or stubby, terminating abruptly into a tiny almost horny spike or spine.

*Wellingtonaspus subgen. nov*. has 19 dorsal mid-body rows and is separated on this basis on its own.

*Slatteryaspus subgen. nov.* is separated from the other two subgenera by one or other of the following suites of characters:

A/ 25-27 dorsal mid-body rows and over 275 ventrals and subcaudals (combined total) versus a lower number in the other two subgenera; or

B/ Less than 275 ventrals and subcaudals (combined total) and 21-23 mid-body rows, 193-225 ventrals, 18-25 divided subcaudals; 5 upper labials with numbers 3 and 4 entering the orbit; 5 lower labials; 1 preaeocular and one postocular; 1+2 temporal formula; with the colour being a uniform purple-brown to black, dorsally and ventrally.

*Wellingtonaspus subgen. nov*. is separated from the other two subgenera by having five (instead of four) gulars and six (instead of five) supralabials.

*Wellingtonaspus subgen. nov*. are also characterized by elongate venom glands.

*Slatteryaspus subgen. nov.* are characterized by normal-sized venom glands.

The subgenus *Wellingtonaspus subgen. nov.* is also diagnosed by the following suite of characters: Head very flat, depressed; snout is broad and rounded. Portion of the rostral visible from above measuring about a third its distance from the frontal; suture between the internasals slightly shorter than that between the praefrontals; frontal a little broader than long, about equal to its distance from the end of the snout, much shorter than the parietals. Eye very small and about equal in size to the nostril which is pierced between two nasals, the anterior of which is larger. One praeocular and one postocular. Temporals usually 1+2, the anterior situated below the postocular and wedged in between the fourth and fifth labials; the upper posterior temporal in contact with the postocular, sometimes very narrowly. Of the six upper labials, the fourth is by far the largest, in contact with the praeocular, the eye and postocular. First lower labials are entirely separated by the symphysial being in contact with the large chin shields; three infralabials in contact with the chin shields; fourth infralabial is very large.19 mid body rows, 224-232 ventrals, divided anal, and 19-22 divided subcaudals. The tail is thick and bluntly pointed. Colour is uniform dark brown to black above and somewhat paler ventrally.

**Distribution:** *Wellingtonaspus subgen. nov.* are found in Somalia and North-east Kenya.

**Etymology:** Named in honour of Cliff Ross Wellington, Australian herpetologist, currently living in Woy Woy, NSW and having spent most of his life in New South Wales. Although best known as co-author of a series of landmark taxonomic papers with Richard Wells in the 1980's, Wellington has had a diverse career in herpetology, including in government administration and developing conservation programs for threatened and endangered species. At times he has worked with utmost integrity in State Government wildlife regulatory bureaucracies where corruption was endemic, including in the notoriously corrupt and dysfunctional New South Wales National Parks and Wildlife Service (NPWS NSW) for many years.

**Content:** *Georgekonstandinouous* (*Wellingtonaspus*) *engdahli* (Lönnberg and Andersson, 1913) (type species).

***SLATTERYASPUS SUBGEN. NOV.***

**Type species:** *Atractaspis congica* Peters, 1877.

**Diagnosis:** The genus *Georgekonstandinouous gen. nov*. consists of three quite distinct groupings of snakes. These are most easily separated from one another on the basis of their mid-body scale row counts and combined total of ventrals and subcaudals.

The nominate subgenus *Georgekonstandinouous subgen. nov*. has 21-23 dorsal mid-body rows.

Other diagnostic features of *Georgekonstandinouous subgen. nov*. are as follows: divided anal, 219-240 ventrals; 20-32 divided subcaudals, head small and not distinct from neck; snout very short and rounded; rostral is visible from above; internasals are smaller than the prefrontals, suture between the internasals and between the prefrontals are of equal length; hexagonal frontal is as broad as it is long or a little longer, much longer than the small supraocular, shorter than the large parietals which are about one and half times longer; sometimes up to three occipital shields; large to enormous wedge-shaped anterior temporal that almost separates the fourth and fifth upper labials; temporals 1+3 or 1+4, sometimes a single post temporal; five upper labials with numbers 3 and 4 entering the orbit and 2 and 3 in contact with the post nasal; 3 and 4 are long (eye to lip), 6 (rarely 5 or 7) lower labials; eye minute and pupil round; scales smooth and without apical pits; body cylindrical; tail is stumpy or stubby, terminating abruptly into a tiny almost horny spike or spine.

*Wellingtonaspus subgen. nov*. has 19 dorsal mid-body rows and is separated on this basis on its own.

*Slatteryaspus subgen. nov.* is separated from the other two subgenera by one or other of the following suites of characters:

A/ 25-27 dorsal mid-body rows and over 275 ventrals and subcaudals (combined total) versus a lower number in the other two subgenera; or

B/ Less than 275 ventrals and subcaudals (combined total) and

21-23 mid-body rows, 193-225 ventrals, 18-25 divided subcaudals; 5 upper labials with numbers 3 and 4 entering the orbit; 5 lower labials; 1 preaeocular and one postocular; 1+2 temporal formula; with the colour being a uniform purple-brown to black, dorsally and ventrally.

*Wellingtonaspus subgen. nov.* is separated from the other two subgenera by having five (instead of four) gulars and six (instead of five) supralabials.

*Wellingtonaspus subgen. nov.* are also characterized by elongate venom glands.

*Slatteryaspus subgen. nov.* are characterized by normal-sized venom glands.

The subgenus *Wellingtonaspus subgen. nov.* is also diagnosed by the following suite of characters: Head very flat, depressed; snout is broad and rounded. Portion of the rostral visible from above measuring about a third its distance from the frontal; suture between the internasals slightly shorter than that between the praefrontals; frontal a little broader than long, about equal to its distance from the end of the snout, much shorter than the parietals. Eye very small and about equal in size to the nostril which is pierced between two nasals, the anterior of which is larger. One praeocular and one postocular. Temporals usually 1+2, the anterior situated below the postocular and wedged in between the fourth and fifth labials; the upper posterior temporal in contact with the postocular, sometimes very narrowly. Of the six upper labials, the fourth is by far the largest, in contact with the praeocular, the eye and postocular. First lower labials are entirely separated by the symphysial being in contact with the large chin shields; three infralabials in contact with the chin shields; fourth infralabial is very large.19 mid body rows, 224-232 ventrals, divided anal, and 19-22 divided subcaudals. The tail is thick and bluntly pointed. Colour is uniform dark brown to black above and somewhat paler ventrally.

**Distribution:** Sub-Saharan Africa, except for the far west, far south and parts of the east.

**Etymology:** Named in honour of Paul Slattery of Park Orchards, Victoria, Australia, in recognition to his immense contribution to local government in the city of Manningham, Victoria, Australia. At the time of writing this paper, he was unfortunately diagnosed with advanced prostate cancer at age 67 and as with all such cancers the prognosis for his long-term survival is not good. It is appropriate his lifetime's work and efforts are recognized before his death.

**Content:** *Georgekonstandinouous* (*Slatteryaspus*) *congica* (Peters, 1877) (type species); *G.* (*Slatteryaspus*) *battersbyi* (De Witte, 1959); *G.* (*Slatteryaspus*) *reticulata* (Sjöstedt, 1896).

***GEORGEKONSTANDINOUOUS SUBGEN. NOV.***

**Type species:** *Elaps irregularis* Reinhardt, 1843.

Currently most widely known as *Atractaspis irregularis* (Reinhardt, 1843).

**Diagnosis:** The genus *Georgekonstandinouous gen. nov.* consists of three quite distinct groupings of snakes. These are most easily separated from one another on the basis of their mid-body scale row counts and combined total of ventrals and subcaudals.

The nominate subgenus *Georgekonstandinouous subgen. nov.* has 21-23 dorsal mid-body rows.

Other diagnostic features of *Georgekonstandinouous subgen. nov.* are as follows: divided anal, 219-240 ventrals; 20-32 divided subcaudals, head small and not distinct from neck,; snout very short and rounded; rostral is visible from above; internasals are smaller than the prefrontals, suture between the internasals and between the prefrontals are of equal length; hexagonal frontal is as broad as it is long or a little longer, much longer than the small supraocular, shorter than the large parietals which are about one and half times longer; sometimes up to three occipital shields; large to enormous wedge-shaped anterior temporal that almost separates the fourth and fifth upper labials; temporals 1+3 or 1+4, sometimes a single post temporal; five upper labials with numbers 3 and 4 entering the orbit and 2 and 3 in contact with the post nasal; 3 and 4 are long (eye to lip), 6 (rarely 5 or 7) lower labials; eye minute and pupil round; scales smooth and without apical pits; body cylindrical; tail is stumpy or stubby, terminating abruptly into a tiny almost horny spike or spine.

*Wellingtonaspus subgen. nov.* has 19 dorsal midbody rows and is separated on this basis on its own.

*Wellingtonaspus subgen. nov.* is separated from the other two subgenera by having five (instead of four) gulars and six (instead of five) supralabials.

*Wellingtonaspus subgen. nov.* are also characterized by elongate venom glands.

The subgenus *Wellingtonaspus subgen. nov.* is also diagnosed by the following suite of characters: Head very flat, depressed; snout is broad and rounded. Portion of the rostral visible from above measuring about a third its distance from the frontal; suture between the internasals slightly shorter than that between the praefrontals; frontal a little broader than long, about equal to its distance from the end of the snout, much shorter than the parietals. Eye very small and about equal in size to the nostril which is pierced between two nasals, the anterior of which is larger. One praeocular and one postocular. Temporals usually 1+2, the anterior situated below the postocular and wedged in between the fourth and fifth labials; the upper posterior temporal in contact with the postocular, sometimes very narrowly. Of the six upper labials, the fourth is by far the largest, in contact with the praeocular, the eye and postocular. First lower labials are entirely separated by the symphysial being in contact with the large chin shields; three infralabials in contact with the chin shields; fourth infralabial is very large.19 mid-body rows, 224-232 ventrals, divided anal, and 19-22 divided subcaudals. The tail is thick and bluntly pointed. Colour is uniform dark brown to black above and somewhat paler ventrally.

*Slatteryaspus subgen. nov.* is separated from the other two subgenera by one or other of the following suites of characters:

A/ 25-27 dorsal mid body rows and over 275 ventrals and subcaudals (combined total) versus a lower number in the other two subgenera; or

B/ Less than 275 ventrals and subcaudals (combined total) and 21-23 mid-body rows, 193-225 ventrals, 18-25 divided subcaudals; 5 upper labials with numbers 3 and 4 entering the orbit; 5 lower labials; 1 preaeocular and one postocular; 1+2 temporal formula; with the colour being a uniform purple-brown to black, dorsally and ventrally.

*Slatteryaspus subgen. nov.* are characterized by normal-sized venom glands.

It is almost certain that more than one species are currently being identified within *Georgekonstandinouous irregularis* (Reinhardt, 1843) as currently recognized, some or all of which may have already been recognized as species or subspecies prior and more recently been synonymized.

**Distribution:** Sub-Saharan Africa, including the West and arid East, but excluding South Africa and nearby areas.

**Etymology:** See for the genus.

**Content:** *Georgekonstandinouous* (*Georgekonstandinouous*) *irregularis* (Reinhardt, 1843) (type species).

**HIGHER CLASSIFICATION**

While it may be regarded as trite by some people for me to herein formalize the higher level of classification for small groups of snakes such as the Atractaspidae and Homoroselapidae, I regard it as important from the point of view of consistency at all levels of classification across all families of the Serpentes when reconciled with morphological and known genetic differences (refer for example to the results of Pryon *et al.* 2011, Fig. 2). Therefore I herein formally redefine the previously named tribes within both families and diagnose a new monotypic tribe to accommodate *Georgekonstandinouous gen.*

*nov.* namely Georgekonstandinouiini *tribe nov*., and separate the component species from the other genus and tribe in the family Homoroselapidae.

**FAMILY ATRACTASPIDIDAE GÜNTHER, 1858.**

**(See above for details).**

**TRIBE HOSERASPINI HOSER, 2012.**

***(Terminal Taxon: Hoseraspea microlepidota)***

**Diagnosis:** Tribe Hoseraspini Hoser, 2012 is separated from all species in the tribe Atractaspini Hoser, 2012 by having 29 to 37 mid body rows (of dorsal scales) (versus 25 or less in all Atractaspini), a number higher than seen in any species of Atractaspini: there are 212-245 ventrals; single anal and 26-37 single subcaudals, there are six supralabials, numbers 3 and 4 entering the orbit.

They are smallish snakes, never exceeding 75 cm total length and usually mature at about 45 cm.

Hoseraspini Hoser, 2012 develops long venom glands, whereas Atractaspini usually develops short venom glands.

The venom apparatus and fangs in particular are well developed and the snakes can often bite from the side, which reflects in one of their common names. This unusual feature makes these snakes risky to handle by using the usual "hand gripping neck" methods, due to the heightened risk of "needle-stick" wound from one of the sideways oriented fangs.

There are a few teeth on the palatines, none on the pterygoids; mandibles edentulous anteriorly, with 2 or 3 very small teeth in the middle of the dentary bone. There's no postfrontal bone. The head is small and indistinct from the neck and covered with large symmetrical shields; nostril is set between 2 nasals; no loreal; eye is minute, with a round pupil.

The body is cylindrical and of similar thickness along its entire length; the dorsal scales smooth and shiny, without apical pits, ventrals are rounded. Tail is short.

These snakes are designed for a burrowing existence and are usually drab in appearance, being typically a blackish colour.

**Content:** *Hoseraspea* Hoser, 2012.

**TRIBE ATRACTASPINI HOSER, 2012.**

***(Terminal Taxon: Atractaspis* bibroni*)***

**Diagnosis:** Tribe Atractaspini Hoser, 2012 is separated from all species in the tribe Hoseraspini Hoser, 2012 by having 25 or less dorsal mid body rows of snakes, versus 29 to 37 mid body rows (of dorsal scales) in Hoseraspini.

Hoseraspini Hoser, 2012 develops long venom glands, whereas Atractaspini Hoser, 2012 usually develops short venom glands.

These are smallish snakes, never exceeding 75 cm total length and usually mature at about 45 cm.

The venom apparatus and fangs in particular are well developed and the snakes can often bite from the side, which reflects in one of their common names. This unusual feature makes these snakes risky to handle by using the usual "hand gripping neck" methods, due to the heightened risk of "needle-stick" wound from one of the sideways oriented fangs.

There are a few teeth on the palatines, none on the pterygoids; mandibles edentulous anteriorly, with 2 or 3 very small teeth in the middle of the dentary bone.

There's no postfrontal bone. The head is small and indistinct from the neck and covered with large symmetrical shields; nostril is set between 2 nasals; no loreal; eye is minute, with a round pupil.

The body is cylindrical and of similar thickness along it's entire length; the dorsal scales smooth and shiny, without apical pits, ventrals are rounded. Tail is short.

These snakes are designed for a burrowing existence and are usually drab in appearance, being typically a blackish colour.

**Content:** *Atractaspis* Günther, 1858.

**FAMILY HOMOROSELAPIDAE HOSER, 2012.**

**(See above for details).**

**TRIBE HOMOROSELAPIINI HOSER, 2012.**

**(Terminal Taxon: *Coluber lacteus* Linnaeus, 1758).**

**Currently most widely known as *Homoroselaps lacteus* (Linnaeus, 1758).**

**Diagnosis:** Separated from all other Elapids, Colubrids and Atractaspididae by the following suite of characters: Never more than 75 cm total length as an adult, usually averaging 20-50 cm; very thin with a build bordering on cylindrical with body thickness being very thin and very similar along the entire length of the body to near the tail; head small, relatively short and marginally distinct from the neck;15 dorsal mid-body rows, 160-239 ventrals, divided anal plate (versus single in Atractaspididae), 22-43 paired subcaudals (all are single (or mainly so) in Atractaspididae, except in the divergent taxon *Atractaspis boulengeri* Mocquard, 1897), tail medium to short in length; 6 Upper labials, numbers 3 and 4 entering the eye, 5-6 lower labials, as well as one pre-ocular and one post-ocular, temporals are either 0+1 or 1+1; while colour is somewhat variable, the pattern and configuration is quite unlike any other snake; it invariably is glossy and blackish on top, with orange running along the mid dorsal line either broken or unbroken, often running on top of a dorsal pattern of large black blotches etched with thick yellow reticulations, the pattern sometimes being reduced to black with a white spot in the centre of each scale, or somewhere between the two configurations listed, or alternatively mainly black dorsally with a thick yellow or orange line running along the spine, commencing at the snout and yellow or orange along the flanks, separated from the black by a well-defined boundary on the mid flanks; in all cases the yellow or orange mid-dorsal line commences on the head from in front of the eye, even if broken by black (Tribe Homoroselapiini Hoser, 2012).

The other tribe in this family; Georgekonstandinouiini *tribe nov.* is defined as follows: They are smallish snakes, rarely exceeding 1 metre in total length and usually mature at about 45 cm. The venom apparatus and fangs in particular are well developed and the snakes can often bite from the side, which reflects in one of their common names. This unusual feature makes these snakes risky to handle by using the usual "hand gripping neck" methods, due to the heightened risk of "needle-stick" wound from one of the sideways oriented fangs.

There are a few teeth on the palatines, none on the pterygoids; mandibles edentulous anteriorly, with 2 or 3 very small teeth in the middle of the dentary bone. There's no postfrontal bone. The head is small and indistinct from the neck and covered with large symmetrical shields; nostril is set between 2 nasals; no loreal; eye is minute, with a round pupil and one or two labials entering the orbit. The body is cylindrical and of similar thickness along its entire length; the dorsal scales smooth and shiny, without apical pits, in 19-27 dorsal mid-body rows; ventrals are rounded. Tail short; subcaudals and anal plate are all divided. These snakes are designed for a burrowing existence and are usually drab in appearance, being typically a blackish colour (Tribe Georgekonstandinouiini *tribe nov*.).

**Distribution:** Southern Africa (essentially only South Africa).

**Content:** *Homoroselaps*, Jan, 1858.

**TRIBE GEORGEKONSTANDINOUIINI *TRIBE NOV.***

**(Terminal Taxon: *Elaps irregularis* Reinhardt, 1843)**

**Diagnosis:** Georgekonstandinouiini *tribe nov.* is defined as follows: They are smallish snakes, rarely exceeding 1 metre in total length and usually mature at about 45 cm. The venom apparatus and fangs in particular are well developed and the snakes can often bite from the side, which reflects in one of their common names. This unusual feature makes these snakes risky to handle by using the usual "hand gripping neck" methods, due to the heightened risk of "needle-stick" wound from one of the sideways oriented fangs.

There are a few teeth on the palatines, none on the pterygoids; mandibles edentulous anteriorly, with 2 or 3 very small teeth in the middle of the dentary bone. There's no postfrontal bone. The head is small and indistinct from the neck and covered with large symmetrical shields; nostril is set between 2 nasals; no loreal; eye is minute, with a round pupil and one or two labials entering the orbit. The body is cylindrical and of similar thickness along its entire length; the dorsal scales smooth and shiny, without apical pits, in 19-27 dorsal mid-body rows; ventrals are rounded. Tail short; subcaudals and anal plate are all divided. These snakes are designed for a burrowing existence and are usually drab in appearance, being typically a blackish colour (Tribe Georgekonstandinouiini *tribe nov*.).

The other tribe in the family, Tribe Homoroselapiini Hoser, 2012 is separated from Georgekonstandinouiini *tribe nov*. by the following suite of characters: Never more than 75 cm total length as an adult, usually averaging 20-50 cm; very thin with a build bordering on cylindrical with body thickness being very thin and very similar along the entire length of the body to near the tail; head small, relatively short and marginally distinct from the neck;15 dorsal mid-body rows, 160-239 ventrals, divided anal plate (versus single in Atractaspididae), 22-43 paired subcaudals (all are single (or mainly so) in Atractaspididae, except in the divergent taxon *Atractaspis boulengeri* Mocquard, 1897), tail medium to short in length; 6 Upper labials, numbers 3 and 4 entering the eye, 5-6 lower labials, as well as one pre-ocular and one post-ocular, temporals are either 0+1 or 1+1; while colour is somewhat variable, the pattern and configuration is quite unlike any other snake; it invariably is glossy and blackish on top, with orange running along the mid dorsal line either broken or unbroken, often running on top of a dorsal pattern of large black blotches etched with thick yellow reticulations, the pattern sometimes being reduced to black with a white spot in the centre of each scale, or somewhere between the two configurations listed, or alternatively mainly black dorsally with a thick yellow or orange line running along the spine, commencing at the snout and yellow or orange along the flanks, separated from the black by a well-defined boundary on the mid flanks; in all cases the yellow or orange mid-dorsal line commences on the head from in front of the eye, even if broken by black (Tribe Homoroselapiini Hoser, 2012).

**Distribution:** Widespread in sub-Saharan Africa from Guinea and South Sudan in the North to the Caprivi Strip, Namibia.

**Content:** *Georgekonstandinouous gen. nov.*

**FIRST REVISOR NOTES:** In the unlikely event that a subsequent worker seeks to subsume or merge genera or subgenera named within this paper, they must be done so in order of priority in terms of hierarchy in the first instance, or if of same hierarchical position, then by page priority within this paper, as in that which comes first, either on a page or by page number, takes precedence.

**REFERENCES CITED**


Auerbach, R. D. 1987. *The Amphibians and Reptiles of Botswana*. Mokwepa Consultants, Botswana:295 pp.

Bauer, A. M., Günther, R. and Klipfel, M. 1995. *The herpetological contributions of Wilhelm C.H. Peters (1815-1883).* SSAR Facsimile Reprints in Herpetology:714 pp.

Boulenger, G. A. 1896. *Catalogue of the Snakes in the British Museum* (Natural History), Volume III. London. pp. 511-512, 517.

Boulenger, G. A. 1897. A list of reptiles and batrachians from the Congo Free State, with the description of two new snakes. *Ann. Mag. nat. Hist.* (6)19:276-281.

Boulenger, G. A. 1901. Materiaux pour la faune du Congo. Batraciens et reptiles nouveaux. *Ann. Mus. Congo Belge, Zool.* (sect. C. ser. 1) 2:7-14.

Boulenger, G. A. 1905a. Description of a new snake of the genus *Atractaspis* from Mount Kenya, British East Africa. *Ann. Mag. nat. Hist.* (7)15:190.

Boulenger, G. A. 1905b. Descriptions of three new snakes discovered in South Arabia by Mr. G.W. Bury. *Ann. Nat. Hist.* (7)xvi:178-180.

Boulenger, G. A. 1908. Description of three new snakes from Africa. *Ann. Mag. Nat. Hist.* (8)2:93-94.

Boulenger, G. A. 1910. A revised list of the South African reptiles and batrachians, with synoptic tables, special reference to the specimens in the South African Museum, and descriptions of new species. *Ann. South African Mus.* 5:455-538.

Bourgeois, M. 1968. Contribution a' la morphologie compare´ du cra^ne des ophidiens de l'Afrique centrale. *Publications de l'Universite´ Officielle du Congo a' Lubumbashi.* 18:1-293.

Branch, W. R. 1993. *A Photographic Guide to Snakes and Other Reptiles of Southern Africa.* Cape Town: Struik:144 S.

Broadley, D. G. 1991a. A review of the southern African stiletto snakes of the genus *Atractaspis* A. Smith (Serpentes: Atractaspididae). *Arnoldia* 9(36):495-517.

Broadley, D. G. 1991b. The Herpetofauna of Northern Mwinilunga Distr., Northw. Zambia. *Arnoldia* 9(37):519-538.

Broadley, D. G. 1998. *The reptilian fauna of the Democratic Republic of the Congo (Congo-Kinshasa). In: Schmidt, K.P. and Noble, G.K., Contributions to the Herpetology of the Belgian Congo.* SSAR Facsimile reprints in Herpetology:780 pp.

Broadley, D. G., Doria, C. T. and Wigge, J. 2003. *Snakes of Zambia. An Atlas and Field Guide.* Edition Chimaira, Frankfurt:280 pp.

Cadle, J. E. 1994. The colubrid radiation in Africa (Serpentes, Colubridae): Phylogenetic relationships and evolutionary patterns based on immunological data. *Zool. J. Linn. Soc.* 110:103-140.

Chifundera, K. 1990. Snakes of Zaire and their bites. *Afr. Stud. Monogr.* (Kyoto) 10(3):137-157.

Chippaux, J. P. 2006. *Les serpents d'Afrique occidentale et central.* 3rd ed. IRD Editions, Paris.

Chirio, L. and Ineich, I. 2006. Biogeography of the reptiles of the Central African Republic. *African Jour. of Herp.* 55(1):23-59.

Chirio, L. and Lebreton, M. 2007. *Atlas des reptiles du Cameroun.* MNHN, IRD, Paris:688 pp.

Corkill, N. L. and Kirk, R. 1954. Poisoning by the Sudan mole viper *Atractaspis microlepidota. Transactions of the Royal Society of Tropical Medicine and Hygiene* 48(5):376-384.
Deufel, A. and Cundall, D. 2003. Feeding in *Atractaspis* (Serpentes: Atractaspididae): a study in conflicting functional constraints. *Zoology;analysis complex systems* (ZACS) 106(1):43-61.

de Witte, G. F. 1959. Contribution à la faune herpétologique du Congo Belge. Description de trois serpents nouveaux. *Rev. Zool. Bot. Afr.* 50(3-4):348-351.

Dobiey, M. and Vogel, G. 2007. *Venomous Snakes of Africa/ Giftschlangen Afrikas. Terralog 15*, Edition Chimaira, Frankfurt am Main:150 pp.

Duméril, A. M. C., Bibron, G. and Duméril, A. H. A., 1854. *Erpétologie générale ou histoire naturelle complète des reptiles. Tome septième. Deuxième partie, comprenant l'histoire des serpents venimeux.* Paris, Librairie Encyclopédique de Roret: i-xii+781-1536.

Gough, L. H. 1907. Description of a new species of *Atractaspis* collected at Serowe, North Eastern Kalahari. *Rec. Albany Museum* 2:178-179
Gower, D. J., Rasmussen, J. B., Loader, S. P. and Wilkinson, M. 2004. The caecilian amphibian *Scolecomorphus kirkii* Boulenger as prey of the burrowing asp *Atractaspis aterrima* Guenther: tropic relationships of fossorial vertebrates. *African Journal of Ecology* 42:83-87.

Gravlund, P. 2001. Radiation within the advanced snakes (Caenophidia) with special emphasis on African opisthoglyph colubrids, based on mitochondrial sequence data. *Biol. J. Linn. Soc.* 72:99-114.

Griffin, M. G., Panagis, C. and Berriman, N. 1989. The Eastern National Water Carrier: a preliminary assessment of its impact on the herpetofauna. *Jour. Herp. Ass. Afr.* 36:36-37.

Günther, A. 1866. Fifth account of new species of snakes in the collection of the British Museum. *Ann. Mag. nat. Hist.* (3)18:24-29.

Günther, A. 1872. Seventh account of new species of snakes in the collection of the British Museum. *Ann. Mag. Nat. Hist.* (4)9:13-37.

Günther, A. 1888. Contribution to the knowledge of snakes of tropical Africa. *Ann. Mag. nat. Hist.* (6) 1:322-335.

Hoser, R. T. 2012a. A reassessment of the higher taxonomy of the Elapidae. *Australasian Journal of Herpetology* 10:49-63.

Hoser, R. T. 2012b. A reassessment of the Burrowing Asps, *Atractaspis* Smith, 1849 with the erection of a new genus and two Tribes (Serpentes: Atractaspidae). *Australasian Journal of Herpetology* 11:56-58.

Kochva, E., 2002. *Atractaspis* (Serpentes, Atractaspididae) the burrowing asp; a multidisciplinary minireview. *BMNH Bull: Zoology* 68:91-99.

Kochva, E., Shayer-Wollberg, M. and Sobol, R. 1967. The special pattern of the venom gland in *Atractaspis* and its bearing on the taxonomic status of the genus. *Copeia* 1967:763-772.

Kurnik, D., Haviv, Y. and Kochva, E. 1999. A snake bite by the burrowing asp*, Atractaspis engaddensis. Toxicon* 37(1):223-227.

Lanza, B. 1990. Amphibians and reptiles of the Somali Democratic Republic:Check list and biogeography. *Biogeographia*, 14:407-465.

Largen, M. J. and Spawls, S. 2010. *Amphibians and Reptiles of Ethiopia and Eritrea*. Edition Chimaira, Frankfurt, 694 pp.

Laurent, R. F. 1945. Contribution a la connaissance du Genre *Atractaspis* A. Smith. *Rev. Zool. Bot. Afr.*, 38:312-343.

Laurent, R. F. 1950. Reptiles nouveaux des Kundelungu. *Rev. Zool. Bot. Afr.* (Bruxelles) 43(4):349-352.

Laurent, R. F. 1956. Contribution à l'herpetologie de la région des Grandes Lacs de l'Afrique centrale. *Ann. Mus. Roy. Congo Belge* (*Sci. Zool.*), 48:1-390.

Lönnberg, E. and Andersson, L. G. 1913. On a collection of reptiles from Kismayu. *Arkiv för Zoologi* 8:1-6.

Minton, S. A. 1968. Antigenic Relationships of the venom of *Atractaspis microlepidota* to that of other snakes *Toxicon* 6(1):59-64.

Mocquard, M. F. 1897. Sur une collection de Reptiles recueillis par M. Haug, à Lambaréné. *Bull. Soc. Philom.* Paris, (8)9:5-20.

Moyer, K. and Jackson, K. 2011. Phylogenetic relationships among the Stiletto Snakes (genus *Atractaspis*) based on external morphology. *African Journal of Herpetology* 211:1-17.

Pauwels, O. S. G. and Meirte, D. 1996. Contribution to the knowledge of the Gambian herpetofauna. *Bri. Herp. Soc. Bull.* 56:27-34.

Pauwels, O. S. G. and Vande weghe, J. P. 2008. *Les reptiles du Gabon*. Smithsonian Institution, Washington:272 pp.

Perret, J. L. 1960. Une nouvelle et remarquable espèce d'*Atractaspis* (Viperidae) et quelques autres Serpents d'Afrique. *Rev. suisse Zool.* 67(1):129-139.

Perret, J. L. 1961. *Bull. Soc. neuchâtel. Sci. nat.,* 84:133.

Peters, W. C. H. 1877. Übersicht der Amphibien aus Chinchoxo (Westafrika), welche von der Africanischen Gesellschaft dem Berliner zoologischen Museum übergeben sind. Monatsber. *königl. Akad. Wiss. Berlin.* 1877 (October):611-620

Pfeffer, G. 1893. Ostafrikanische Reptilien und Amphibien, gesammelt von Herrn Dr. F. Stuhlmann im Jahre 1888 und 1889. *Jb. Hamb. Wiss. Anst.* 10:71-105.

Pitman, C. R. S. 1974. A guide to the snakes of Uganda. Codicte, Wheldon and Wesley Ltd., UK:290 pp.

Pyron, R. A., Burbrink, F. T., Colli G. R., de Oca, A. N. M., Vitt, L. J., Kuczynski, C. A. and Wiens, J. J. 2011. The phylogeny of advanced snakes (Colubroidea), with discovery of a new subfamily and comparison of support methods for likelihood trees**.** *Mol. Phylogenet. Evol.* 58:329-342.

Pyron, R. A., Burbrink, F. T. and Weins, J. J. 2013. A phylogeny and revised classification of Squamata, including 4161 species of lizards and snakes. Published online at: http://www.biomedcentral.com/1471-2148/13/93.

Rasmussen, J. B. and Hughes, B. 1996. Description of some new snake species. I. *Steenstrupia* 22:13-39.

Reinhardt, J. T. 1843. Beskrivelse af nogle nye Slangearter. *Danske Vidensk. Selsk. Afhandl.* 10:233-279.

Ride, W. D. L. (ed.) *et al.* (on behalf of the International Commission on Zoological Nomenclature) 1999. *International code of Zoological Nomenclature*. The Natural History Museum - Cromwell Road, London SW7 5BD, UK (also commonly cited as "ICZN 1999").

Schmidt, K. P. 1923. Contributions to the herpetology of the Belgian Congo based on the collection of the American Museum Congo Expedition, 1909-1915. Part II. Snakes, with field notes by Herbert Lang and James P. Chapin. *Bull. Amer. Mus. nat. Hist.* 49(1):1-146

Schmidt, K. P. 1943. Amphibians and reptiles from the Sudan. *Field Mus. nat. Hist* (ser. zool.) 24:331-338.

Segniagbeto, G. H., Trape, J. F., David. P., Ohler, A., Dubois, A. and Glitho, I. A. 2011. The snake fauna of Togo: systematics, distribution and biogeography, with remarks on selected taxonomic problems. *Zoosystema* 33(3):325-360. DOI: 10.5252/z2011n3a4

Shine, R., Branch, W. R., Harlow, P. S., Webb, J. K. and Shine, T. 2006. Biology of Burrowing Asps (Atractaspididae) from southern Africa. *Copeia* 2006:103-115.

Sjöstedt, Y. 1896. *Atractaspis reticulata*, eine neue Schlange aus Kamerun. *Zool. Anz.* 19:516-517.

Smith, A. 1849. *Illustrations of the Zoology of South Africa. 3 (Reptiles).* Smith, Elder, and Co., London.

Spawls, S. and Branch, W. 1995. *The Dangerous Snakes of Africa*. Ralph Curtis Books. Dubai: Oriental Press:192 pp.

Spawls, S., Howell, K., Drewes, R. C. and Ashe, J. 2001. *A field guide to the reptiles of East Africa*. Academic Press:543 pp.

Trape, J. F. and Roux-Esteve, R. 1995. Les serpents du Congo: liste commentée et clé de détermination. *Journal of African Zoology* 109(1):31-50.

Trape, J. F., Mane, Y. and Ineich, I. 2006. *Atractaspis microlepidota*, *A. micropholis* et *A. watsoni* en Afrique occidentale et centrale. *Bull. Soc. Herp. France* 119:5-16.

Underwood, G. and Kochva, E. 1993. On the affinities of the burrowing asps *Atractaspis* (Serpentes: Atractaspididae). *Zool. J. Linn. Soc.* 107:3-64.

Wagner, P., Townsend, E., Barej, M., Rödder, D. and Spawls, S. 2009. First record of human envenomation by *Atractaspis congica* Peters, 1877 (Squamata: Atractaspididae). *Toxicon* 54:368-372.

Warrell , D. A., Ormerod, D. and Davidson, N. 1976. Bites by the Night Adders (*Causus maculatus*) and Burrowing Vipers (Genus *Atractaspis*) in Nigeria. *American Journal of Tropical Medicine and Hygiene* 25(3):517-523.

Werner, F. 1897. Über Reptilien und Batrachier aus Togoland, Kamerun und Tunis aus dem Kgl. Museum für Naturkunde in Berlin. *Verh. Zool.-Bot. Ges., Wien* 47:395-407.

Werner, F. 1899. Ueber Reptilien und Batrachier aus Togoland, Kamerun und Deutsch-Neu-Guinea grösstentheils aus dem k. Museum für Naturkunde in Berlin. *Verhandlungen der Kaiserlich-Königlichen Zoologisch-Botanischen Gesellschaft in Wien* 49:132-157.

**CONFLICT OF INTEREST**

The author has no conflicts of interest in terms of this paper or conclusions within.

*Australasian Journal of Herpetology* 20:20-25.
Published 10 July 2013.

ISSN 1836-5698 (Print)
ISSN 1836-5779 (Online)

# Four new species of snake from Central Africa (Serpentes: Colubridae) and (Serpentes: Lamprophiidae).

**RAYMOND T. HOSER**

**488 Park Road, Park Orchards, Victoria, 3114, Australia.**
***Phone*: +61 3 9812 3322 *Fax*: 9812 3355 *E-mail*: snakeman@snakeman.com.au**
**Received 2 May 2013, Accepted 13 June 2013, Published 10 July 2013.**

## ABSTRACT

An audit of rainforest snakes found on both sides of the Dahomey Gap in West Africa found that a number of species were in fact composite.

Some of these were found to include taxa for which there were no available names.

This paper formally names four of them according to the Zoological Code (Ride *et al*. 1999).

The species now effectively divided in two, based on morphological, distributional and geological evidence are as follows: the Emerald Snake *Hapsidophrys smaragdina* (Schlegel, 1837); the Black-lined Green Snake *Hapsidophrys lineatus* Fischer, 1856; African Banded Snake *Chamaelycus fasciatus* (Günther, 1858) and the Leach's Wolf Snake *Lycophidion irroratum* (Leach, 1819).

In every case the nominate form is now confined to the forested region west of the Dahomey Gap, commencing from about Ghana and progressing west to include the forests of Guinea, with the newly described taxa being found in the region to the east of Benin and including the main forested Central African region.

**Keywords:** Taxonomy; nomenclature; snakes, Africa; *Hapsidophrys*; *Chamaelycus*; *Lycophidion*; new species; *pintaudii*; *daranini*; *euanedwardsi*; *woolfi.*

### INTRODUCTION

The Dahomey gap in the region of Togo/Benin West Africa has long been recognized as a barrier to forest species dispersal in geologically recent times (Maurin *et al.* 2007; Murphy and Collier 1999; Weber 2001; White 1983).

Across various zoological disciplines, populations of animals thought to consist a single species on both sides of the Dahomey Gap have been found to be sufficiently divergent to warrant being classified as two separate species Murphy and Collier (1999) for fish and Lenk *et al.* (1999) for snakes.

An audit of species of snake found on both sides of the Dahomey Gap did show many recognized as single species to be composite, as in being different on both sides of the gap.

This is clearly the result of the same drying factors that have separated entire ecosystems and all the species within them, allowing each side to continue evolving and speciating independently.

In terms of the snakes found to be different, the vast majority of composite species were also found to have available names.

That is earlier workers (usually from the 1800's) had proposed names for the relevant species populations, only to have them relegated to synonymy later on by others in later reviews.

Since then and more recently, myself or others have found these named species to represent different taxa to the similar earlier described forms from across the Dahomey Gap.

One such example was the relegation of *Bitis rhinoceros* into synonymy with *B. gabonica* for many years until Lenk *et al.* (1999) resurrected the former as a full species, which is a position I concur with.

The physical barrier separating the divergent forest viper populations was the Dahomey Gap.

The audit of the species of snake affected by this barrier did also find two viper species to have diverged across the barrier, the result being each unnamed population needed to be formally described.

That has been done in two other papers published at the same time as this one.

Those species split into two were, *Bitis* (*Macrocerastes*) *nasicornis* Shaw, 1802 and *Causus lichtensteini* Jan, 1859.

In the case of both species, it was the populations east of the Dahomey Gap that were described as new species.

In terms of snakes within the Colubridae, two species (as generally accepted at the present time) within the genus *Hapsidophrys* were found to each consist of two allopatric species, being found on either side of the Dahomey Gap.

These were the Emerald Snake *Hapsidophrys smaragdina* (Schlegel, 1837) and the Black-lined Green Snake *Hapsidophrys lineatus* Fischer, 1856.

As a result, for each taxon group, I have described the unnamed species taxa below.

For the West African Lamprophiidae, two species groups were found to have diverged into allopatric species populations, each with one population needing to be formally named at the species level.

These are the snakes currently recognized as the African Banded Snake *Chamaelycus fasciatus* (Günther, 1858) and the Leach's Wolf Snake *Lycophidion irroratum* (Leach, 1819).

Although this was not planned, it turned out that in each case the nominate forms were found west of the Dahomey Gap, with the populations east of there being the unnamed ones.

While each new species is diagnosed below and in accordance with the Zoological Code (Ride *et al.* 1999), it will be easiest for most field herpetologists to simply assume that specimens formerly attributed to the split species in the countries east of Nigeria (including Nigeria), will in fact be the newly described taxa, derived from the same species groups.

Due to the fact that the newly named species have generally been regarded as being no different to the species from where they have been split as already noted, there is little if any relevant literature on the comparative taxonomy of the relevant snakes.

My own review consisted of an audit of literature, live specimens, dead specimens and images with reliable locality data, in order to ascertain the taxonomic status of the relevant snakes.

That has in effect been the "material and methods" of this study.

Because of the known distribution of the "old" and "newly described" species, most published material on the "old" species can be readily extrapolated to the new, if appropriate and based on the location of the subject specimens.

As a result, I think it is important to cite key literature in terms of each of the newly described species and those from where they have been split.

The most obvious morphological differences between the species described and those with which they have been lumped with to date are given in the descriptions below. This will enable people to identify given species in the absence of locality data, although I note for many people, locality data will in effect be sufficient to define which species they have in hand and usually be the easiest alternative to use in terms of accurate species-level identification.

The Colubrid genus *Hapsidophrys* as presently recognized consists of just three species, namely, *Hapsidophrys lineatus* Fischer, 1856, *Hapsidophrys principis* (Boulenger, 1906) and *Hapsidophrys smaragdina* (Schlegel, 1837).

*Hapsidophrys principis* (Boulenger, 1906) occurs on São Tomé and Príncipe Islands in the Gulf of Guinea, off the African coast. The other two, as recognized prior to the publication of this paper, were found on both sides of the Dahomey Gap in forested sub-Saharan and central Africa.

The taxonomy of *Hapsidophrys principis* (Boulenger, 1906) and to a lesser extent the rest of the genus was dealt with by Jesus *et al.* (2009).

Other important publications in terms of the three species of *Hapsidophrys* include the following: Barnett (2001), Barnett and Emms (2005), Blanc and Fretey (2000), Bocage (1895), Böhme *et al.* (2001), Boulenger (1894, 1897, 1906), Branch and Rödel (2003), Broadley (1966, 1998), Broadley and Howell (1991), Burger *et al.* (2004), Capocaccia (1961), Chifundera (1990), Chirio and Lebreton (2007), Cope (1861), Doucet (1963), Fischer (1856), Gossmann *et al.* (2002), Günther (1896), Hallowell (1844, 1854, 1857), Hofer (2002), Jackson (2008), Jackson *et al.* (2007), Lawson *et al.* (2005), Loveridge (1936), Luiselli (2000), Manacas (1858), Pauwels and David (2008), Pauwels and Vande weghe (2008), Pauwels *et al.* (2002, 2004, 2007), Rödel and Mahsberg (2000), Schatti and Loumont (1992), Schlegel (1837), Schmidt (1923), Sclater (1891), Segniagbeto *et al.* (2011), Sinsin and Bergmans (1999), Spawls *et al.* (2001), Sternfeld (1917), Trape and Roux-Esteve (1995), Werner (1899, 1902), Williams and Wallach (1989) and sources cited therein.

Important publications in terms of the African Banded Snake *Chamaelycus fasciatus* (Günther, 1858) and the other species in the same genus include Angel (1934), Bogert (1940), Boulenger (1893, 1919), Broadley (1998), Chifundera (1990), Chippaux (2001), Chirio and Lebreton (2007), Günther (1858), Hughes (1983), Lebreton (1999), Loveridge (1936), Mocquard (1902), Pauwels and Vande weghe (2008), Pauwels *et al.* (2002), Schmidt (1923), Segniagbeto *et al.* (2011), Sinsin and Bergmans (1999), Spawls *et al.* (2001), Sternfeld (1917), Trape and Roux-Esteve (1990, 1995), Werner (1899), Witte (1963) and sources cited therein.

The genus *Lycophidion* as currently recognized includes about 19 species. However a number of phylogenies, including those of Pyron *et al.* (2011 and 2013) both show the genus to be paraphyletic at the genus level. However important publications in terms of the Leach's Wolf Snake *Lycophidion irroratum* (Leach, 1819) include Barnett (2001), Barnett and Emms (2005), Böhme and Schneider (1987), Boulenger (1893), Broadley (1992, 1998), Broadley and Hughed (1983), Chifundera (1990), Chirio and Lebreton (2007), Günther (1858, 1868, 1896), Laurent (1968), Leach (1819), Segniagbeto *et al.* (2011), Trape and Mane (2006), Werner (1897) and sources cited therein.

***HAPSIDOPHRYS PINTAUDII SP. NOV.***

**Holotype:** A specimen at the Field Museum of Natural History, (FMNH), Division of Amphibians and Reptiles, Roosevelt Road at Lake Shore Drive, Chicago, Illinois, 60605, USA. Specimen number 214773 from the Democratic Republic of Congo. This is a facility that allows access to its collection by scientists.

**Paratype:** A specimen at the Field Museum of Natural History, (FMNH), Division of Amphibians and Reptiles, Roosevelt Road at Lake Shore Drive, Chicago, Illinois, 60605, USA. Specimen number 145179 from the Democratic Republic of Congo. This is a facility that allows access to its collection by scientists.

**Diagnosis:** This species was until now treated as the eastern variant of the Emerald Snake *Hapsidophrys smaragdina* (Schlegel, 1837).

*Hapsidophrys pintaudii sp. nov.* is separated from *H. smaragdina* by the fact that in *Hapsidophrys pintaudii sp. nov.* the lower postocular is noticeably smaller than the upper one. In *H. smaragdina* both postoculars are of similar size.

In *Hapsidophrys pintaudii sp. nov.* there is a dark blackish streak running along each side of the head, through the eye and to the nostril or just before it, with the streak being sufficiently wide as to run across the entirety of the lower postocular.

By contrast in *H. smaragdina* the streak running along each side of the head is relatively indistinct and narrow (or entirely absent), and is never of sufficient width to run across the entirety of the lower postocular.

In *Hapsidophrys pintaudii sp. nov.* the yellowish-green lower labials have some darker speckling on the scales. This is absent in *H. smaragdina.*

Both *Hapsidophrys pintaudii sp. nov.* and *H. smaragdina* are diagnosed as follows: Rostral is broader than deep, visible from above; internasals longer than the praefrontals; frontal is one and a half times as long as broad, as long as or a little longer than its distance from the end of the snout, or as long as or slightly shorter than the parietals; loreal is two to three times as long as deep, sometimes confluent with the praefrontal; one praeocular, in contact with or narrowly separated from the frontal; two postoculars; temporals 1+2; nine (rarely 8) upper labials, fifth and sixth or fourth and fifth entering the eye. Five or

Hoser 2013 - Australasian Journal of Herpetology 20:20-25.

six lower labials are in contact with the anterior chin-shields, which are shorter than the posterior. There are 15 dorsal mid body scale rows (15 anterior and 11 posterior), all strongly keeled and distinctly striated. There are 150-174 ventrals, divided anal and 140-172 subcaudals. The colour is a dark bluish green above, commonly green but with blue between the scales, being pale yellowish or green ventrally and on the upper lip. While there is usually some form of demarcation along each side of the head, which passes through the eye, this is noticeable in particular in *Hapsidophrys pintaudii sp. nov.*, rather than in *H. smaragdina* (see the diagnosis above).

**Distribution:** Forested areas east of the Dahomey Gap, being the countries from Nigeria and east of there in forested Central Africa. This includes far northern Angola, the Democratic Republic of the Congo (Zaire), Congo (Brazzaville), Gabon, Equatorial Guinea, Cameroon, Central African Republic, Nigeria and Tanzania.

Specimens formerly referred to as *H. smaragdina* from São Tomé und Principé in the Gulf of Guinea, are now referred to the species *Hapsidophrys principis* Boulenger, 1906 (Jesus *et al.* 2009).

**Etymology:** Named in honour of Vince Pintaudi in recognition of his services to reptile conservation and welfare through his managerial role at the Melbourne, Victoria, Australia, business, "Amazing Amazon" a shop in Glen Waverley, Victoria, Australia, that specializes in reptiles and fish, as well his work as a snake and reptile relocator in Melbourne's south-eastern suburbs.

***HAPSIDOPHRYS DARANINI SP NOV.***

**Holotype:** A specimen at the American Museum of Natural History, Division of Vertebrate Zoology (Herpetology), 79th Street and Central Park West, New York, New York 10024, USA, specimen number 12131 from Medje in the Democratic Republic of Congo, Africa. This is a government owned facility that allows access to its material by scientists.

**Paratype:** Specimens at the American Museum of Natural History, Division of Vertebrate Zoology (Herpetology), 79th Street and Central Park West, New York, New York 10024, USA, specimen numbers 12132, 12133 and 12129 also from the Democratic Republic of Congo, Africa. This is a government owned facility that allows access to its material by scientists.

**Diagnosis:** This species was formerly regarded as the eastern variant of *Hapsidophrys lineatus* Fischer, 1856.

*Hapsidophrys daranini sp. nov.* is separated from *H. lineatus* by the fact that the upper postocular is nearly twice the length of the lower one, versus being of similar length or slightly longer only in *H. lineatus.*

*Hapsidophrys daranini sp. nov.* is also diagnosed by the size and shape of the loreal scale. In *Hapsidophrys daranini sp. nov.* it is of similar or same size as the two labials it borders below. By contrast in *H. lineatus* the loreal is noticeably narrower than the two labials it borders below.

In both *Hapsidophrys daranini sp. nov.* and *H. lineatus* there is black etching to the scales on the head. However in *Hapsidophrys daranini sp. nov.* this does not overflow onto the scales of the side of the head, which is the case in *H. lineatus.*

Both *Hapsidophrys daranini sp. nov.* and *H. lineatus* are diagnosed as follows: Nostril is broader than deep being just visible from above. The internasals are as long as the praefrontals; frontal is one and half to one and two thirds as long as broad, as long as or a little longer than the distance from the end of the snout, as long as the parietals; loreal at least twice as long as deep; one praeocular (rarely two) not touching the frontal; two postoculars only; temporals 2+2 (rarely 1+2); eight or nine upper labials with the fourth and fifth or fifth and sixth entering the eye; four to six lower labials in contact with the anterior chin-shields, which are as long as or a little shorter than the posterior.

There are 15 dorsal mid body scale rows (15 anterior and 11 posterior), striated and keeled, the outer row without or with a very faint keel. 158-170 ventrals, single anal, 95-158 subcaudals. Dorsally the colour is a striated black and green, each scale green in the middle and black on the sides; upper lip and lower parts are pale green or yellowish green.

In *H. lineatus* the upper lip (labials) is a pale green colour, whereas in *Hapsidophrys daranini sp. nov.* the upper lip is a distinctive yellow colour, running across the upper labials, but only including the lower parts of the first two, and then the entire labial scales for the second trio, which means this yellow region meets the lower eye.

**Distribution:** Forested areas of central Africa, east of the Dahomey Gap. This includes Uganda, Western Tanzania, Kenya, Rwanda, Burundi, the Democratic Republic of the Congo (Zaire), Congo (Brazzaville), Gabon, Equatorial Guinea, Cameroon, Nigeria and the Central African Republic.

**Etymology:** Named in honour of Dara Nin of Ringwood, Victoria, Australia, in recognition of many years of active wildlife conservation and education through his role with Snakebusters, Australia's best wildlife displays, including in 2012 taking a bite from an adult female venomoid Death Adder *Acanthophis bottomi* to shatter the repeated lie peddled by Ron Waters of the Victorian Department of Sustainability and Environment and his criminal associates that the snakes have regenerated venom and are dangerous.

Other than having a chewed up forearm, nothing happened to Dara!

***CHAMAELYCUS EUANEDWARDSI SP. NOV.***

**Holotype:** A specimen at the United States National Museum (USNM) Washington, DC, USA, specimen number: 570889 from Mt. Nlonako, Cameroon, Africa. The United States National Museum is a government-owned facility that allows access to its specimens by researchers.

**Paratypes:** Two specimens at the United States National Museum (USNM) Washington, DC, USA, specimen numbers: 570891 and 570890 from Mt. Nlonako, Cameroon, Africa. The United States National Museum is a government-owned facility that allows access to its specimens by researchers.

**Diagnosis:** Until now this taxon has been treated as a variant of the African Banded Snake *Chamaelycus fasciatus* (Günther, 1858) a species commonly placed in the genus *Lycophidion* until the genus *Chamaelycus* Boulenger, 1919 was resurrected by de Witte in 1963.

However *Chamaelycus euanedwardsi sp. nov.* is most readily separated from *C. fasciatus* by the fact that the venter is uniformly grey as opposed to being whitish in colour in *C. fasciatus* the ventral scales in *C. fasciatus* in fact being grey in colour but etched with white at the posterior side, the etching being about half the scale width, thereby giving the whitish in colour view at a distance.

In *Chamaelycus euanedwardsi sp. nov.* the head is entirely without markings, whereas in *C. fasciatus* the head is a light greyish brown in colour with a darker and slightly indistinct temporal streak of about two scales width on either side.

*Chamaelycus euanedwardsi sp. nov.* has 30 or more narrow dark cross-bands, interrupted along the mid-dorsal line, sometimes presenting as alternating transverse spots, versus usually less than 30 narrow dark crossbands or sets of such markings in *C. fasciatus.*

Both *Chamaelycus euanedwardsi sp. nov.* and *C. fasciatus* are diagnosed by the following traits: The diameter of the eye is much greater than its distance from the mouth. The rostral is twice as broad as deep, visible from above; internasals at least as large as the nasals, one half to two fifths the length of the prefrontals, which are broader than long; the frontal is as long as broad or broader than long, as long as or a little shorter than the parietals; loreal longer than deep; praeocular as large or a little smaller than the supraocular, forming a short suture with the

frontal; seven upper labials, third fourth and fifth entering the eye, sixth being the largest; anterior chin shields longer and wider than the posterior ones and in contact with four or five lower labials. 17 dorsal mid-body scale rows (17 anterior and 15 posterior), 175-198 ventrals, single anal, 34-56 subcaudals.

*Chamaelycus euanedwardsi sp. nov.* has a known ventral range of 175-198 versus 180-189 for *C. fasciatus.*

**Distribution:** Forested areas of central Africa, east of the Dahomey Gap. This includes the Democratic Republic of the Congo (formerly Zaire), Congo (Brazzaville), Gabon, Equatorial Guinea, Cameroon, Nigeria and the Central African Republic.

**Etymology:** Named in honour of Gold-coast, Queensland Australia herpetologist Euan Edwards in recognition of a stellar career in herpetology spanning some decades and including long stints of research in the United States, Madagascar and elsewhere and for his largely unseen (by most people) contributions to the taxonomy and nomenclature of the world's reptiles.

***LYCOPHIDION WOOLFI SP. NOV.***

**Holotype:** A female specimen at the American Museum of Natural History, Division of Vertebrate Zoology (Herpetology), 79th Street and Central Park West, New York, New York 10024, USA, specimen number 12035 from Garamba in the Democratic Republic of Congo, Africa. This is a government owned facility that allows access to its material by scientists.

**Paratype:** A female specimen at the American Museum of Natural History, Division of Vertebrate Zoology (Herpetology), 79th Street and Central Park West, New York, New York 10024, USA, specimen number 12041 from Dungu in the Democratic Republic of Congo, Africa. This is a government owned facility that allows access to its material by scientists.

**Diagnosis:** Until now, this species has been treated as a regional variant of the Leach's Wolf Snake *Lycophidion irroratum* (Leach, 1819).

*Lycophidion woolfi sp. nov.* is most readily separated from *L. irroratum* by colour pattern. Unlike *L. irroratum* in *Lycophidion woolfi sp. nov.* the colouration is entirely blackish-brown above and below and without a trace of spots.

By contrast specimens of *L. irroratum* are brown above, with or without a dark vertebral line; a series of transverse dark brown or black spots usually present along each side of the back, these spots wide apart and usually alternating with those on the other side; head is speckled or vermiculated with dark brown; a yellowish, dark-edged streak from the eye to the angle of the mouth; ventrals and subcaudals are dark brown or olive brown in the middle and yellowish speckled with brown on the sides.

Both *Lycophidion woolfi sp. nov.* and *L. irroratum* have similar physical traits and scalation, diagnosed as follows: The diameter of the eye is greater than the distance from the mouth. The rostral is twice as broad as it is deep, visible from above; internasals are hardly as large as the nasals; praefrontals are a little longer than broad; frontal is as long as it is broad or a little longer, shorter than its distance from the end of the snout which nearly equals the length of the parietals; loreal longer than deep; praeocular is nearly as large as or larger than the supraocular, broadly in contact with the frontal; two postoculars, both in contact with the parietal; temporals 1+2; eight upper labials with the third, fourth and fifth entering the eye; seventh is the largest; chin-shields are very small, the anterior in contact with four or five lower labials. 17 dorsal mid-body scale rows (17 anterior and 15 posterior); 164-189 ventrals; single anal; 37-52 subcaudals. The tail is between 11 and 13 percent of the total body length.

**Distribution:** Known from the forested areas of central Africa, east of the Dahomey Gap, including the Central African Republic, Cameroon and the Democratic Republic of the Congo (formerly Zaire). It is also presumably present in adjacent countries with similar forested habitats.

**Etymology:** Named in honour of Paul Woolf, of Walloon, west of Brisbane, Queensland, Australia, in recognition for his contributions to herpetology spanning some decades, including as foundation president of the Herpetological Society of Queensland (HSQI) and a considerable amount of research work on Australian reptiles and other wildlife, most of which has been conducted without fanfare or publicity and in the face of intense harassment at times by corrupt wildlife officers motivated solely by personal greed.

For a while he lived in Sydney, NSW, but like many other herpetologists (including for example Shane Black, Michael Cermac, Brian Bush, John Scanlon, Matthew Lebreton, Greg Wallis, Trevor Sullivan and Kaj Bulliard), he fled the ongoing harassment by corrupt wildlife officers working for the NSW National Parks and Wildlife Service, AKA NPWS (see Hoser 1993 and 1996 for details), including the ever present risk of illegal violent armed raids in the middle of the night or at dawn and has been living in Queensland for more than ten years as of 2013.

**REFERENCES CITED**


Angel, F. 1934. Remarques sur le genre Oophilositum Parker (Colubridé aglyphe) et description d'une espèce nouvelle. *Bull. Soc. Zool. France*, Paris 59:417-419.

Barnett, L. K. 2001. The herpetofauna of Abuko Nature Reserve, the Gambia. *Herpetological Bulletin* (77):5-1.

Barnett, L. K. and Emms, C. 2005. *Common reptiles of The Gambia.* Rare Repro, Hailsham, East Sussex:24 pp.

Blanc, P. and Fretey, T. 2000. Les reptiles de la Réserve de La Lopé et de la Foret des Abeilles (Gabon). *Bull. Soc. Zool.* France 125(4):281-292.

Bocage, B. du 1895. *J. Sci. math. phys. nat.* Lisboa, 4(2):12.

Bogert, C. M. 1940. Herpetological results of the Vernay Angola Expedition. I. Snakes, including an arrangement of the African Colubridae. *Bull. Amer. Mus. Nat. Hist.* 77:1-107.

Böhme, W. and Schneider, B. 1987. Zur Herpetofaunistik Kameruns (3) mit Beschreibung einer neuen Cardioglossa (Anura: Arthroleptidae). *Bonner Zoologische Beiträge* 38(3):241-263.

Böhme, W., Rödel, M., Brede, C. and Wagner, P. 2011. The reptiles (Testudines, Squamata, Crocodylia) of the forested southeast of the Republic Guinea (Guinée forestière), with a country-wide checklist. *Bonn zoological Bulletin* 60(1):35-61.

Boulenger, G. A. 1893. Catalogue of the snakes in the British Museum (Nat. Hist.) I. London (Taylor and Francis):448 pp.

Boulenger, G. A. 1894. *Catalogue of the Snakes in the British Museum (Natural History). Volume II., Containing the Conclusion of the Colubridae Aglypae.* British Mus. (Nat. Hist.), London:xi+382 pp.

Boulenger, G. A. 1897. A list of reptiles and batrachians from the Congo Free State, with the description of two new snakes. *Ann. Mag. nat. Hist.* (6)19:276-281.

Boulenger, G. A. 1906. Report on the reptiles collected by the late L. Fea in West Africa. *Ann. Mus. civ. Stor. Nat. Genova* (3)2:196-216.

Boulenger, G. A. 1919. Batraciens et reptiles cecueillis par le Dr. C. Christy dans les districts de Stanleyville, Haut-Uelé et Ituri en 1912-1914. *Rev. zool. afr., Bruxelles*, 7(1):1-29.

Branch, W. R. and Rödel, M. O. 2003. Herpetological survey of the Haute Dodo and Cavally forests, western ivory Coast, Part II: Trapping, results and reptiles. *Salamandra* 39(1):21-38.

Broadley, D. G. 1992. The taxonomy and zoogeography of the genus *Lycophidion* (Serpentes: Colubridae). *Journal of the Herpetological Association of Africa* 40:30-36.

Broadley, D. G. 1966. A review of the Natal green snake, *Philothamnus natalensis* (A.Smith), with a description of a new subspecies. *Ann. Natal Mus.* 18(2):417-423.

Broadley, D. G. 1998. *The reptilian fauna of the Democratic*

*Republic of the Congo (Congo-Kinshasa). In: Schmidt, K.P. and Noble, G.K., Contributions to the Herpetology of the Belgian Congo*... [reprint of the 1919 and 1923 papers]. SSAR Facsimile reprints in Herpetology:780 pp.

Broadley, D. G. and Howell, K. M. 1991. A check list of the reptiles of Tanzania, with synoptic keys. *Syntarsus* 1:1-70.

Broadley, D. G. and Hughes, B. 1993. A review of the genus *Lycophidion* (Serpentes: Colubridae) in northeastern Africa. *Herpetological Journal* 3(1):8-18.

Burger, M., Branch, W. R. and Channing, A. 2004. Amphibians and Reptiles of Monts Doudou, Gabon: Species Turnover Along an Elevational Gradient. *California Academy of Sciences Memoir*(28):145–186

Capocaccia, L. 1961. Catalogo dei tipi di Rettili del Museo Civico di Storia Naturale di Genova [MSNG]. *Ann. Mus. Civ. Stor. Nat. Giacomo Doria* 72:86-111.

Chifundera, K. 1990. Snakes of Zaire and their bites. *Afr. Stud. Monogr.* (Kyoto) 10(3):137-157.

Chippaux, J. P. 2001. *Les serpents d'Afrique occidentale et centrale, 2nd ed.* Paris (IRD editions):292 pp.

Chirio, L. and Lebreton, M. 2007. Atlas des reptiles du Cameroun. MNHN, IRD, Paris:688 pp.

Cope, E. D. 1861. Catalogue of the Colubrids in the museum of the Academy of Natural Sciences of Philadelphia. Part 3. *Proc. Acad. Nat. Sci. Philadelphia*, 12:553-566.

Doucet, J. 1963. Les serpents de la Republique de Cote d'Ivoire Acta Tropica (Basel) 20:201-259, 297-340.

Fischer, J. G. 1856. Neue Schlangen des Hamburgischen Naturhistorischen Museums. *Abhandl. Nat. Ver. Hamburg* 3(4):79-116.

Gossmann, V., Lötters, S., Obame, F. and Böhme, W. 2002. Zur Herpetofauna Gabuns. Teil II: Kommentierte Artenliste der gefundenen Reptilien, Bemerkungen zur Artenvielfalt. *Herpetofauna* 24(136):19-33.

Günther, A. 1858. *Catalogue of Colubrine snakes of the British Museum.* London, I-XVI:1-281.

Günther, A. 1868. Sixth account of new species of snakes in the collection of the British Museum. *Ann. Mag. nat. Hist.* (4)1:413-429.

Günther, A. 1896. Report on a collection of reptiles and fishes made by Miss M. H. Kingsley during her travels on the Ogowe river and in Old Calabar. *Ann. Mag. Nat. Hist.* (6)17:261-267.

Hallowell, E. 1844. Descriptions of new species of African reptiles. *Proc. Acad. nat. Sci. Philad.*, 1844: 8-62.

Hallowell, E. 1854. Remarks on the geographical distribution of reptiles, with descriptions of several species supposed to be new, and corrections of former papers. *Proc. Acad. Nat. Sci. Philad.* 1854:98-105.

Hallowell, E. 1857. Notes of a collection of reptiles from the Gaboon country, West Africa, recently presented to the Academy of Natural Sciences of Philadelphia, by Dr. Herny A. Ford. *Proc. Acad. Nat. Sci. Philadelphia* 9:48-72.

Hofer, D. 2002. *The São Tomé and Principé Handbook.* D. Hofer Verlag, Bern:152 pp.

Hoser, R. T. 1993. *Smuggled: The underground trade in Australia's wildlife*. Apollo Publishing, Mosman, NSW, 2088, Australia:160 pp.

Hoser, R. T. 1996. *Smuggled-2: Wildlife trafficking, crime and corruption in Australia.* Kotabi Publishing, Doncaster, Victoria, 3108, Australia:280 pp.

Hughes, B. 1983. African snake faunas. *Bonn. Zool. Beitr.* 34:311-356.

Jackson, K. 2008. *Mean and lowly things:Snakes, Science, and Survival in the Congo.* Harvard University Press:336 pp.

Jackson, K., Zassi-Boulou, A., Mavoungou, L. and Pangou, S. 2007. Amphibians and Reptiles of the LacTélé Community Reserve, Likouala Region, Republic of Congo (Brazzaville). *Herp. Cons. Biol.* 2(2):75-86.

Jesus, J., Nagy, Z., Branch, W., Wink, M., Brehm, A. and Harris, D. J. 2009. Phylogenetic relationships of African green snakes (genera *Philothamnus* and *Hapsidophrys*) from São Tomé, Príncipe and Annobon islands based on mtDNA sequences and comments on their colonization and taxonomy. *Herpetological Journal* 19:41-48.

Laurent, R. F. 1968. A re-examination of the snake genus *Lycophidion* Duméril and Bibron. *Bull. Mus. comp. Zool. Harvard* 136(12):461-482.

Lawson, R., Slowinski, J. B., Crother, B. I. and Burbrink, F. T. 2005. Phylogeny of the Colubroidea (Serpentes): New evidence from mitochondrial and nuclear genes. *Molecular Phylogenetics and Evolution*, 37(2):581-601.

Leach 1819. in: Bowdich. Miss. Cape Coast Cast. *Ashantee, App.*:493-494.

LeBreton, M. 1999. *A working checklist of the herpetofauna of Cameroon.* Netherlands Committee for IUCN:160 pp.

Lenk, P., Herrmann, H. W., Joger, U. and Wink, M. 1999. Phylogeny and taxonomic subdivision of *Bitis* (Reptilia: Viperidae) based on molecular evidence. *Kaupia* (Darmstadt) (8):31-38.

Loveridge, A. 1936. African reptiles and amphibians in the Field Museum of Natural History. *Zool. Ser. Field Mus. Nat. Hist., Chicago*, 22(1):1-122.

Luiselli, L., Akani, G. and Angelici, F. M. 2000. Observations on the biology of the African Emerald Snake *Gastropyxis smaragdina* (Schlegel, 1837) in southern Nigeria. *Herpetozoa* 13.

Manacas, S. 1958. Amphibians and reptiles of the islands of Sao Tome & Principe and of Rolas Islet. *Conferencia Intern. dos Africanistas Ocidentais, Comunicacoes Zool. e Biol. Animal, 6. Sess.*, 4:179-192.

Maurin, O., Davis, A. P., Chester, M., Mvungi, E. F., Jaufeerally-Fakim, Y. and Fay, M. F. 2007. Towards a Phylogeny for Coffea (Rubiaceae): identifying well-supported lineages based on nuclear and plastid DNA sequences. *Ann. Bot.* 100(7):1565-1583.

Mocquard, F. 1902. Sur des reptiles et batraciens de l'Afrique Orientale Anglaise, du Gabon et de la Guinée Francaise (Région de Kouroussa). *Bulletin du Muséum d'Histoire Naturelle*, Paris, 8:404-417.

Murphy, W. J. and Collier, G. E. 1999. Phylogenetic relationships of African killifishes in the genera *Aphyosemion* and *Fundulopanchax* inferred from mitochondrial DNA sequences. *Mol. Phylogenet. Evol.* 11(3):351-60.

Pauwels, O. S. G. and David, P. 2008. Miscellanea Herpetologica Gabonica II. *Hamadryad* 32(1):19-24.

Pauwels, O. S. G. and Vande weghe, J. P. 2008. *Les reptiles du Gabon.* Smithsonian Institution, Washington:272 pp.

Pauwels, O. S. G., Kamdem Toham, A. and Chimsunchart, C. 2002. Recherches sur l'herpétofaune du Massif du Chaillu, Gabon. *Bull. Inst. Roy. Sci. Nat. Belgique (Biologie)* 72:47-57.

Pauwels, O. S. G., Branch, W. R. and Burger, M. 2004. Reptiles of Loango National Park, Ogooure-Maritime Province, South-western Gabon. *Hamadryad* 29(1):115-127.

Pauwels, O. S. G., Albert, J. L., Vande Weghe, G. and Gramentz, D. 2007. Neue Reptiliennachweise von Franceville, Südost-Gabun. *Elaphe* 15(3):63-66.

Perret 1961. *Bull. Soc. neuchâtel. Sci. nat.,* 84:133.

Pyron, R. A., Burbrink, F. T., Colli G. R., de Oca, A. N. M., Vitt, L. J., Kuczynski, C. A. and Wiens, J. J. 2011. The phylogeny of advanced snakes (Colubroidea), with discovery of a new subfamily and comparison of support methods for likelihood trees**.** *Mol. Phylogenet. Evol.* 58:329-342.

Pyron, R. A., Burbrink, F. T. and Weins, J. J. 2013. A phylogeny

and revised classification of Squamata, including 4161 species of lizards and snakes. Published online at: http://www.biomedcentral.com/1471-2148/13/93.

Ride, W. D. L. (ed.) *et al.* (on behalf of the International Commission on Zoological Nomenclature) 1999. *International code of Zoological Nomenclature*. The Natural History Museum - Cromwell Road, London SW7 5BD, UK (also commonly cited as "ICZN 1999").

Rödel, M. O. and Mahsberg, D. 2000. Vorläufige Liste der Schlangen des Tai-Nationalparks/Elfenbeinküste und angrenzender Gebiete. *Salamandra* 36(1):25-38.

Schatti, B. and Loumont, C. 1992. A contribution to the herpetofauna of Sao Tome (Gulf of Guinea) (Amphibia & Reptilia). *Zool. Abhandl. Staatl. Mus. für Tierkunde*, Dresden, 47:23-36.

Schlegel, H. 1837. Essai sur la physionomie des serpens. Partie Générale: xxviii +251 S. + Partie Descriptive: 606 S. + xvi. La Haye (J. Kips, J. HZ. et W. P. van Stockum)

Schmidt, K. P. 1923. Contributions to the herpetology of the Belgian Congo based on the collection of the American Museum Congo Expedition, 1909-1915. Part II. Snakes, with field notes by Herbert Lang and James P. Chapin. *Bull. Amer. Mus. nat. Hist.* 49(1):1-146.

Sclater, W. L. 1891. *List of snakes in the Indian Museum.* Trustees of the Indian Museum, Calcutta, 79 pp.

Segniagbeto, G. H., Trape J. F., David, P., Ohler, A., Dubois A. and Glitho, I. A. 2011. The snake fauna of Togo: systematics, distribution and biogeography, with remarks on selected taxonomic problems. *Zoosystema* 33(3):325-360.

Sinsin, B. and Bergmans, W. (eds) 1999. *Rongeurs, ophidiens et relations avec l'environnement agricole du Bénin.* Cotonou (Éd. Flamboyant):199 pp.

Spawls, S., Howell, K., Drewes, R. C. and Ashe, J. 2001. *A field guide to the reptiles of East Africa*. Academic Press:543 pp.

Sternfeld, R. 1917. Reptilia und Amphibia. In: Schubotz, H. (Hrsg.): Wissenschaftliche Ergebnisse der Zweiten Deutschen Zentral-Afrika-Expedition, 1910-1911 unter Führung Adolph Friedrichs, Herzog zu Mecklenburg. Leipzig: Klinkhardt and Biermann, [Band] 1, *Zoologie, Lieferung* 11; S. 407-510.

Trape, J. F. and Mane, Y. 2006. *Guide des serpents d'Afrique occidentale. Savane et désert*. IRD Editions, Paris:226 pp.

Trape, J. F. and Roux-Esteve, R. 1990. Note sur une collection de serpents du Congo avec description d'une espèce nouvelle. *Rev. Zool. Afr.* (*J. Afr. Zool.*) 104:375-383.

Trape, J. F. and Roux-Esteve, R. 1995. Les serpents du Congo: liste commentée et clé de détermination. *Journal of African Zoology* 109(1):31-50.

Weber, W. 2001. *African Rain Forest Ecology and Conservation: An Interdisciplinary Perspective*. Yale University Press.

Werner, F. 1897. Über Reptilien und Batrachier aus Togoland, Kamerun und Tunis aus dem Kgl. *Museum für Naturkunde in Berlin. Verh. Zool.-Bot. Ges., Wien* 47:395-407.

Werner, F. 1899. Ueber Reptilien und Batrachier aus Togoland, Kamerun und Deutsch-Neu-Guinea grösstentheils aus dem k. Museum für Naturkunde in Berlin. Verhandlungen der Kaiserlich-Königlichen Zoologisch-Botanischen Gesellschaft in Wien 49:132-157.

Werner, F. 1902. Über westafrikanische Reptilien. *Verh. Zool. Bot. Ges. Wien* 52:332-348.

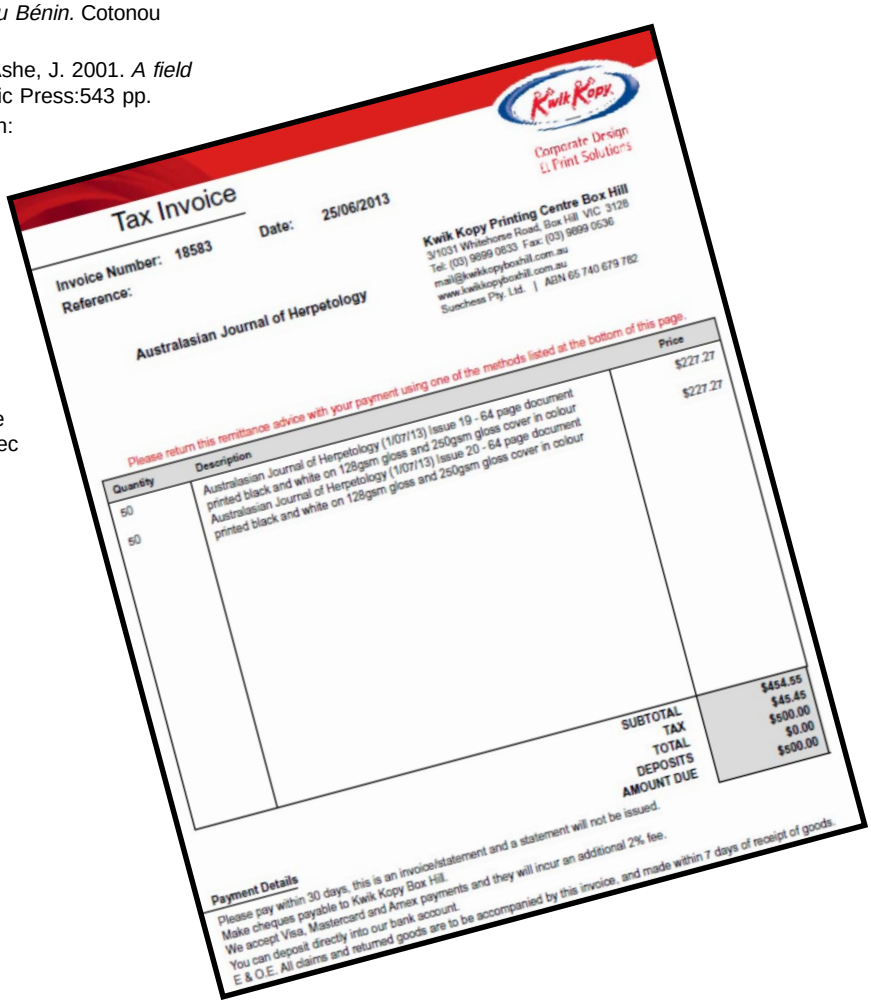
White, F. 1983. *The vegetation of Africa. A descriptive memoir to accompany the Unesco/AETFAT/UNSO vegetation map of Africa*. UNESCO, Paris, France.

Williams, K. L. and Wallach, V. 1989. *Snakes of the World. 1. Synopsis of snakes generic names*. Krieger, Malabar, Florida:234 pp.

Witte, G. F. de 1963. The colubrid snake genera *Chamaelycus* Boulenger and *Oophilositum* Parker. *Copeia* 1963(4):634-636.

**CONFLICT OF INTEREST**

The author has no conflicts of interest in terms of this paper or conclusions within.



*Australasian Journal of Herpetology* 20:26-29.
Published 10 July 2013.

ISSN 1836-5698 (Print)
ISSN 1836-5779 (Online)

# *Chrismaxwellus*: A new genus of Colubrid snake from south-west Africa.

**RAYMOND T. HOSER**

**488 Park Road, Park Orchards, Victoria, 3114, Australia.**
***Phone*: +61 3 9812 3322 *Fax*: 9812 3355 *E-mail*: snakeman@snakeman.com.au**
**Received 20 May 2013, Accepted 7 June 2013, Published 10 July 2013.**

## ABSTRACT

In 2000, Broadley and Schätti described a species Colubrid snake from Namibia which they called **"***Coluber zebrinus*" in a publication backdated to 1997. That the generic placement was inappropriate was inferred by Broadley in 2012, who then placed the snake in the genus *Platyceps* Blyth, 1860 (type species *Coluber ventromaculatus* Gray, 1834).

A review of the morphological and molecular evidence finds this placement inconsistent when compared to the taxonomy of other colubrid snakes. As a result, the species *Coluber zebrinus* Broadley and Schätti, 2000 is placed in a new monotypic genus *Chrismaxwellus gen. nov.* that is formally named according to the Zoological Code (Ride *et al.* 1999) for the first time.

This new genus and two others, namely *Bamanophis* Schätti and Trape, 2008 and *Macroprotodon* Guichenot, 1850, shown to be closely related to one another in a number of recent phylogenetic studies including the online publication of Pyron, Burbrink and Weins (2013) are formally placed in a new tribe Chrismaxwelliini *tribe nov.*

**Keywords:** Taxonomy; snake; Colubridae; Africa; Coluber; *zebrinus*; *Platyceps*; New genus; *Chrismaxwellus*; new tribe; Chrismaxwelliini.

### INTRODUCTION

In 2000, Broadley and Schätti described a species Colubrid snake from Namibia which they called **"***Coluber zebrinus*" the description and holotype being from near the Cunene River, at Ruacana, western Owamboland, Namibia (17° 25' S, 14° 10' E).

While the publication had the date of 1997 on the cover, it was in fact published in year 2000.

Uetz (2013) wrote:

"The University of Washington libraries received this issue of *Madoqua* in August 2000. The year of description might therefore be 2000 (this was confirmed by BROADLEY, pers. comm.). Description based on a single specimen.".

While in this instance there was no apparent harm arising from this act of backdating the publication date, the practice of backdating dates of taxonomic publications is both reckless and unethical as it can lead to false claims of priority for nomenclatural purposes.

A recent example of this kind of action was seen in 2013 by the publication of an online draft paper published by Pyron, Weins and Burbrink, rushed onto the worldwide web on 29 April 2013, then hastily promoted to the world via a series of "Facebook" posts (e.g. Burbrink 2013a, 2013b) as a rough uncorrected copy of a paper set to be published in a print journal (in order to comply with the Zoological Code), itself with a publishing date backdated, at a later and unspecified date.

In the week following this (on 1 May 2013), one of the coauthors Frank Burbrink confirmed on Facebook that the paper had not in fact been published in hard copy (Burbrink 2013c) and therefore as it stood was not even compliant with the Zoological Code (Ride *et al.* 1999), even though the authors were clearly masquerading that it was (Burbrink 2013a, 2013b).

The then non-hard copy publication of the paper identified herein as Pyron *et al* (2013) was further confirmed on 10 May 2013 by Robinson (2013).

The motivation for this rushed online publication was an improper attempt to mislead other people and unethically scoop naming rights for the newly named Boa Family Candoidae Hoser, 2013, that was in fact published in hard copy two days earlier (27 April 2013) in a journal with a cover date of 29 April 2013 (Hoser 2013a) and been promoted as such by Hoser on his private Facebook page that was being monitored by a close friend of the other Authors, namely Wolfgang Wüster (see Schleip 2013, Wüster 2013a, 2013b).

The later authors had agreed with the Hoser action elevating the genus *Candoia* Gray, 1842 as commonly recognized to the status of family level and had sought to name the same group of snakes as a new subfamily.

Another case of nomenclatural chaos and confusion was created when the Western Australian Museum published the description of "*Liasis stimsoni*" (Smith, 1985), in a publication backdated to claim date priority over Wells and Wellington

(1985) who had already scientifically described and named the same species as "*Antaresia saxacola*".

The nomenclatural error was perpetuated by the authors Underwood and Stimson (1990) and Shea and Sadlier (1999), who wrongly claimed that the Wells and Wellington name was *nomen nudem*.

In terms of the species "*Coluber zebrinus* Broadley and Schätti, 2000" it's fairly short taxonomic history has been unstable.

Several other cases of taxonomic and nomenclatural instability, including some that have potentially put lives at risk involving venomous species, arising from unethical conduct by people trying to deliberately re-name valid taxa in breach of the Zoological Code (Ride *et al.* 1999) are dealt with by Hoser (2013b).

Bauer *et al.* (2001) continued to identify the taxon subject of this paper as *Coluber zebrinus* in a paper that described the third specimen of the species known.

That the generic placement for this taxon was inappropriate was suggested by Nagy *et al.* (2004) and acted upon by Broadley (2012) in a book review, where he placed it in the genus *Platyceps*.

However the taxon *Coluber ventromaculatus* Gray, 1834 is the type species of the genus *Platyceps* Blyth, 1860. This is a very morphologically different species with a type locality in Asia and not remotely similar to the taxon *zebrinus*, except superficially.

Hence a review of the morphological and molecular evidence published to date finds this placement inconsistent when compared to the taxonomy of other colubrid snakes.

Important relevant literature in terms of this species and genus, as well as closely related racer species within the genera *Bamanophis* Schätti and Trape, 2008 and *Macroprotodon* Guichenot, 1850, as shown in recent phyogenetic studies include Bauer *et al.* (2001), Boulenger (1913), Broadley (2012), Broadley and Schätti (2000), Carranza *et al.* (2004), Duméril *et al.* (1854), Geniez (2004), Geoffroy (1827), Guichenot (1850), Schätti and Trape (2008), Marias (2004), Nagy *et al.* (2004), Pyron *et al.* (2011, 2013), Tiedemann (1991), Uetz (2013), Wade (1988, 2001) and sources cited therein.

As a result, the species "*Coluber zebrinus* Broadley and Schätti, 2000" is placed in a new monotypic genus *Chrismaxwellus gen. nov*. that is formally named according to the Zoological Code (Ride *et al.* 1999) for the first time.

In turn this genus is placed in a newly named tribe Chrismaxwelliini *tribe nov.* also including the genera *Bamanophis* Schätti and Trape, 2008 and *Macroprotodon* Guichenot, 1850, formally named according to the Zoological Code (Ride *et al.* 1999) for the first time.

***CHRISMAXWELLUS GEN. NOV.***

**Type species:** *Coluber zebrinus* Broadley and Schätti, 2000

**Diagnosis:** As this genus is monotypic for the species "*Coluber zebrinus* Broadley and Schätti, 2000" this diagnosis for *Chrismaxwellus gen. nov.* is the same as for the species (see Broadley and Schätti, 2000 for the detail).

*Chrismaxwellus gen. nov.* is separated from all species of *Coluber* and *Platyceps* (as well as the genera *Bamanophis* Schätti and Trape, 2008 and *Macroprotodon* Guichenot, 1850) as recognized in 2013 by the following suite of characters: A small species of racer, currently only known from a small number of specimens and not known to exceed 70 cm. Physically typical of a racer with slender build, large eyes and a round pupil. It has 23 dorsal mid-body scale rows, approximately 195 or more ventrals, divided anal and about 90 divided subcaudals. There are nine supralabials with 5 and 6 entering the orbit; 2 preoculars and 2 postoculars; large loreal. There are 21-23 rows of scales around the neck and 19-17 anterior to the vent. The colour is grey above, becoming pale to white on the sides. There are numerous (usually well in excess of 60) irregular crossbars on the back that fade towards the tail as well as dark ventral bars on the sides. The top of the head is uniform grey to brown and both the lips and snout are a yellowish or orange colour. The venter is white. The middle supralabials (number 2 and beyond) have dark markings on the posterior borders with most noticeable darkening towards the posterior supralabials. At the rear of the jaw and on the side of the head is a square dark brown mark, not reaching the top of the head and commencing at the labial line. It is in effect a part of a broken band. The first full dark cross-band is behind the skull on the upper neck being widest at the median line and narrowing on the flanks. At the fore-body the cross-bands and markings are dark brown, being almost black, but these fade along the body to become medium brown near the beginning of the tail. The light-brown (tending to white) patches between the irregular cross-bands at the fore-body darken slightly, which leads to a less contrasting pattern at the rear end of the body. The tail is effectively a medium brown colour with dark-blackish flecks.

The scientific name *zebrinus* is in recognition of the distinctive "Zebra-like" pattern of this taxon.

Importantly and as an alternative to the detailed diagnosis above, it should be remembered that *Chrismaxwellus gen. nov.* is separated from all species of *Coluber* and *Platyceps* most easily by distribution, as neither of the other genera occur in Namibia or nearby.

**Distribution:** Known only from North-west Namibia, south-west Africa and presumably occurs in immediately adjacent nearby Angola which has identical habitat and has been little collected by herpetologists.

**Etymology:** Named in honour of Melbourne, Victoria, Australia based lawyer Chris Maxwell, (now appointed to the Supreme Court of Victoria as a judge) in recognition of his public interest work as a lawyer. In year 2000, or thereabouts, the then Labor Attorney General, Rob Hulls breached the fundamental law of "double jeopardy" and charged me (Raymond Hoser) a second time for the alleged criminal offence of "Scandalizing the courts" an arcane and unused charge laid against me for bringing the legal system of the state into disrepute.

I had in fact won the first series of charges in front of Supreme Court Judge Bill Gillard, who quite appropriately referred to the fascist nature of the charges against me in his final judgment.

The basis of the Hulls charges (several) was the true and correct contents of two best-selling books about Victorian Police Corruption and entrenched endemic corruption in the Victorian Judiciary, at all levels titled "*Victoria Police Corruption*" (1 and 2) (Hoser 1999a, 1999b).

As mentioned already, the charges had been beaten earlier, in a case heard in front of Judge Bill Gillard in 2000, that was defended by myself through lawyer David Beach (now also appointed to the Victorian Supreme Court).

Normally under British/Australian law, a person charged with an offence once cannot be retried for the same charges.

In a breach of this rule, the Attorney General, Rob Hulls (known best as a Labor Party head-kicker), re-charged myself and had the case heard in front of fellow Labor Lawyer, Geoffrey Eames. Both Hulls and Eames had a long-running friendship going back many years so the result of the case being finalized against myself was effectively a predetermined outcome.

To ensure that no appeal could be successful, Hulls then elevated Eames to the Court of Appeal so that Hulls and Eames could effectively control that result as well.

Accordingly the appeal failed and I spent the next 10 years paying off the illegally imposed fines.

Defending me in this matter and without charging a cent was Barrister Chris Maxwell, assisted by lawyers Gabriel Keuk and Brenton O'Loughlin along with Barrister David Perkins (also acting *pro-bono*, meaning in the public interest).

Of note is that Hulls, through his lawyer, John Langmead, argued (and successfully to the Fabian Socialist Geoff Eames,

as judge) that truth was not a defence in terms of the charges I faced.

The legal precedent set is that anyone in Australia who discloses government or judicial corruption in the public interest cannot defend themselves if the state seeks to impose criminal sanctions against them, be this fines, imprisonment or both.

The charge as defined and now set as precedent carries no maximum penalty, effectively making the disclosure of truth about corruption in government in Australia a more serious offence than charges such as murder, rape or pedophilia (child sex).

Of relevance is that preceding these charges, the Hulls side lost a series of defamation proceedings in relation to the same books and statements within them.

These charges were successfully defended by David Beach on the basis that the entire contents (1,536 pages) of both books were 100 per cent true, this being confirmed by the Judge (Gillard) at the hearing and in his judgment.

Gillard also made strong statements against the idea of myself (Hoser) being charged for scandalizing the court, although Hulls ignored this published judgment and went ahead and broke all rules to re-charge me a second time for the offence/s.

Lawyers as a group have a justifiable reputation for being masters of hiding the truth using a combination of legal tactics and at times bare-faced lies and of having interest in little beyond extracting large amounts of money from vulnerable people. So when one or more lawyers break this stereotype, it is fitting that their efforts be recognized. Maxwell, Kuek and Perkins deserve this recognition and in this case it is fitting that a genus of snake be named after Chris Maxwell.

***CHRISMAXWELLIINI TRIBE NOV.***

**(Terminal taxon: *Coluber zebrinus* Broadley and Schätti, 2000)**

**Diagnosis:** A tribe of snakes divided into three genera, apparently diverged as a result of either aridification in the north of Africa, or unsuitable jungle habitat forming in central Africa. The tribe is best diagnosed by defining each of the component genera.

One or other of one of the following three:

1/ *Chrismaxwellus gen. nov.* is separated from all species of *Coluber* and *Platyceps* (as well as the genera *Bamanophis* Schätti and Trape, 2008 and *Macroprotodon* Guichenot, 1850) as recognized in 2013 by the following suite of characters: A small species of racer, currently only known from a small number of specimens and not known to exceed 70 cm. Physically typical of a racer with slender build, large eyes and a round pupil. It has 23 dorsal mid-body scale rows, approximately 195 or more ventrals, divided anal and about 90 divided subcaudals. There are nine supralabials with 5 and 6 entering the orbit; 2 preoculars and 2 postoculars; large loreal. There are 21-23 rows of scales around the neck and 19-17 anterior to the vent. The colour is grey above, becoming pale to white on the sides. There are numerous (usually well in excess of 60) irregular crossbars on the back that fade towards the tail as well as dark ventral bars on the sides. The top of the head is uniform grey to brown and both the lips and snout are a yellowish or orange colour. The venter is white. The middle supralabials (number 2 and beyond) have dark markings on the posterior borders with most noticeable darkening towards the posterior supralabials. At the rear of the jaw and on the side of the head is a square dark brown mark, not reaching the top of the head and commencing at the labial line. It is in effect a part of a broken band. The first full dark cross-band is behind the skull on the upper neck being widest at the median line and narrowing on the flanks. At the fore-body the cross-bands and markings are dark brown, being almost black, but these fade along the body to become medium brown near the beginning of the tail. The light-brown (tending to white) patches between the irregular cross-bands at the fore-body darken slightly, which leads to a less contrasting pattern at the rear end of the body. The tail is effectively a medium brown colour with dark-blackish flecks.

The scientific name *zebrinus* for the only described species in this genus is in recognition of the distinctive “Zebra-like” pattern of this taxon.

Importantly and as an alternative to the detailed diagnosis above, it should be remembered that *Chrismaxwellus gen. nov.* is separated from all species of *Coluber* and *Platyceps* (as well as the genera *Bamanophis* Schätti and Trape, 2008 and *Macroprotodon* Guichenot, 1850) most easily by distribution, as neither of the other genera occur in Namibia or nearby, or:

2/ *Bamanophis* Schätti and Trape, 2008 is defined by the following suite of characters: Anterior subocular absent [present in other racers]; usually one comparatively large posterior subocular. Ten (or eleven) supralabials, fourth and fifth (sometimes fifth and sixth) entering eye. Dorsal scales smooth, with paired apical pits; 25-27 longitudinal scale rows on the neck (as measured from the 20th ventral), 29-33 scale rows at mid-body, 17 rows (only in males) to 19 rows prior to anal plate; usually two or three bilateral increases in the number of dorsal scale rows on anterior part of body; reductions after midbody confined to ventrolateral and lateral levels (including paravertebral rows). 229-265 ventral scales (with a clear-cut sexual dimorphism in Senegal); tail comparatively short, with 75-95 paired subcaudals. Dark “X-shaped” markings along the dorsum (pattern may be slightly different). 15-19 maxillary teeth, diastema distinct, last tooth laterally offset. Palatine processus of maxillary well developed and laterally rounded, lateral processus distinct. Crista basisphenoidea absent (usually present in other racers). Hemipenis spinose with intermittent barbed calyces, probably bulbous when everted (versus sub-cylindrical in others).

This monotypic genus restricted to western Africa (Sahel to Guinea Savanna); or:

3/ *Macroprotodon* Guichenot, 1850 is defined as follows: Attains a total length under 70 cm, including the tail, but usually under 50 cm, with a well-defined and horizontally flattened head, especially at the snout end. Small eye and oval pupil, which may appear vertically oval in bright light. Scales smooth with 19-23 dorsal mid-body scale rows, medium that is not rounded at the end, with all divided subcaudals; rostral low and slightly u-shaped, more than twice as wide as high, frontal not very narrow and of same width as supraoculars, 2 postoculars, no loreal, pre-ocular has a point on the upper edge at the upper level of the eye or slightly higher; no prominent brow ridge; anterior temporal usually single; largest upper labial (usually number 6) reaches or approaches the parietal and is considerably larger than it, 7-8 upper labials, 6 lower labials. Dorsal colour pattern varies and consists of small dark markings that form bars, streaks or some other kind of patterning. This may include a collar on the neck that may extend onto the head. Usually a dark streak runs from the nostril through the eye to the lower cheek. Belly colour may be yellow, pink, red or orange with or without weak markings or a bold black “diced” pattern which may consist of a central band or twin stripes.

**Distribution:** South-west Africa (*Chrismaxwellus gen. nov.*); Sahel to Guinea Savanna in West Africa *Bamanophis* Schätti and Trape, 2008; Northern Africa into southern Israel as well as far southern Europe (Spain/Portugal) *Macroprotodon* Guichenot, 1850.

**Etymology:** See for the genus *Chrismaxwellus gen. nov.*

**Content:** *Chrismaxwellus gen. nov.* (type genus); *Bamanophis* Schätti and Trape, 2008; *Macroprotodon* Guichenot, 1850.

**REFERENCES CITED**

Bauer, A., Lamb, T., Branch, W. R. and Babb, R. B. 2001. New records of two rare snakes from northern Namibia, with comments on the trans-Kunene distribution of mopaneveld squamates (Squamata: Serpentes: Colubridae). *Herpetozoa* 14(1/2):75-79.

Boulenger, G. A. 1913. *The snakes of Europe*. Methusen and Co. Ltd, London:151 pp.

Broadley, D. G. 2012. Book review: The Amphibians and Reptiles of Ethiopia and Eritrea. By Malcolm Largen and Stephen Spawls. 2010. 693 pp. Chimaira, Frankfurt am Main. (Hard cover). •98. ISBN 978-3-89973-466-9. *African Herp News* (*Newsletter of the Herpetological Association of Africa*) 58:2-7.

Broadley, D. G. and Schätti, B. 2000. A new species of *Coluber* from northern Namibia (Reptilia: Serpentes). *Madoqua* 19(2):171-174 (publication was improperly backdated to 1997).

Burbrink, F. 2013a. Post on facebook at: https://www.facebook.com/#!/frank.burbrink on 29 April 2013 (downloaded on 5 June 2013).

Burbrink, F. 2013b. 9 Posts on facebook at: https://www.facebook.com/#!/frank.burbrink on 30 April 2013 (downloaded on 5 June 2013).

Burbrink, F. 2013c. Post on facebook at: https://www.facebook.com/#!/frank.burbrink on 1 May 2013 (downloaded on 5 June 2013).

Carranza, S., Arnold, E. N., Wade, E. and Fahd, S. 2004. Phylogeny of the false smooth snakes, *Macroprotodon* (Serpentes, Colubridae): mitochondrial DNA sequences show European populations arrived recently from Northwest Africa. *Molecular Phylogenetics and Evolution* 33:523-532.

Duméril, A. M. C., Bibron, G. and Duméril, A. H. A., 1854. *Erpétologie générale ou histoire naturelle complète des reptiles. Tome septième. Deuxième partie, comprenant l'histoire des serpents venimeux*. Paris, Librairie Encyclopédique de Roret: i-xii+781-1536.

Geniez, P., Mateo, J. A., Geniez, M. and Pether, J. 2004. *The amphibians and reptiles of the Western Sahara (former Spanish Sahara) and adjacent regions*. Edition Chimaira, Frankfurt:228 pp.

Geoffroy, l. 1827. Reptiles. In: Savigny, M. J. C. L. de, Description d'Égypte... Vol. l. *Histoire Naturelle. Paris*:121-160.

Guichenot, A. 1850. Histoire naturelle des reptiles et des poissons de l'Algérie. *Exploration Scientifique de l'Algérie pendant les annees 1840, 1841, 1842*., Imprimerie Nationale, Paris.

Hoser, R. T. 1999a. *Victoria Police Corruption: The book that the Victoria Police don't want you to read*. Kotabi Publishing, Doncaster, Victoria, Australia:736 pp.

Hoser, R. T. 1999b. *Victoria Police Corruption - 2: Including what the media didn't tell you*. Kotabi Publishing, Doncaster, Victoria, Australia:800 pp.

Hoser, R. T. 2013a. Stopping the shuffle between families: Six new Colubroid snake families named. *Australasian Journal of Herpetology* 17:3-21.

Hoser, R. T. 2013b. The science of herpetology is built on evidence, ethics, quality publications and strict compliance with the rules of nomenclature. *Australasian Journal of Herpetology* 18:1-64.

Marias, J. 2004. *A complete guide to the snakes of southern Africa*. Struik, South Africa:312 pp.

Nagy, Z. T., Lawson, R., Joger, U. and Wink, M. 2004. Molecular systematics of racers, whipsnakes and relatives (Reptilia: Colubridae) using mitochondrial and nuclear markers. *J. Zool. Syst. Evol. Research* 42(2004):223-233.

Pyron, R. A., Burbrink, F. T., Colli G. R., de Oca, A. N. M., Vitt, L. J., Kuczynski, C. A. and Wiens, J. J. 2011. The phylogeny of advanced snakes (Colubroidea), with discovery of a new subfamily and comparison of support methods for likelihood trees**.** *Mol. Phylogenet. Evol.* 58:329-342.

Pyron, R. A., Burbrink, F. T. and Weins, J. J. 2013. A phylogeny and revised classification of Squamata, including 4161 species of lizards and snakes. Published online at: http://www.biomedcentral.com/1471-2148/13/93.

Ride, W. D. L. (ed.) *et al.* (on behalf of the International Commission on Zoological Nomenclature) 1999. *International code of Zoological Nomenclature*. The Natural History Museum - Cromwell Road, London SW7 5BD, UK (also commonly cited as "ICZN 1999").

Robinson, E. 2013. Email on behalf of Thomson Reuters to Raymond Hoser dated 10 May 2013.

Schleip, W. 2013. Posts on Facebook wall of Wulf Schleip https://www.facebook.com/#!/wulf.schleip?fref=ts in the period 1 January 2013 to 4 June 2013, including posts made on the walls of others (downloaded on 5 June 2013).

Schätti, B. and Trape, J. 2008. *Bamanophis*, a new genus for the West African colubrid *Periops dorri* Lataste, 1888 (Reptilia: Squamata: Colubrinae). *Rev. Suisse Zool.* 115(4):595-615.

Shea, G. M. and Sadlier, R. A. 1999. A catalogue of the non-fossil amphibian and reptile type specimens in the collection of the Australian Museum: types currently, previously and purportedly present. *Technical Reports of the Australian Museum* 15:1-91.

Smith, L. A. 1985. A revision of the *Liasis childreni* species-group (Serpentes: Boidae). *Rec. West. Austr. Mus.* 12(3):257-276.

Tiedemann, F. 1991. First record of *Acanthodactylus opheodurus* Arnold, 1980, and *Coluber ventromaculatus* Gray, 1834 (Squamata: Lacertidae, Colubridae) from the United Arab Emirates *Herpetozoa* 4(3/4):167-175.

Uetz, P. 2013. The reptile database *Coluber zebrinus* BROADLEY & SCHÄTTI, 2000. Posted online at: http://reptile-database.reptarium.cz/species?genus=Coluber&species=zebrinus and downloaded on 20 January 2013.

Underwood, G. and Stimson, A. F. 1990. A classification of pythons (Serpentes, Pythoninae). *Journal of Zoology* 221(4):565-603.

Wade, E. 1988. Intraspecific variation in the colubrid snake genus *Macroprotodon*. *Herp. J.* 1:237-245.

Wade, E. 2001. Review of the false smooth snake genus *Macroprotodon* (Serpentes, Colubridae) in Algeria with a description of a new species. *Bull. Nat. Hist. Mus. London* (*Zool.*) 67(1):85-107.

Wells, R. W. and Wellington, C. R. 1985. A classification of the Amphibia and Reptilia of Australia. *Australian Journal of Herpetology, Supplementary Series* (1):1-61.

Wüster, W. 2013a. Posts on Facebook wall of Wolfgang Wüster https://www.facebook.com/#!/Wolfgang.Wüster in the period 1 January 2013 to 4 June 2013, including posts made on the walls of others (downloaded on 5 June 2013).

Wüster, W. 2013b. Post on Facebook wall of Frank Burbrink at: https://www.facebook.com/#!/frank.burbrink on 30 April 2013 (6.26 AM).

**CONFLICT OF INTEREST**

The author has no conflicts of interest in terms of this paper or conclusions within.

*Australasian Journal of Herpetology* 20:30-32.
Published 10 July 2013.

ISSN 1836-5698 (Print)
ISSN 1836-5779 (Online)

# Three new genera of Ground Snakes from Middle and South America (Serpentes: Dipsadidae).

**RAYMOND T. HOSER**

**488 Park Road, Park Orchards, Victoria, 3114, Australia.**
***Phone*: +61 3 9812 3322 *Fax*: 9812 3355 *E-mail*: snakeman@snakeman.com.au**
**Received 3 April 2013, Accepted 22 June 2013, Published 10 July 2013.**

## ABSTRACT

The Ground Snakes of the genus *Atractus* Wagler, 1828 (Dipsadidae) as currently recognized consists of over 130 species.

However the genus has long been recognized as being paraphyletic, with various species groups having been assigned generic names in the past.

Notwithstanding this fact, most publishing authors continue to group all within *Atractus* as a matter of convenience rather than an evidence-based firm belief that all should be placed within a single genus on the basis of accepted genus level affinity.

This paper begins the dismemberment of the genus *Atractus* as known to date and formally removes three divergent species from Colombia (the *wagleri* group) and places them in a newly named genus according to the Zoological Code (Ride *et al.* 1999).

Two other divergent species are each placed into monotypic (at this stage) genera, these being *Atractus clarki* Dunn and Bailey, 1939 and *Atractus zidoki* Gasc and Rodrigues, 1979.

**Keywords:** Taxonomy; Ground Snake; Colombia; *Atractus*; New Genera; *Shanekingus*; *Carstensus*; *Drewwilliamsus.*

### INTRODUCTION

The Colubroid Ground Snakes of the genus *Atractus* Wagler, 1828 (Dipsadidae) as currently recognized consists of over 130 species. Uetz (2013) cites 134 species.

However the genus has long been recognized as being paraphyletic, with various species groups having been assigned generic names in the past. Boulenger (1894) cited seven other potentially available generic names as being synonymous with *Atractus* with most being referrable to distinct species groups within the genus *Atractus sensu lato* and therefore available for use in light of known taxonomic relationships.

Notwithstanding this fact, most publishing authors continue to group all within *Atractus* as a matter of convenience rather than a firm belief that all should be placed within a single genus on the basis of accepted genus level affinity (Pyron *et al.* 2013), noting that in their published phylogeny, Pyron *et al.* made a point of using existing nomenclature even when their results pointed to a significantly different taxonomic picture.

This paper formally removes three divergent species, until now placed within the genus *Atractus* from Colombia (the *wagleri* group) and places them in a newly named genus according to the Zoological Code (Ride *et al.* 1999). This genus is named *Shanekingus gen. nov.*.

There is absolutely no doubt that the creation of this new genus for a group of snakes formerly within *Atractus*, and two others (see below) will be the first step towards the greater dismemberment of the genus *Atractus* as currently recognized in coming years.

The so-called *wagleri* group includes the following three species, *Atractus wagleri*, Prado, 1945, *Atractus sanguineus* Prado, 1944 and *Atractus attenuatus* Myers and Schargel, 2006.

All three species are currently only known from Colombia in South America.

Publications relevant to the taxonomy of the species within the so-called *wagleri* group include the following: Boulenger (1894), Myers and Schargel (2006), Passos and Arredondo (2009), Passos *et al.* (2009a), Pérez-Santos and Moreno (1988), Prado (1944, 1945, 1946), Pyron, Burbrink and Weins (2013) and sources cited therein.

The species currently recognized as *Atractus clarki* Dunn and Bailey, 1939 has long been recognized as being divergent within the genus *Atractus* (Myers 2003) and the current generic placement of the taxon was questioned by Myers in that paper.

Revisiting the data presented by Myers leads to the inescapable conclusion that this species should not be placed within the *Atractus* group at the genus level. As no name is available for the taxon, it is hereby placed in a new genus *Carstensus gen. nov.* diagnosed and defined according to the Zoological Code (Ride *et al.* 1999).

Publications relevant to the taxonomic status of the species currently recognized as *Atractus clarki* Dunn and Bailey, 1939 includes: Dunn and Bailey (1939), Myers (2003), Passos *et al.* (2009b), Pérez-Santos and Moreno (1988) and sources cited therein.

The species *Atractus zidoki* Gasc and Rodrigues, 1979 is known

to be quite divergent from all other *Atractus* including that it is readily separated from all other *Atractus*, the genus it has been placed in to date, by the presence of paired apical pits and tubercles on the dorsal scales (Gasc and Rodrigues, 1979). In my view, these and other obvious differences between this taxon and other *Atractus* warrant it being placed in a monotypic genus. This is formally done according to the Zoological Code (Ride *et al*.1999) below.

Publications relevant to the taxonomic status of the species currently recognized as *Atractus zidoki* Gasc and Rodrigues, 1979 include: Claessen (2003), da Cunha and do Nascimento (1983), Gasc and Rodrigues (1979, 1980), Passos and Fernandes (2008), Passos *et al.* (2007), Pérez-Santos and Moreno (1988), Prudente and Passos (2008), Silva Haad (2004), Starace (1998) and sources cited therein.

***GENUS SHANEKINGUS GEN. NOV.***

**Type species:** *Atractus wagleri*, Prado, 1945.

**Diagnosis:** *Shanekingus gen. nov.* are separated from all other *Atractus* Wagler, 1828, by the following combination of characters: (1) 17/17/17 smooth dorsal scale rows; (2) two postoculars; (3) loreal long; (4) temporals 1+2; (5) seven supralabials, third and fourth contacting orbit; (6) seven infralabials, first three contacting chinshields; (7) six or seven maxillary teeth; (8) generally four gular scale rows; (9) four or five preventrals; (10) 174-180 ventrals in females, 157-174 in males; (11) 29-44 subcaudals in females, 46-56 in males; (12) dorsal ground colour being cream-red with an irregular vertebral black stripe connected to lateral black blotches, sometimes constituting complete bands anteriorly (sometimes not) and decreasing in size posteriorly or; alternatively widely spaced crossbars that are distinctly darker than the ground color and that are connected by a vertebral dark line or; an extremely vague pattern of numerous, closely spaced, indistinct crossbars (13) venter black with paraventral region cream; (14) moderate body size, females reaching 437 mm SVL and males 445 mm SVL; (15) moderate tail length in females (13.6-15.3% SVL) and long in male (21.61% SVL); (16) hemipenis moderately bilobed, semicapitate, and semicalyculate.

The genus *Carstensus gen. nov.* is separated from *Shanekingus gen. nov.* by the character suite given within that description (below).

The genus *Drewwilliamsus gen. nov.* is readily separated from all other *Atractus*, the genus it would otherwise be diagnosed as being within (and the genera *Shanekingus gen. nov.* and *Carstensus gen. nov.*), by the presence of paired apical pits and tubercles on the dorsal scales (Gasc and Rodrigues, 1979).

**Distribution:** The genus *Shanekingus gen. nov.* is known only from Colombia in South America.

**Etymology:** Named in honour of herpetologist Shane King, formerly of Bendigo, Victoria, Australia, and more recently of Mildura, Victoria, Australia in recognition of his largely unrecognized work assisting other herpetologists over many years during the period of the 1990's to 2013.

**Content:** *Shanekingus wagleri*, (Prado, 1945) (type species); *S. sanguineus* (Prado, 1944) and *S. attenuatus* (Myers and Schargel, 2006).

***GENUS CARSTENSUS GEN. NOV.***

**Type species:** *Atractus clarki* Dunn and Bailey, 1939.

**Diagnosis:** The genus *Carstensus gen. nov.* is readily separated from other *Atractus* by the following suite of characters: It has a uniformly pale venter, narrow pale dorsal bars, pale dashes on the lower scale rows, and in having a relatively large eye whose length is noticeably greater than its distance to lip and which is contained less than two times in length of the loreal plate; the hemipenis of *Carstensus gen. nov.* is bilobed for a third of its length and the lobes are markedly calyculate. By contrast the hemipenes of *Atractus* are bilobed only at the tips and never fully calyculate.

The genera *Carstensus gen. nov.* and *Atractus* are separated from the morphologically similar genus *Geophis* Wagler, 1830 by having 17 instead of 15 dorsal mid-body rows.

*Carstensus gen. nov.* is essentially a terrestrial species as opposed to the more fossorial species within the genus *Atractus*, also distinguished by the relatively smaller eye and other morphological traits reflective of their lifestyle.

The genus *Shanekingus gen. nov.* is separated from *Carstensus gen. nov.* by the characters given within that description (above).

The genus *Drewwilliamsus gen. nov.* is readily separated from all other *Atractus*, the genus it would otherwise be diagnosed as being within (and the genera *Shanekingus gen. nov.* and *Carstensus gen. nov.*), by the presence of paired apical pits and tubercles on the dorsal scales (Gasc and Rodrigues, 1979).

**Distribution:** Known only from two specimens (possibly two different species), from Panama and Colombia.

**Etymology:** Named in honour of Terry Carstens, a snake catcher of Mildura, Victoria, Australia, for his services to wildlife conservation, namely his removal of threatened snakes from human habitation before they get needlessly killed. Carstens has also been involved in reptile education and awareness for some years and this work should be recognized.

**Content:** *Carstensus clarki* Dunn and Bailey, 1939 (type species) monotypic for the genus.

***GENUS DREWWILLIAMSUS GEN. NOV.***

**Type species:** *Atractus zidoki* Gasc and Rodrigues, 1979.

**Diagnosis:** The genus *Drewwilliamsus gen. nov.* is readily separated from all other *Atractus*, the genus it would otherwise be diagnosed as being within (and the genera *Shanekingus gen. nov.* and *Carstensus gen. nov.* as defined within this paper), by the presence of paired apical pits and tubercles on the dorsal scales (Gasc and Rodrigues, 1979).

The similar genus *Geophis* Wagler, 1830 is readily separated from *Atractus* and *Drewwilliamsus gen. nov.* by having 15 instead of 17 dorsal mid-body rows.

The genus *Drewwilliamsus gen. nov.* is monotypic for *Atractus zidoki* Gasc and Rodrigues, 1979, the full diagnosis for the species being within Gasc and Rodrigues (1979).

**Distribution:** Brazil (Pará, Amapá), French Guiana and Colombia (Amazonas).

**Etymology:** Named in honour of Drew Williams a herpetologist from Bendigo, Victoria, Australia in recognition of his largely unrecognized work assisting other herpetologists in Australia some of whom have subsequently published his material and findings without proper attribution, in the morally reprehensible act of plagiarization.

**Content:** *Drewwilliamsus zidoki* (Gasc and Rodrigues, 1979).

**REFERENCES CITED**

Boulenger, G. A. 1894. *Catalogue of the Snakes in the British Museum (Natural History), Volume II.* London. Gov. Printer.

Claessen, H. 2003. De slangen can de Guyana's. Deel iv. *Lacerta* 61(1):19-27.

da Cunha, O. R., do Nascimento, F. P. 1983. Ofidios da Amazonia 20 - As especies de *Atractus* Wagler, 1828, na Amazonia oriental and Maranhao (Ophidia, Colubridae). *Boletim do Museu Paraense Emilio Goeldi Nova Serie Zool.* (123):1-38.

Dunn, E. R. and Bailey, J. R. 1939. Snakes from the uplands of the Canal Zone and of Darien. *Bull. Mus. Comp. Zool.* Harvard 86(1):1-22.

Gasc, J. P. and Rodrigues, M. T. 1979. Une nouvelle espece du genre *Atractus* (Colubridae, Serpentes) de la Guyane francaise. *Bulletin Du Museum National D'Histoire Naturelle Section A Zoologie Biologie Et Ecologie Animales* (2):547-557.

Gasc, J. P. and Rodrigues, M. T. 1980. Liste preliminaire des Serpents de la Guyane francaise. *Bull. Mus. Nat. Hist. Nat. Paris* 2(4):559-598.

Myers, C. W. 2003. Rare Snakes-Five New Species from Eastern Panama: Reviews of Northern *Atractus* and Southern

*Geophis* (Colubridae: Dipsadinae). *Am. Mus. Novit.* 3391:1-47.

Myers, C. W. and Schargel, W. E. 2006. Morphological extremes - two new snakes of the genus *Atractus* from northwestern South America (Colubridae: Dipsadinae). *Am. Mus. Novit.* (3532):1-13.

Passos, P. and Arredondo, J. C. 2009. Rediscovery and redescription of the Andean earth-snake *Atractus wagleri* (Reptilia: Serpentes: Colubridae). *Zootaxa* 1969:59-68.

Passos, P. and Fernandes, R. 2008. A new species of the colubrid snake genus *Atractus* (Reptilia: Serpentes) from the central Amazon of Brazil. *Zootaxa* 1849:59-66.

Passos, P., Fernandes, R. and Borges-Nojosa, D.M. 2007. A New Species of *Atractus* (Serpentes: Dipsadinae) from a Relictual Forest in Northeastern Brazil. *Copeia* 2007(4):788-797.

(Passos *et al.* 2009a) Passos, P., Arredondo, J. C., Fernandes, R. and Lynch, J. D. 2009. Three new *Atractus* (Serpentes: Dipsadidae) from the Andes of Colombia. *Copeia* 2009(3):425-436.

(Passos *et al.* 2009b) Passos, P., Mueses-Cisneros, J. J., Lynch, J. D. and Fernandes, R. 2009. Pacific lowland snakes of the genus *Atractus* (Serpentes: Dipsadidae), with description of three new species. *Zootaxa* 2293:1-34.

Pérez-Santos, C. and Moreno, A. G. 1988. *Ofidios de Colombia.* Museo reegionale di Scienze Naturali, Torino, Monographie VI:517 pp.

Prado, A. 1944. Serpentes da Colombia, com a descricao de duas novas espécies de *Atractus*. *Ciencia* (Mexico) 5:111.

Prado, A. 1945. Um novo *Atractus* da Colombia. *Ciencia* (Mexico) 6:61.

Prado, A. 1946. Notas ofiológicas 19. *Atractus* da Colombia, com a redescrição de tres novas espécies. *Memorias do Instituto Butantan* 18(1944-1945):109-111.

Prudente, A. L. C. and Passos, P. 2008. New Species of *Atractus* Wagler, 1828 (Serpentes: Dipsadinae) from Guyana Plateau in Northern Brazil. *Journal of Herpetology* 42(4):723.

Pyron, R. A., Burbrink, F. T. and Weins, J. J. 2013. A phylogeny and revised classification of Squamata, including 4161 species of lizards and snakes. Published online at: http://www.biomedcentral.com/1471-2148/13/93.

Ride, W. D. L. (ed.) *et al.* (on behalf of the International Commission on Zoological Nomenclature) 1999. *International code of Zoological Nomenclature*. The Natural History Museum, Cromwell Road, London, SW7 5BD, UK.

Silva Haad, J. J. 2004. Las serpientes del género *Atractus* Wagler, 1828 (Colubridae; Xenodontinae) en la Amazonia colombiana. [The snakes of the genus *Atractus* Wagler, 1828 (Colubridae; Xenodontinae) in the colombian Amazonia.] *Revista de la Academia Colombiana de Ciencias Exactas, Físicas y Naturales* (108):409-446.

Starace, F. 1998. *Guide des Serpents et Amphisbènes de Guyane*. IBIS Rouge Editions, Guadeloupe, Guyane:450 pp.

Uetz, P. 2013. The reptile database. Search result: Search Parameters: Genus Atractus. Url at: http://reptile-database.reptarium.cz/advanced_search?genus=Atractus&submit=Search downloaded on 2 February 2013.

*Australasian Journal of Herpetology* **20:33-40.**
**Published 10 July 2013.**

**ISSN 1836-5698 (Print)**
**ISSN 1836-5779 (Online)**

# Division of the Asian Snake Genera *Liopeltis* Fitzinger, 1843 and *Gongylosoma* Fitzinger, 1843 (Serpentes:Colubridae).

**RAYMOND T. HOSER**

**488 Park Road, Park Orchards, Victoria, 3114, Australia.**
***Phone*: +61 3 9812 3322 *Fax*: 9812 3355 *E-mail*: snakeman@snakeman.com.au**
**Received 1 May 2013, Accepted 14 June 2013, Published 10 July 2013.**

## ABSTRACT

The Asian genera *Liopeltis* Fitzinger, 1843 and *Gongylosoma* Fitzinger, 1843 as recognized at start 2013 have had a chequered taxonomic history, as outlined by Leviton (1964) for *Liopeltis* and Grismer *et al.* (2003) for *Gongylosoma*.

Species previously assigned to both genera have been removed and placed elsewhere by various authors.

However a review of the remaining species within both genera show that there is sufficient evidence to warrant further division of both genera on the basis of strong morphological and biological differences between members.

As a result, in *Liopeltis*, what is perhaps the most divergent species is herein placed in its own monotypic genus, *Rossnolanus gen. nov.*.

In terms of *Gongylosoma* the genus as recognized to date is divided three ways, with two new subgenera created and named according to the Zoological Code (Ride *et al.* 1999).

In turn all relevant genera are placed in a new colubrid tribe, namely Rossnolaniini, that also includes other genera including species formerly placed in *Liopeltis* and *Gongylosoma*.

The species *Liopeltis tricolor* Schlegel, 1837 is also herein divided into four subspecies, three formally named for the first time.

**Keywords:** Taxonomy; nomenclature; new tribe; Rossnolaniini; *Liopeltis*; *Gongylosoma*; new genus; *Rossnolanus*; new subgenera; *Paulelliottus*; *Avonlovellus;* new subspecies; *tricolor*; *philippinesiensis*; *brummeri*; *borneoiensis.*



### INTRODUCTION

The Asian Snakes of the genera *Liopeltis* Fitzinger, 1843 and *Gongylosoma* Fitzinger, 1843 are diminutive and relatively uncommon snakes from the wetter South Asian region. Species within both genera as presently recognized have in the past been placed in a single genus (e.g. Boulenger 1890, 1894), with division of the group by most herpetologists only being done in the latter part of the twentieth century, this being done by resurrecting older available names.

Some species have in fact been transferred out, including the species *Cyclophiops doriae* Boulenger, 1888, returned to a monotypic genus as first described by Boulenger in 1888 and *Coluber porphyraceus* Cantor, 1839, held in with the *Liopeltis* group for many years and then transferred out to the genus *Oreocryptophis* Utiger *et al.* 2005, noting it had been recognized as divergent for some time and in fact including more than one species-level taxon (Utiger *et al.* 2005).

For several reasons, including in part a relative lack of specimens in museums of the remainder of the species, these snakes have not been of much taxonomic interest in the latter part of the twentieth century.

However a wide-ranging audit of most of the world's snake genera as popularly recognized showed that both genera contained divergent species worthy of taxonomic recognition in their own right, based on morphological and biological differences.

In terms of the genus *Liopeltis* the species *L. rappii* Günther, 1860, is significantly different from others in the genus, being of longer body-shape, more fossorial in habits and with a considerably smaller eye. Its head also differs significantly, including having just six as opposed to seven or eight upper labials.

As a result it is placed in a new genus *Rossnolanus gen. nov.* defined and named according to the Zoological Code (Ride *et al.* 1999), with the genus *Liopeltis* being redefined accordingly.

The genus *Gongylosoma* also comprises two main groups. The first (nominal group), includes the species, *Gongylosoma baliodeirus* Boie, 1827 the type species for the genus and *Gongylosoma scripta* (Theobold, 1868). The second group consists of the species *Gongylosoma mukutense* Grismer, Das and Leong, 2003, *Gongylosoma nicobariensis* (Stolicza, 1870)

and *Gongylosoma scripta* (Theobold, 1868), characterized by a body colour that fades from reddish brown anteriorly to greyish brown at the rear.

While my first view was to divide the genus along these lines, the second group of three also consists two different groups, that being *G. nicobariensis* which lacks a chevron-shaped nuchal band, anterior and posterior chin shields of the same size, five stripes anteriorly and a triangular postocular patch, versus the other two species (*G. scripta* and G. *mukutense*) which have these.

Therefore *Gongylosoma* is divided three ways into subgenera, according to the Zoological Code.

The differences between the three groups are in my view significant, based solely on morphological differences and almost certainly warrant division at the full genus level, but I have taken a conservative position (naming subgenera instead) in the absence of relevant molecular data for the relevant species.

There is also a likelihood that one of the two named subgenera should be treated as a full genus, with the other subgenus remaining within the group.

In the unlikely event that a subsequent or first reviser seeks to merge the two newly named subgenera within *Gongylosoma*, into a single genus, then *Paulelliottus gen. nov*. as defined herein is then the name that must take priority.

Because the taxonomic history of these snakes has been well documented elsewhere, it is not my purpose to rehash the detail here. However key references in terms of the taxonomy and ecology of the relevant species within the genera *Liopeltis*, *Gongylosoma*, *Cyclophiops* and *Oreocryptophis* include Boettger (1897), Boie (1827), Bong Hean (1987), Boulenger (1898, 1890, 1894), Brown and Alcala (1970), Bulian *et al.* (2005, 2006), Cantor (1839), Chanard *et al.* (1999), Cox *et al.* (1998), Daan and Hillenius (1966), Das (1999), Das and Yaakob (2007), David and Vogel (1996), David *et al.* (2004), Dowling and Jenner (1988), Fischer (1886), Gaulke (1999), Grandison (1972, 1978), Gray (1853), Grismer *et al.* (2002, 2003, 2008), Grossmann and Tillack (2004, 2005), Grossmann and Schulz (2000), Gumprecht (2003), Günther (1858, 1859, 1860), Heiko (2013), Hendrickson (1966), Jan (1865, 1866), Karunarathna Suranjan and Naalin Perera (2010), Karunarathna Suranjan and Thasun Amarasinghe (2011), Knietsch (2005), Kopstein (1938), Kramer (1977), Lenk *et al.* (2001), Leviton (1964), Lidth De Juede (1890), Lim and Ng (1999), Love (2010), Malkmus *et al.* (2002), Manthey (1983), Manthey and Grossman (1997), Marx (1958), Mattison (2007), Mell (1931), Oshima (1910), Pauwels *et al.* (2003), Peters (1871), Pyron *et al.* (2013), Saikia *et al.* (2007), Sang *et al.* (2009), Schlegel (1837), Schulz (1996a, 1996b), Schulz and Helfenberger (2010), Schulz *et al.* (2010), Sclater (1891), Sharma (2004), Smedley (1931a, 1931b), Smith (1931, 1943), Stejneger (1910), Stoliczka (1870a, 1870b, 1873), Stuart *et al.* (2006), Stuebing and Inger (1999), Taylor (1950, 1965), Teo and Rajathurai (1997), Theobald (1868), Trapp (2012), Utiger *et al.* (2002, 2005), van Rooijen and van Rooijen (2007), Vijayakumar and David (2006), Wall (1908, 1921, 1924), Whitaker and Captain (2004), Zhao (1993), Ziegler *et al.* (2007) and sources cited therein.

A number of molecular studies have shown that at least some (as tested) species within these genera (including those defined below) form a divergent group within the Colubridae (e.g. Utiger *et al.* 2005, Pyron *et al.* 2013).

As a result, the group are formally placed in a new tribe defined according to the Zoological Code (Ride *et al.* 1999), namely *Rossnolaniini tribe nov.*

*Liopeltis tricolor* Schlegel, 1837 has been known to vary significantly between populations. These differences have in part been documented in some of the literature cited above.

As a result those differences are given taxonomic recognition, with three regional subspecies described herein.

**GENUS *LIOPELTIS* FITZINGER, 1843**

**Type species:** *Herpetodryas tricolor* Schlegel, 1837.

**Diagnosis:** Smallish snakes usually well under 60 cm in total length. Maxillary teeth small, equal in size and numbering 15-30. Mandibular teeth are subequal. The head is short, not or scarcely distinct from the neck. The eye is small or moderate in size, but is more than half the length of the snout. The pupil is round, head shields are more-or-less normal. The body is cylindrical with smooth or feebly keeled scales in 15 dorsal mid-body rows without apical pits. Ventrals are not angulate laterally, the tail is moderate to long and the subcaudals are divided. 7-8 upper labials.

Nasal shield may be single, semidivided or divided.

**Distribution:** Southern Asia including south-east Asia.

**Content:** *Liopeltis calamaria* (Günther, 1858); *L. frenatus* (Günther, 1858); *L. philippinus* (Boettger, 1897); *L. stoliczkae* (Sclater, 1891); *L. tricolor* (Schlegel, 1837).

***LIOPELTIS TRICOLOR* (SCHLEGEL, 1837)**

**Type locality:** Java, Indonesia.

**Diagnosis:** As for the genus (above) and then including the following: Snout is rather long and depressed, twice as long as the diameter of the eye; rostral broader than deep, visible from above; nasal undivided; suture between the internasals as long as or a little shorter than that between the praefrontals; frontal not broader than the supraocular, as long as its distance from the end of the snout, shorter than the parietals; no loreal, the praefrontal in contact with the second and third labials; one preaocular and two postoculars; temporals 1+2; eight supralabials, numbers 4 and 5 entering the eye; four or five lower labials in contact with the anterior chinshields, which are a little shorter than the posterior. There are 15 dorsal mid-body scale rows; 140-187 ventrals, divided anal and 103-130 divided subcaudals. The colour is olive or greenish above; a black streak on each side of the head and anterior part of the body; passing through the eye; upper lip and lower parts are yellowish-white; a pale streak along each side of the belly.

**Distribution:** Indonesia (Pulau We, Borneo, Bangka, Java, Nias, Riau Archipelago, Sumatra, We); Brunei Darussalam; Malaysia (Malaya and East Malaysia, Pulau Tioman); Philippine Islands (including Bubuan, Palawan); Singapore; Thailand; Vietnam.

***LIOPELTIS TRICOLOR PHILIPPINESIENSIS SUBSP. NOV.***

**Holotype:** A specimen at the California Academy of Science (CAS), San Francisco, USA, specimen number 62168 from Palawan Island, the Philippines. This is a government-owned facility that allows access to its specimens by scientists.

**Paratype:** A specimen in the Chicago Natural History Museum, Chicago, USA, specimen number 15054 from Palawan Island, the Philippines. This is a government-owned facility that allows access to its specimens by scientists.

**Diagnosis:** *Liopeltis tricolor philippinesiensis subsp. nov.* is most readily separated from the nominal form of the species and the subspecies *Liopeltis tricolor borneoiensis subsp. nov.* described herein by consistent differences in scalation.

For *Liopeltis tricolor philippinesiensis subsp. nov.* males have 149 ventrals (n=3), females have 148 ventrals (n=1); males have 116-125 subcaudals (n=3), females have 124 subcaudals (n=1); the tail length versus standard length is .55-.61 (n=4); compared to:

For *Liopeltis tricolor borneoiensis subsp. nov.* males have 153-160 ventrals (n=4), females have 167-171 ventrals (n=2); males have 124-133 subcaudals (n=4), females have 127-133 subcaudals (n=2); the tail length versus standard length is .60-.62 (n=2); compared to:

For *Liopeltis tricolor tricolor* males have 140-149 ventrals (n=3), females have 187 ventrals (n=1); males have 118-131 subcaudals (n=3), females have 108 subcaudals (n=1); the tail length versus standard length is .65-.66 (n=2).

*Liopeltis tricolor brummeri subsp. nov.* is most readily separated from the other three subspecies by the following: In life, the upper lip and lower parts are whitish with at best a faint yellowish tinge as opposed to yellowish white to yellow in the other subspecies.

In *Liopeltis tricolor brummeri subsp. nov.* the frontal shield is also a different shape to that seen in the other three subspecies. In the other three subspecies the anterior part of the frontal flares outwards to a noticeable degree, whereas in *Liopeltis tricolor brummeri subsp. nov.* the frontal either does not flare out or does so only slightly.

Obviously all four subspecies can be separated by distribution as well.

*Liopeltis tricolor philippinesiensis subsp. nov.* is restricted to Palawan Island, the Philippines.

*Liopeltis tricolor borneoiensis subsp. nov*. is restricted to the island of Borneo and immediately adjacent offshore islands.

*Liopeltis tricolor tricolor* occupies Java and immediately adjacent islands.

*Liopeltis tricolor brummeri subsp. nov.* is found in Peninsula Malaysia, Singapore, Thailand and immediately adjacent islands.

**Distribution:** *Liopeltis tricolor philippinesiensis subsp. nov*. is restricted to Palawan Island, the Philippines and immediately adjacent islands.

**Etymology:** Named in relation to where the subspecies occurs.

***LIOPELTIS TRICOLOR BORNEOIENSIS SUBSP. NOV.***

**Holotype:** A specimen at the Museum of Comparative Zoology **(**MCZ), Harvard, USA, specimen number: MCZ 11270 from the Limbang District, Sarawak on the island of Borneo. The Museum of Comparative Zoology allows access to its specimens by scientists.

**Diagnosis:** *Liopeltis tricolor borneoiensis subsp. nov*. is most readily separated from the nominal form of the species and the subspecies *Liopeltis tricolor philippinesiensis subsp. nov*. described herein by consistent differences in scalation.

For *Liopeltis tricolor borneoiensis subsp. nov*. males have 153-160 ventrals (n=4), females have 167-171 ventrals (n=2); males have 124-133 subcaudals (n=4), females have 127-133 subcaudals (n=2); the tail length versus standard length is .60-.62 (n=2); compared to:

For *Liopeltis tricolor philippinesiensis subsp. nov*. males have 149 ventrals (n=3), females have 148 ventrals (n=1); males have 116-125 subcaudals (n=3), females have 124 subcaudals (n=1); the tail length versus standard length is .55-.61 (n=4); compared to:

For *Liopeltis tricolor tricolor* males have 140-149 ventrals (n=3), females have 187 ventrals (n=1); males have 118-131 subcaudals (n=3), females have 108 subcaudals (n=1); the tail length versus standard length is .65-.66 (n=2).

*Liopeltis tricolor brummeri subsp. nov.* is most readily separated from the other three subspecies by the following: In life, the upper lip and lower parts are whitish with at best a faint yellowish tinge as opposed to yellowish white to yellow in the other subspecies.

In *Liopeltis tricolor brummeri subsp. nov.* the frontal shield is also a different shape to that seen in the other three subspecies. In the other three subspecies the anterior part of the frontal flares outwards to a noticeable degree, whereas in *Liopeltis tricolor brummeri subsp. nov.* the frontal either does not flare out or does so only slightly.

Obviously all four subspecies can be separated by distribution as well.

*Liopeltis tricolor philippinesiensis subsp. nov.* is restricted to Palawan Island, the Philippines.

*Liopeltis tricolor borneoiensis subsp. nov*. is restricted to the island of Borneo and immediately adjacent offshore islands.

*Liopeltis tricolor tricolor* occupies Java and immediately adjacent islands.

*Liopeltis tricolor brummeri subsp. nov.* is found in Peninsula Malaysia, Singapore, Thailand and immediately adjacent islands.

**Distribution:** *Liopeltis tricolor borneoiensis subsp. nov*. is restricted to the island of Borneo and immediately adjacent offshore islands.

**Etymology:** Named in relation to where the subspecies occurs.

***LIOPELTIS TRICOLOR BRUMMERI SUBSP. NOV.***

**Holotype:** A specimen at the Raffles Museum of Biodiversity Research, Singapore, specimen number: ZRC.2.2837, from Penang Hill, Penang, Peninsula Malaysia. This is a facility that allows access to its collection by scientists.

**Paratype:** A specimen at the Raffles Museum of Biodiversity Research, Singapore, specimen number: ZRC.2.2838, from Penang Hill, Penang, Peninsula Malaysia. This is a facility that allows access to its collection by scientists.

**Diagnosis:** *Liopeltis tricolor brummeri subsp. nov.* is most readily separated from the other three subspecies by the following: In life, the upper lip and lower parts are whitish with at best a faint yellowish tinge as opposed to yellowish white to yellow in the other subspecies.

In *Liopeltis tricolor brummeri subsp. nov.* the frontal shield is also a different shape to that seen in the other three subspecies. In the other three subspecies the anterior part of the frontal flares outwards to a noticeable degree, whereas in *Liopeltis tricolor brummeri subsp. nov.* the frontal either does not flare out or does so only slightly.

*Liopeltis tricolor borneoiensis subsp. nov*. is most readily separated from the nominal form of the species and the subspecies *Liopeltis tricolor philippinesiensis subsp. nov*. described herein by consistent differences in scalation.

For *Liopeltis tricolor borneoiensis subsp. nov*. males have 153-160 ventrals (n=4), females have 167-171 ventrals (n=2); males have 124-133 subcaudals (n=4), females have 127-133 subcaudals (n=2); the tail length versus standard length is .60-.62 (n=2); compared to:

For *Liopeltis tricolor philippinesiensis subsp. nov*. males have 149 ventrals (n=3), females have 148 ventrals (n=1); males have 116-125 subcaudals (n=3), females have 124 subcaudals (n=1); the tail length versus standard length is .55-.61 (n=4); compared to:

For *Liopeltis tricolor tricolor* males have 140-149 ventrals (n=3), females have 187 ventrals (n=1); males have 118-131 subcaudals (n=3), females have 108 subcaudals (n=1); the tail length versus standard length is .65-.66 (n=2).

Obviously all four subspecies can be separated by distribution as well.

*Liopeltis tricolor philippinesiensis subsp. nov*. is restricted to Palawan Island, the Philippines.

*Liopeltis tricolor borneoiensis subsp. nov*. is restricted to the island of Borneo and immediately adjacent offshore islands.

*Liopeltis tricolor tricolor* occupies Java and immediately adjacent islands.

*Liopeltis tricolor brummeri subsp. nov.* is found in Peninsula Malaysia, Singapore, Thailand and immediately adjacent islands.

**Distribution:** Peninsula Malaysia, Singapore and Thailand.

**Etymology:** Named in honour of Marcus Brummer of Upwey, Melbourne, Victoria, Australia for his magnificent efforts in terms of highlighting police and political corruption in the Australian state of Victoria.

In the late 1990's the Victorian police were routinely bashing political protestors, on instructions of their controlling government, led at the time by Premier Steve Bracks.

The police were not enforcing the law of the land, but rather in

effect acting as paid government thugs to bash, rob and lock up any people they deemed a threat to their cosy and corrupt arrangement.

After several law-abiding workers were bashed, robbed and some even killed as a result of their protests against Bracks government policies and highly corrupt practices, Brummer decided to wage a peaceful protest against the dictatorial and fascist Bracks government.

He did this by sneaking into a press conference at a Museum opening on 22 October 2000 and shoving a large pie into the face of Bracks while live TV cameras were running.

This caused the meglomaniac Bracks extreme embarrassment.

For this act, Brummer was jailed, although as it happened the other prisoners treated him like Royalty for his deed!

A short time earlier Victorian police had without provocation attacked and killed a number of peaceful protestors, and severely injuring many more, campaigning for better working conditions in the city of Melbourne. This included a number of elderly ladies.

In contrast to Brummer, no police officer was charged or punished in any way.

All it takes for evil to flourish is for supposedly good people to do nothing.

Brummer did his best to highlight the extreme political and police corruption that was the hallmark of the Bracks government of the period post-dating August 1999.

The government of Bracks was an evil monstrosity run in effect by the hatchet-man Rob Hulls who broke all the rules of democracy by banning protest and dissent. Hulls copied the Nazi Adolf Hitler and had books seized from shops and shredded and his henchmen and thugs effectively destroyed any semblance of decency or integrity in the legal system by appointing his own corrupt mates to positions of power. This in effect made his own band of thieves untouchable by the law and removing the right to a fair trial for any fabricated charges laid against anyone seen by Hulls, Bracks and the band of thieves as dissenting.

As it happens, Bracks had deposed an equally corrupt leader in the form of Jeffrey Gibb Kennett, (also known to have had books seized from shops and shredded) whose legacy of debt created to line the pockets of the favoured few, the State of Victoria will be repaying for many years. This includes in the form of tolls on roads that had long earlier been built and paid for by taxpayers and then given to one or more companies owned or controlled by people with connections to the Kennett regime.

**GENUS *ROSSNOLANUS GEN. NOV.***

**Type species:** *Ablabes rappii* Günther, 1860.

**Diagnosis:** This genus consists of smallish snakes, usually well under 60 cm in length. Maxillary teeth small, equal in size and numbering 15-30. Mandibular teeth are subequal. The head is short, not or scarcely distinct from the neck. The eye is small or moderate in size and is less than half the length of the snout. The pupil is round, head shields are more-or-less normal. The body is cylindrical with smooth or feebly keeled scales in 15 dorsal mid-body rows without apical pits. Ventrals are not angulate laterally, the tail is moderate to long and the subcaudals are divided. 6 upper labials.

This genus (*Rossnolanus gen. nov.*) is separated from *Liopeltis* Fitzinger, 1843 (within which it was formerly placed), by having the eye being not more than half the length of the snout, (being smaller than in *Liopeltis*, which has an eye more than half the length of the snout), and by having six upper labials, as opposed to 7-8 in *Liopeltis*.

This genus (*Rossnolanus gen. nov.*) is separated from *Gongylosoma* Fitzinger, 1843 (including the subgenera named below) by the fact that species in that genus have either 13 or 17 dorsal mid-body rows instead of the 15 in this genus.

This genus (*Rossnolanus gen. nov.*) is separated from the genus *Oreocryptophis* Utiger *et al*. 2005 by the fact that the latter has 19 as opposed to 15 dorsal mid-body rows.

*Cyclophiops doriae* Boulenger, 1888 (monotypic for the Boulenger-named genus) is separated from *Rossnolanus gen. nov*. by having 8 as opposed to 6 upper labials. *Cyclophiops doriae* Boulenger, 1888 also has a distinctively convex snout.

*Rossnolanus gen. nov* is also diagnosed by the following suite of characters: Rostral is twice as broad as deep, being just visible from above. The nostril is between two nasals; suture between the internasals is a little shorter than that between the praefrontals; frontal slightly shorter than its distance from the end of the snout, a little shorter than the parietals; loreal is as long as deep or a little longer than deep; one praeocular; two postoculars, only the upper in contact with the parietal; temporals 1+1; 6 upper labials, the third and fourth entering the eye; four lower labials in contact with the anterior chin shields, which equal or a little exceed the posterior in length. 15 dorsal mid-body scale rows, 178-195 ventrals, divided anal and 60-75 divided subcaudals. The colour is brown above with a broad dark collar and a double series of transverse dark spots on the anterior part of the body; these markings being noticeably more distinct in young specimens. The venter is a uniform yellowish colour.

**Distribution:** The Himalayas, including, Nepal, India (Sikkim, Darjeeling, Himachal Pradesh).

**Etymology:** Named in honour of Ross Nolan of Ringwood, Victoria, Australia in recognition of his civic ethics in being a whistleblower of corruption in the Victorian Liberal Party and their private army, including heavily armed and highly corrupt Victorian Police Officers and a totally corrupt judiciary appointed by the politicians and who follow orders given to them to railroad innocent people and ensure that police protected thugs and criminals remain untouched by the law.

As a result of his blowing the whistle on the corruption, Liberal Party luminaries in Melbourne organised a campaign to discredit him via the Murdoch-controlled “hate press” (known best for the illegal phone hacking scandal in the UK) the end result being a total destruction of Nolan’s life and distinguished career as an aviation engineer. Nolan’s speciality was the development of “Flying Cars”.

**Content:** *Rossnolanus rappii* Günther, 1860 (monotypic for the genus).

**GENUS *GONGYLOSOMA* FITZINGER, 1843**

**Type species:** *Coronella baliodeira* Boie, 1827.

**Diagnosis:** Smallish snakes, usually well under 60 cm in length. Maxillary teeth small, equal in size and numbering 15-30. Mandibular teeth are subequal. The head is short, not or scarcely distinct from the neck. The eye is small or moderate in size and may be less than half the length of the snout or more. The pupil is round, head shields are more-or-less normal. The body is cylindrical with smooth or feebly keeled scales in 13 or 17 dorsal mid-body rows (depending on the subgenus as defined herein) without apical pits. Ventrals are not angulate laterally, the tail is moderate to long and the subcaudals are divided. 7-8 upper labials.

Separated from *Rossnolanus gen. nov*. by the fact that *Rossnolanus gen. nov.* has six as opposed to 7-8 upper labials. *Liopeltis* Fitzinger, 1843 has 15 dorsal-mid-body rows, which no *Gongylosoma* species has. *Oreocryptophis* Utiger *et al*. 2005 is separated from *Gongylosoma* by having 19 dorsal-mid-body scale rows, as opposed to 13 or 17.

*Cyclophiops* Boulenger, 1888 is separated from *Gongylosoma* by having 15 dorsal-mid-body rows, which no *Gongylosoma* species has.

**Distribution:** Southern Asia, including south-east Asia.

**Content:** *Gongylosoma baliodeirus* (Boie, 1827); *G. longicauda* (Peters, 1871); *G. mukutense* Grismer, Das and Leong, 2003; *G. nicobariensis* (Stolicza, 1870); *G. scripta* (Theobold, 1868).

**SUBGENUS *PAULELLIOTTUS SUBGEN. NOV.***

**Type species:** *Ablabes longicaudus* Peters, 1871.

**Diagnosis:** The subgenus *Paulelliottus subgen. nov.* is separated from all other *Gongylosoma* and *Liopeltis* by the presence of (1) a nuchal band, (2) a wide, triangularly shaped postocular patch, (3) five, thin, white stripes consisting of a vertebral stripe and a pair of lateral and ventrolateral stripes, and (4) anterior and posterior chin shields of equal length and 13 dorsal mid-body rows.

The subgenus *Avonlovellus subgen. nov.* in common with *Paulelliottus subgen. nov.* has a dorsal body colour that fades from reddish anteriorly to gray-brown posteriorly. This is not the case in the remaining species of *Gongylosoma.*

*Avonlovellus subgen. nov.* is readily separated from all other *Gongylosoma* by having 17 rather than 13 dorsal mid-body rows.

In turn and in common with all other *Gongylosoma* these snakes are diagnosed as follows: Smallish snakes, usually well under 60 cm in length. Maxillary teeth small, equal in size and numbering 15-30. Mandibular teeth are subequal. The head is short, not or scarcely distinct from the neck. The eye is small or moderate in size and may be less than half the length of the snout or more. The pupil is round, head shields are more-or-less normal. The body is cylindrical with smooth or feebly keeled scales in 13 or 17 dorsal mid-body rows (depending on the subgenus as defined herein) without apical pits. Ventrals are not angulate laterally, the tail is moderate to long and the subcaudals are divided. 7-8 upper labials.

Separated from *Rossnolanus gen. nov.* by the fact that *Rossnolanus gen. nov.* has six as opposed to 7-8 upper labials. *Liopeltis* Fitzinger, 1843 has 15 dorsal-mid-body rows, which no *Gongylosoma* species has. *Oreocryptophis* Utiger *et al.* 2005 is separated from *Gongylosoma* by having 19 dorsal-mid-body scale rows, as opposed to 13 or 17.

*Cyclophiops* Boulenger, 1888 is separated from *Gongylosoma* by having 15 dorsal-mid-body rows, which no *Gongylosoma* species has.

**Distribution:** *Paulelliottus subgen. nov*. occurs in Malaysia (West and East) and parts of Indonesia within these boundaries.

**Etymology:** Named in honour of Paul Elliott of Polyester booksellers in Brunswick Street, Fitzroy, Victoria, Australia in recognition for his courageous efforts in fighting government corruption by selling books about corruption banned by the government (illegally) and in the face of countless armed raids and falsified criminal charges by the local Victorian Police (see etymology for *Avonlovellus gen. nov.* below).

**Content:** *Gongylosoma* (*Paulelliottus*) *longicaudus* (Peters, 1871) (type species); *G.* (*Paulelliottus*) *mukutense* Grismer, Das and Leong, 2003.

**SUBGENUS *AVONLOVELLUS SUBGEN. NOV.***

**Type species:** *Ablabes nicobariensis* Stolicza, 1870.

**Diagnosis:** The subgenus *Paulelliottus subgen. nov.* is separated from all other *Gongylosoma* and *Liopeltis* by the presence of (1) a nuchal band, (2) a wide, triangularly shaped postocular patch, (3) five, thin, white stripes consisting of a vertebral stripe and a pair of lateral and ventrolateral stripes, and (4) anterior and posterior chin shields of equal length and 13 dorsal mid-body scale rows.

The subgenus *Avonlovellus subgen. nov.*, monotypic for the species *Gongylosoma* (*Avonlovellus*) *nicobariensis* (Stolicza, 1870) in common with *Paulelliottus subgen. nov.* has a dorsal body colour that fades from reddish anteriorly to gray-brown posteriorly. This is not the case in the remaining species of *Gongylosoma.*

*Avonlovellus subgen. nov.* is also readily separated from all other *Gongylosoma* by having 17 rather than 13 dorsal mid-body rows.

*Avonlovellus subgen. nov.* is further diagnosed as follows: Rostral low, wide, not reaching the top of the head; nostril between two nasals; internasals about half the size of the praefrontals; frontal somewhat larger than the supraoculars; parietals about one forth larger than the frontal, in contact with both postoculars; loreal united with the postnasal; one praeocular and two postoculars; temporals 1+2, 7 upper labials, the third and fourth entering the eye; both pairs of chin-shields are subequal in size. 17 dorsal mid-body scale rows. 189 ventrals, divided anal and 87 subcaudals. The anterior half of the body is reddish brown above grading to a blackish grey at the rear. Head above is blackish, the first three labials have yellow spots. There is a short broad yellow streak from behind and below the eye posteriorly to the angle of the mouth; a black collar, margined on both sides with an interrupted yellow band, of which the anterior is the most distinct; an indistinct series of blackish-grey dorsal spots, almost forming a dark undulating band; sides marbled and freckled blackish grey, this colour being separated from the upper brown one by a series of closely set black spots which are partially conspicuous on the posterior part of the body; chin dusky; lower parts yellow with a vermilion tinge, each ventral with a large black spot near the outer extremity (Stoliczka 1870).

In turn and in common with all other *Gongylosoma* these snakes are diagnosed as follows: Smallish snakes, usually well under 60 cm in length. Maxillary teeth small, equal in size and numbering 15-30. Mandibular teeth are subequal. The head is short, not or scarcely distinct from the neck. The eye is small or moderate in size and may be less than half the length of the snout or more. The pupil is round, head shields are more-or-less normal. The body is cylindrical with smooth or feebly keeled scales in 13 or 17 dorsal mid-body rows (depending on the subgenus as defined herein) without apical pits. Ventrals are not angulate laterally, the tail is moderate to long and the subcaudals are divided. 7-8 upper labials.

Separated from *Rossnolanus gen. nov.* by the fact that *Rossnolanus gen. nov.* has six as opposed to 7-8 upper labials. *Liopeltis* Fitzinger, 1843 has 15 dorsal-mid-body rows, which no *Gongylosoma* species has. *Oreocryptophis* Utiger *et al.* 2005 is separated from *Gongylosoma* by having 19 dorsal-mid-body scale rows, as opposed to 13 or 17.

*Cyclophiops* Boulenger, 1888 is separated from *Gongylosoma* by having 15 dorsal-mid-body rows, which no *Gongylosoma* species has.

**Distribution:** Known only from the holotype from the Nicobar Islands (India).

**Etymology:** Named in honour of Avon Lovell, author of the three books, *The Mickleberg Stitch*, published in 1985, *Split Image* published in 1990 and *Litany of Lies*, published in 2011, all about corruption in the Western Australian (WA) Police Force (Lovell 1985, 1990, 2011).

To attempt to publish a book about government corruption in Australia just once is an act of extreme courage and to have done this three times is something Lovell should be honoured for.

The three books had as their centrepiece the story of the Perth Mint Swindle, which is the popular name for the robbery of 49 gold bars weighing 68 kg from the Perth Mint in Western Australia on 22 June 1982. The bullion was valued at A$653,000 at that time (2011:$2.02 million). According to the WA Police at the time, three brothers, Ray, Peter and Brian Mickelberg, orchestrated the robbery. The three went to trial and were found guilty of the conspiracy and sentenced in 1983 to twenty, sixteen and twelve years in jail respectively. Lovell took up the case and all three convictions were overturned in 2004, because they were able to show that there had been a conspiracy by corrupt Western Australia Police to frame them. The offending officers have not been charged.

The senior investigating officer in the case was the highly corrupt and protected Detective Sergeant Don Hancock who was later promoted to head of the State Criminal Investigation Bureau (CIB). In September 2001 in an apparently unrelated

series of events and an act of Karma, Hancock was murdered when a bomb which had been planted under his car exploded outside his home in Lathlain, killing him and a friend Lou Lewis. The bomb had been planted by a member of the family of a man Hancock had ordered killed, the original victim being in a well-known bikie gang.

In 2002, midway through a State Royal Commission into police corruption commenced in part as a result of material detailing WA Police corruption including the Mickleberg matter, published in chapters dedicated to the WA Police in the books *Victoria Police Corruption* and *Victoria Police Corruption-2* (Hoser 1999a, 1999b), a retired police officer who had been at the centre of the case, Tony Lewandowski, made a confession of his involvement in fabricating evidence which was used to help frame the brothers. Lewandowski's senior officer during the investigation was Don Hancock, who with Lewandowski, were the only persons present at the brothers' interviews following the Mickelberg arrests. Lewandowski was subsequently charged with attempting to pervert the course of justice, making false statements, fabricating evidence and perjury. In May 2004, just before facing trial Lewandowski apparently committed suicide though there has been some speculation as to whether or not this may have been staged to cover his (possible) murder. Although Lewandowski is now deceased, it was ultimately through Lewandowski's confession, Hancock was directly implicated in fabricating evidence in the Mickelberg case.

In July 2004 the Western Australian Court of Criminal Appeal quashed the brothers' convictions after seven unsuccessful attempts. The judge ruled that with the suppression of their sentence, they were entitled to a presumption of innocence. The Assistant Police Commissioner, Mel Hay, expressed disappointment with the decision which prompted a threat of a defamation lawsuit from the brothers. The brothers subsequently sued the Western Australian government for libel, and as part of the settlement, the West Australian police issued a public apology in December 2007.

After lodging claims for compensation, in January 2008 State Attorney-General Jim McGinty offered $500,000 in ex-gratia payments to each brother for the "injustice done to them". The payment followed $658,672 paid to cover legal costs of their two appeals. The Mickelbergs' lawyer had asked for $950,000 in compensation for Ray and $750,000 for Peter.

Meanwhile, in WA, Lovell's books were all banned illegally by the State Government and police who had all copies seized and destroyed. From Victoria, myself and others distributed books through the postal system into WA.

The police union collected a levy of $1 per week from each member to fund legal action against Lovell and his publishers and distributors to suppress publication of the book and these proceedings, illegal in initiation by the police ran for many years. The WA Police Union raised in excess of a million dollars and also diverted a far greater sum of tax-payer's funds to enforce the bans on the book and associated legal actions. While websites such as "Wikipedia" state that the ban has been lifted, the fact is that as of 2013, state police across Australia still routinely raid major bookshops with all Lovell titles being on the ongoing "banned, seize and destroy" list.

In Melbourne, the owner of the Polyester Bookshop in Brunswick Street, Fitzroy, Paul (Gonzo) Elliott was raided and charged and fined by the Victoria police after being found selling copies of the Lovell books.

**Content:** *Gongylosoma* (*Avonlovellus*) *nicobariensis* (Stolicza, 1870) (monotypic).

**TRIBE ROSSNOLANIINI *TRIBE NOV.***

**(Terminal taxon: *Ablabes rappii* Günther, 1860)**

**Defined herein as *Rossnolanus rappii* (Günther, 1860).**

**Diagnosis:** Separated from other snakes by the following suite of characters: Smallish terrestrial or subarboreal snakes, growing to usually well under 60 cm in total length. Maxillary teeth small, equal in size and numbering 15-30. Mandibular teeth are subequal. The head is short, not or scarcely distinct from the neck. The eye is small or moderate in size, and may be more than half the length of the snout or alternatively less. The pupil is round, head shields are more-or-less normal. The body is cylindrical with smooth or feebly keeled scales in 13-23 dorsal-mid-body rows without apical pits. Ventrals are not angulate laterally, the tail is moderate to long and the subcaudals are divided. 6-8 upper labials.

Nasal shield may be single, semidivided or divided.

**Distribution:** Southern and south-east Asia.

**Etymology:** See for the genus *Rossnolanus gen. nov.* above.

**Content:** *Rossnolanus gen. nov.*; *Cyclophiops* Boulenger, 1888; *Gongylosoma* Fitzinger, 1843; *Liopeltis* Fitzinger, 1843; *Oreocryptophis* Utiger *et al.* 2005.

**FIRST REVISER NOTE**

In the unlikely event that a subsequent reviser seeks to merge the two newly named subgenera within *Gongylosoma*, then *Paulelliottus* is than name that must take priority.

**REFERENCES CITED**

Boettger, O. 1897. Neue Reptilien und Batrachier von den Philippinen. *Zool. Anz.* 20:161-166.

Boie, F. 1827. Bemerkungen über Merrem's Versuch eines Systems der Amphibien, 1. Lieferung: Ophidier. *Isis van Oken* 20:508-566.

Bong Heang, K. 1987. An annotated checklist of the herpetofauna of Ulu Endau, Johore, Malaysia. *Malayan Nature J.* 41(2-3):413-423.

Boulenger, G. A. 1888. An account of the Reptilia obtained in Burma, north of Tenasserim, by M. L. Fea, of the Genova Civic Museum. *Ann. Mus. Civ. Stor. Nat. Genova, ser. 2,* 6:593-604.

Boulenger, G. A. 1890. *The Fauna of British India, Including Ceylon and Burma. Reptilia and Batrachia.* Taylor and Francis, London, xviii, 541 pp.

Boulenger, G. A. 1894. *Catalogue of the Snakes in the British Museum (Natural History). Volume II., Containing the Conclusion of the Colubridae Aglyphae.* British Mus. (Nat. Hist.), London, xi+382 pp.

Brown, W. C. and Alcala, A. C. 1970. The zoogeography of the herpetofauna of the Philippine Islands, a fringing archipelago. *Proc. Cal. Acad. Sci.* 38(6):105-130.

Bulian, J., Siebert, B. and Ansermet, M. 2005. Zur Nachzucht der Roten Breitband-Bambusnatter, *Oreophis porphyraceus laticinctus* Schulz and Helfenberger 1998. *Reptilia* (Münster) 10(56):67-70.

Bulian, J., Siebert, B . and Ansermet, M. 2006. Captive Breeding of the Broad-Banded Red Bamboo Ratsnake *Oreophis porphyraceus laticinctus*. *Reptilia* (GB) (46):47-49.

Cantor, T. E. 1839. Spicilegium serpentium indicorum [part 1]. *Proc. Zool. Soc. London* 1839:31-34.

Chanard, T., Grossmann, W., Gumprecht, A. and Schulz, K. D. 1999. *Amphibians and reptiles of peninsular Malaysia and Thailand - an illustrated checklist.* Bushmaster Publications, Würselen, Gemany:240 pp.

Cox, M. J., Van Dijk, P. P., Nabhitabhata, J. and Thirakhupt, K. 1998. *A Photographic Guide to Snakes and Other Reptiles of Peninsular Malaysia, Singapore and Thailand.* Ralph Curtis Publishing:144 pp.

Daan, S. and Hillenius, D. 1966. Catalogue of the type specimens of amphibians and reptiles in the Zoological Museum, Amsterdam. *Beaufortia* 13:117-144.

Das, I. 1999. Biogeography of the amphibians and reptiles of the Andaman and Nicobar Islands, India. pp. 43-77 in: Ota, H. (ed.) *Tropical Island herpetofauna*, Elsevier.

Das, I. and Yaakob, N. 2007. Status of knowledge of the Malaysian herpetofauna. In Status of biological diversity in

Malaysia and threat assessment of plant species in Malaysia. in: Chua, L. S. L., Kirton, L. G. and Saw , L. G. (eds.), *Status of biological diversity in Malaysia and threat assessment of plant species in Malaysia*. Forest Research Institute Malaysia, Kepong:pp.31-81.

David, P. and Vogel, G. 1996. *The snakes of Sumatra. An annotated checklist and key with natural history notes.* Bücher Kreth, Frankfurt/M.

David, P., Cox, M. J., Olivier, S. G., Pauwels, O. S. G., Chanhome, L. and Thirakhupt, K. 2004. Book Review: When a book review is not sufficient to say all: an in-depth analysis of a recent book on the snakes of Thailand, with an updated checklist of the snakes of the Kingdom. *The Natural History Journal of Chulalongkorn University* 4(1):47-80.

Dowling, H. G. and Jenner, J. V. 1988. Snakes of Burma: checklist of reported species and bibliography. *Smithsonian Herp. Inf. Serv*. (76):19 pp.

Fischer, J. G. 1886. Ueber eine Kollektion Reptilien und Amphibien von der Insel Nias und über eine zweite Art der Gattung Anniella Gray. *Abh. Naturw. Ver. Hamburg* 19(1):3-10.

Gaulke, M. 1999. Die Herpetofauna von Calauit Island (Calamianes-Inseln, Provinz Palawan, Philippinen) (Amphibia et Reptilia). *Faun. Abh. Staatl. Mus. Tierk. Dresden* 21(19).

Grandison, A. G. C. 1972. The Gunong Benom Expedition 1967. 5. Reptiles and amphibians of Gunong Benom with a description of a new species of *Macrocalamus*. *Bull. Br. Mus. nat. Hist. (Zool.),* London, 23:45-101.

Grandison, A. G. C. 1978. Snakes of West Malaysia and Singapore. *Annalen des Naturhistorischen Museums in Wien* 81 [1977]:283-303.

Gray, J. E. 1853. Descriptions of some undescribed species of reptiles collected by Dr. Joseph Hooker in the Khassia Mountains, East Bengal, and Sikkim Himalaya. *Ann. Mag. Nat. Hist.* (2)12:386- 392.

Grismer, L. L., McGuire, J. A., Sosa, R. and Kaiser, H. 2002. Revised checklist and comments on the terrestrial herpetofauna of Pulau Tioman, Peninsular Malaysia. *Herpetological Review* 33(1):26-29.

Grismer, L., Das, I. and Leong, T. M. 2003. A new species of *Gongylosoma* (Squamata:Colubridae) from Pulau Tioman, West Malaysia. *Herpetologica* 59(4):565-572.

Grismer, L. L., Neang, T., Chav, T., Wood, P. L. Jr., Oaks, J. R., Holden, J. and Gr, J. L. 2008. Additional amphibians and reptiles from the Phnom Samkos Wildlife Sanctuary in Northwestern Cardamom Mountains, Cambodia, with comments on their taxonomy and the discovery of three new species. *The Raffles Bulletin of Zoology* 56(1):161-175.

Grossmann, W. and Tillack, F. 2004. Angaben zur Haltung und Vermehrung der Breitband-Porphyrnatter *Oreophis porphyraceus laticincta* (Schulz and Helfenberger 1998) (Squamata: Colubridae). *Sauria*, Berlin 26(1):37-44.

Grossmann, W. and Tillack, F. 2005. Pulau Tioman - Perle im Südchinesischen Meer, Teil 2. *Reptilia* (Münster) 10(51):56-64.

Grossmann, W. and Schulz, K. D. 2000. *Elaphe porphyracea laticincta* Schulz and Helfenberger. *Sauria* 22(2):2.

Gumprecht, A. 2003. Anmerkungen zu den Chinesischen Kletternattern der Gattung *Elaphe* (*sensu lato*) Fitzinger, 1833. *Reptilia* (Münster) 8(44):37-41.

Günther, A. 1858. *Catalogue of Colubrine snakes of the British Museum*. London, I-XVI+281 pp.

Günther, A. 1859. On the geographical distribution of reptiles. *Ann. Mag. Nat. Hist.* (3)3:221-237.

Günther, A. 1860. Contributions to a knowledge of the reptiles of the Himalaya mountains. - I. Descriptions of the new species. II. List of Himalayan reptiles, with remarks on their horizontal distribution. *Proc. Zool. Soc. London* 1860:148-175.

Heiko, W. 2013. Im Schlangenland:Ein Besuch bei Yvonne und Thomas Klesius. *Terraria Elaphe* 2013 (2):88-93.

Hendrickson, J. R. 1966. Observations on the fauna of Pulau Tioman and Pulau Tulai. 5. The Reptiles. *Bull. Nat. Mus. Singapore* 34:53-71.

Hoser, R. T. 1999a. *Victoria Police Corruption*. Kotabi Publishing, Doncaster, Victoria, 3108, Australia:736 pp.

Hoser, R. T. 1999b. *Victoria Police Corruption-2*. Kotabi Publishing, Doncaster, Victoria, 3108, Australia:800 pp.

Jan, G. 1865. *Iconographie générale des ophidiens. 13. Livraison*. [Homalosoma mite] J.B. Bailière et Fils, Paris.

Jan, G. 1866. *Iconographie générale des ophidiens. 15. Livraison*. J.B. Bailière et Fils, Paris.

Karunarathna Suranjan, D. M. S. and Naalin Perera, W. P. 2010. New Distribution Records for *Liopeltis calamaria* (Günther, 1858) (Reptilia: Serpentes: Colubridae), with Notes on its Bioecology and Threats in Sri Lanka. *Sauria* 32(2):49-55.

Karunarathna Suranjan, D. M. S. and Thasun Amarasinghe, A. A. 2011. A preliminary survey of the reptile fauna in Nilgala Forest and its vicinity, Monaragala District, Sri Lanka. Taprobanica 03 (2):69-76.

Knietsch, V. 2005. Die Terrarienhaltung der Thailändischen Roten Bambusnatter (*Oreophis porphyraceus coxi*) sowie eine seltene Zwillingsgeburt. *Reptilia* (Münster) 10(56):62-66.

Kopstein, F. 1938. Ein Beitrag zur Eierkunde und zur Fortpflanzung der Malaiischen Reptilien. *Bull. Raffl. Mus.* 14:81-167.

Kramer, E. 1977. Zur Schlangenfauna Nepals. *Rev. suisse Zool.*, 84(3):721-761.

Lenk, P., Joger, U. and Wink, M. 2001. Phylogenetic relationships among European ratsnakes of the genus *Elaphe* Fitzinger based on mitochondrial DNA sequence comparisons. *Amphibia-Reptilia* 22(3): 329-339.

Leviton, A. E. 1964. Contributions to a review of Philippine snakes, II. The snakes of the genera *Liopeltis* and *Sibynophis*. *The Philippine Journal of Science* (1962) 92:367-381.

Lidth De Juede, T. W. V. 1890. Reptilia from the Malay Archipelago. II. Ophidia. In: M. Weber: *Zoologische Ergebnisse einer Reise in Niederländisch Ost-Indien*. Leiden (E. J. Brill), 1(2):178-192.

Lim, K. K. P. and Ng, H. H. 1999. The terrestrial herpetofauna of Pulau Tioman, Peninsular Malaysia. *Raffles Bull. Zool.,* Suppl. No. 6:131-155.

Love, B. 2010. Die China-Connection. *Reptilia* (Münster) 15(82):14-15.

Lovell, A. 1985. *The Mickleberg Stitch*. Creative Research, Perth, Western Australia.

Lovell, A. 1990. *Split Image*. Creative Research, Perth, Western Australia.

Lovell, A. 2011. *Litany of Lies.* Creative Research, Perth, Western Australia.

Malkmus, R., Manthey, U., Vogel, G., Hoffmann, P. and Kosuch, J. 2002. *Amphibians and reptiles of Mount Kinabalu (North Borneo).* A.R.G. Ganther Verlag, Rugell:404 pp.

Manthey, U. 1983. Exkursion am Mt. Kinabalu (4101 m), Nordborneo, Teil 3: Checkliste der Herpetofauna oberhalb 600 m ü. NN. *Herpetofauna* 5(23):20-31.

Manthey, U. and Grossmann, W. 1997. Amphibien and Reptilien Südostasiens. *Natur und Tier Verlag* (Münster):512 pp.

Marx, H. 1958. Catalogue of type specimens of reptiles and amphibians in Chicago Natural History Museum. *Fieldiana Zool.* 36:407-496.

Mattison, C. 2007. *The New Encyclopedia of Snakes*. Princeton University Press.

Mell, R. 1931. List of Chinese snakes. *Lingnan Sci. Jour., Canton*, 8[1929]:199-219.

Oshima, M. 1910. An annotated list of Formosan snakes, with

descriptions of four new species and one new subspecies. *Annot. Zool. Japon., Tokyo*, 7(3):185-207.

Pauwels, O. S. G., David, P., Chimsunchart, C. and Thirakhupt, K. 2003. Reptiles of Phetchaburi Province, Western Thailand: a list of species, with natural history notes, and a discussion on the biogeography at the Isthmus of Kra. *Natural History Journal of Chulalongkorn University* 3(1):23-53.

Peters, W. 1871. Uber neue Reptilien aus Ostafrika und Sarawak (Borneo), vorzüglich aus der Sammlung des Hrn. Marquis J. Doria zu Genua. *Mber. k. preuss. Akad. Wiss.*, Berlin [1871]:566-581.

Pyron, R. A., Burbrink, F. T. and Weins, J. J. 2013. A phylogeny and revised classification of Squamata, including 4161 species of lizards and snakes. Published online at: http://www.biomedcentral.com/1471-2148/13/93.

Ride, W. D. L. (ed.) *et al.* (on behalf of the International Commission on Zoological Nomenclature) 1999. *International code of Zoological Nomenclature*. The Natural History Museum, Cromwell Road, London, SW7 5BD, UK (also commonly cited as "ICZN 1999").

Saikia, U., Sharma, D. K. and Sharma, R. M. 2007. Checklist of the Reptilian fauna of Himachal Pradesh, India. *Reptile Rap* (8):6-9.

Sang, N. V., Cuc, H. T. and Nguyen, Q. T. 2009. *Herpetofauna of Vietnam*. Chimaira, Frankfurt:768 pp.

Schlegel, H. 1837. *Essai sur la physionomie des serpens*. Partie Générale: xxviii +251 S. + Partie Descriptive: 606 S. + xvi. La Haye (J. Kips, J. HZ. et W. P. van Stockum)

Schulz, K. D. 1996a. *Eine Monographie der Schlangengattung Elaphe Fitzinger*. Bushmaster, Berg (CH):460 pp.

Schulz, K. D. 1996b. *A monograph of the colubrid snakes of the genus* Elaphe *Fitzinger*. Koeltz Scientific Books:439 pp.

Schulz, K. D. and Helfenberger, N. 1998. Eine Revision des Unterarten-Komplexes der Roten Bambusnatter *Elaphe porphyracea* (Cantor, 1839). *Sauria* 20(1):25-45.

Schulz, K. D., Helfenberger, N. and Chettri, B. 2010. *Psammophis nigrofasciatus*, ein Juniorsynonym von *Oreophis porphyraceus porphyraceus*. *Sauria* 32(3):31-38.

Sclater, W. L. 1891. Notes on a collection of snakes in the Indian Museum, with descriptions of several new species. *J. Asiat. Soc. Bengal* LX:230-250.

Sharma, R. C. 2004. *Handbook Indian Snakes*. Akhil Books, New Delhi, India:292 pp.

Smedley, N. 1931a. Notes on some Malaysian snakes. *Bull. Raffl. Mus.* No 5:49-54.

Smedley, N. 1931b. Amphibians and reptiles from the Cameron Highlands, Malay Peninsula. *Bull. Raffl. Mus., Singapore*, 6:105-123.

Smith, M. A. 1931. The herpetology of Mt. Kinabalu, North Borneo, 13455 ft. *Bull. Raffles Mus., Singapore*, 5:3-32.

Smith, M. A. 1943. *The Fauna of British India, Ceylon and Burma, Including the Whole of the Indo-Chinese Sub-Region. Reptilia and Amphibia. 3 (Serpentes).* Taylor and Francis, London:583 pp.

Stejneger, L. 1910. The batrachians and reptiles of Formosa. *Proc. US Natl. Mus.* 38:91-114.

Stoliczka, F. 1870a. Observations on some Indian and Malayan Amphibia and Reptilia. *J. Asiat. Soc. Bengal, Calcutta*, 39:134-228.

Stoliczka, F. 1870b. Observations of some Indian and Malayan Amphibia and Reptilia. *Ann. Mag. Nat. Hist.* (4)6:105-109.

Stoliczka, F. 1873. Notes on some species of Malayan Amphibia and reptilia. *J. Asiat. Soc. Bengal* 42:111-126.

Stuart, B., Sok, K. and Neang, T. 2006. A collection of amphibians and reptiles from hilly Eastern Cambodia. *Raffl. Bull. Zool.* 54(1):129-155.

Stuebing, R. B. and Inger, R. F. 1999. *A field guide to the snakes of Borneo*. Natural history Publications (Borneo), Kota Kinabalu:254 pp.

Taylor, E. H. 1950. The snakes of Ceylon. *Univ. Kansas Sci. Bull.* 33(14):519-603.

Taylor, E. H. 1965. The serpents of Thailand and adjacent waters. *Univ. Kansas Sci. Bull.* 45(9):609-1096.

Teo, R. C. H. and Rajathurai, S. 1997. Mammals, reptiles and amphibians in the Nature Reserves of Singapore:diversity, abundance and distribution. *Proc. Nature Reserves Survey Seminar. Gardens' Bulletin Singapore* 49:353-425.

Theobald, W. 1868. Catalogue of the reptiles of British Birna [sic], embracing the provinces of Pegu, Martaban, and Tenasserim; with descriptions of new or little-known species. *Zool. J. Linnean Soc.* 10:4-67.

Trapp, B. 2012. Terrarientiere fotografieren. Einsatz von Licht und Blitz bei Spiegelreflexkameras. *Reptilia* (Münster) 17(94):28-38.

Utiger, U., Helfenberger, N., Schätti, B., Schmidt, C., Ruf, M. and Ziswiler, V. 2002. Molecular systematics and phylogeny of Old World and New World ratsnakes, *Elaphe Auct.,* and related genera (Reptilia, Squamata, Colubridae). *Russ. J. Herp.* 9(2):105-124.

Utiger, U., Schatti, B. and Helfenberger, N. 2005. The oriental colubrine genus *Coelognathus* Fitzinger, 1843 and classification of old and new world racers and ratsnakes (Reptilia, Squamata, Colubridae, Colubrinae). *Russ. J. Herpetol.* 12(1):39-60.

van Rooijen, J. and van Rooijen, M. 2007. The land snakes of the Santubong Peninsula, Sarawak, Borneo: A preliminary list of species with natural history notes. *Russian Journal of Herpetology* 14 (1):27-38.

Vijayakumar, S. P. and David, P. 2006. Taxonomy, Natural History, and Distribution of the Snakes of the Nicobar Islands (India), based on new materials and with an emphasis on endemic species. *Russian Journal of Herpetology* 13(1):11-40.

Wall, F. 1908. Notes on a collection of snakes from the Khasi Hills, Assam. *J. Bombay nat. Hist. Soc.* 18:312-337.

Wall, F. 1921. *Ophidia Taprobanica or the Snakes of Ceylon*. Colombo Mus. (H. R. Cottle, gov. printer), Colombo. Xxii+581 pp.

Wall, F. 1924. A Hand-list of the Snakes of the Indian Empire. Part 3. *J. Bombay nat. Hist. Soc.* 29:864-878.

Whitaker, R. and Captain, A. 2004. *Snakes of India*. Draco Books:500 pp.

Zhao, E. and Adler, K. 1993. *Herpetology of China*. SSAR, Oxford/Ohio:522 pp.

Ziegler, T., Hendrix, R., Thanh, V. B., Vogt, M., Forster, B. and Kien, D. N. 2007. The diversity of a snake community in a Karst forest ecosystem in the central Truong Son, Vietnam, with an identification key. *Zootaxa* 1493:1-40.

**CONFLICT OF INTEREST**

The author has no conflicts of interest in terms of this paper or conclusions within.

***Australasian Journal of Herpetology***

**ISSN 1836-5698 (Print)**

**ISSN 1836-5779 (Online)**

**Publishes original research in printed form in relation to reptiles, other fauna and related matters, including the subjects of classification, ecology, public interest, legal, captivity, exposure of frauds, "academic misconduct", etc.**

**It is a peer reviewed printed journal published in hard copy for permenant public scientific record, with a sizeable print run and has a global audience.**

**Full details at:**

**http://www.herp.net**

*Australasian Journal of Herpetology* 20:41-46.
Published 10 July 2013.

ISSN 1836-5698 (Print)
ISSN 1836-5779 (Online)

# Further division of the tree snake genus *Dendrelaphis* Boulenger, 1890, including the erection of three new genera to accommodate divergent species groups (Serpentes: Charlespiersonserpeniidae).

**RAYMOND T. HOSER**

**488 Park Road, Park Orchards, Victoria, 3114, Australia.**
***Phone*: +61 3 9812 3322 *Fax*: 9812 3355 *E-mail*: snakeman@snakeman.com.au**
**Received 1 May 2013, Accepted 12 June 2013, Published 10 July 2013.**

## ABSTRACT

The tree Snake genus *Dendrelaphis* Boulenger, 1890 as recognized at the beginning of year 2012 had long been recognized as a diverse group (McDowell 1984).

Hoser (2012), commenced the dismemberment of the genus as widely known by removing several distinctive Australasian species and placing them in the new genus *Charlespiersonserpens*.

Hoser 2013 went further and created a new family Charlespiersonserpeniidae to accommodate the Colubroid snake genera *Charlespiersonserpens* Hoser, 2012, *Dendrelaphis* Boulenger, 1890, *Chrysopelea* Boie, 1826 and *Ahaetulla* Link, 1807, in turn placed within tribes.

Phylogenies published by Pyron *et al*. (2013a, 2013b) provided molecular evidence in support of the Hoser (2012 and 2013) divisions of *Dendrelaphis* and the higher level taxonomy as well as other earlier morphological studies (e.g. Boulenger 1890).

This paper now takes the next logical step in the dismemberment of the genus *Dendrelaphis* and removes divergent Asian species groups from *Dendrelaphis sensu lato* creating three new genera, namely *Dannycoleus gen. nov*. for the *bifrenalis* group, *Shaneblackus gen. nov.* for the *pictus* group and *Brucegowus gen. nov.* for the *caudolineolatus* group, all placed within the tribe Charlepiersonserpenini Hoser, 2013.

**Keywords:** Taxonomy; Tree Snakes; Charlespiersonserpeniidae; Charlepiersonserpenini; *Dendrelaphis*; *Charlespiersonserpens*; new genera; *Dannycoleus*; *Brucegowus*; *Shaneblackus.*



### INTRODUCTION

The tree Snake genus *Dendrelaphis* Boulenger 1890 as popularly recognized at the start of year 2012 had long been recognized as a diverse group (McDowell 1984).

Notwithstanding the anatomical differences between members within the genus as understood by McDowell (1984), the undeniable fact in terms of these snakes is the similar morphology and habits of most members within the genus as defined.

As of 2012 the genus stood at in excess of 40 recognized species including a number of distinct species groups.

Hoser (2012), commenced the dismemberment of the genus as widely known by removing several distinctive Australasian species and placing them in the new genus *Charlespiersonserpens* Hoser, 2012 in turn broken up into subgenera, based on morphological differences.

Hoser 2013 went further and created a new family Charlespiersonserpeniidae Hoser, 2013 to accommodate the Colubroid snake genera *Charlespiersonserpens* Hoser, 2012, *Dendrelaphis* Boulenger, 1890, *Chrysopelea* Boie, 1826 and *Ahaetulla* Link, 1807, in turn placed within tribes, the tribe Charlepiersonserpenini Hoser, 2013 effectively including all species until then placed within the genus *Dendrelaphis* Boulenger, 1890 (and including *Charlespiersonserpens* Hoser, 2012).

A phylogeny published by Pyron *et al.* in 2013 (Pyron et al. 2013a) provided molecular evidence in support of the Hoser (2012 and 2013) division of *Dendrelaphis*.

The divisions indicated in the phylogeny of Pyron *et al.* (2013a) based on molecular evidence are also corroborated by the morphological divergence of the relevant species as noted as far back as 1890 by Boulenger (1890), who divided relevant species between two genera (*Dendrophis* Smith, 1840 and *Dendrelaphis* Boulenger, 1890).

As a result of the convergence of data, both morphological and molecular, pointing to the same obvious position, this paper now removes three divergent Asian species groups from *Dendrelaphis sensu lato* (AKA Charlepiersonserpenini Hoser, 2013), creating three new genera, namely *Dannycoleus gen. nov*. for the *bifrenalis* group, *Shaneblackus gen. nov.* for the

*pictus* group and *Brucegowus gen. nov.* for the *caudolineolatus* group, all placed within the tribe Charlepiersonserpenini Hoser, 2013, with all defined according to the Zoological Code (Ride *et al.* 1999).

Along with the genera *Dendrelaphis* and *Charlespiersonserpens*, these are all placed within the tribe Charlepiersonserpenini Hoser, 2013 as defined by Hoser (2013).

Hoser (2012) provided an extensive list of references relevant to the snakes of the genus *Dendrelaphis sensu lato* and their taxonomy, including the newly erected genus *Charlespiersonserpens.*

Although it has already been inferred that molecular data of Pyron *et al.* (2013) supports the erection of the three genera as defined below, I should note that the genera are defined solely on the basis of morphological divergence rather than any phylogenies produced on the basis of molecular data.

The body of literature and published in relation to the genus *Dendrelaphis* as widely recognized at start 2012, including Charlespiersonserpens Hoser (2012) as defined by Hoser (2012) is large. Key publications including those relevant to the species dealt with in this paper include, Anderson (1871), Auffenberg (1980), Auliya (2006), Baier (2005), Bergman (1955), Boie (1827), Boulenger (1886, 1888, 1890, 1894, 1895a, 1895b, 1897), Bourret (1935), Cohn (1905), Cox *et al.* (1998), Das (1999), Das and De Silva (2005), Daudin (1803), David and Vogel (1996), de Lang and Vogel (2005), de Rooij (1917), Deuve (1970), Devan-Song and Brown (2012), Doria (1817), Duméril *et al.* (1854), Flower (1897, 1899), Frith (1977), Gadow (1909), Garman (1901), Gaulke (1994, 1999), Gaulke *et al.* (1993), Gmelin (1789), Gray (1825, 1826, 1835, 1841, 1842), Grismer *et al.* (2008), Günther (1858, 1867, 1872), Hoser (1989, 2012, 2013), How and Kitchner (1997), How *et al.* (1996), Iskandar and Colijn (2002), Janzen *et al.* (2007), Koch (2011), Kuhl (1820), Lazell (2002), Lazell and Wu (1990), Leviton (1970), Lim and Cheong (2011), Lim and Lim (1992), Lim and Ng (1999), Lidth De Jeude (1911), Loveridge (1948), Luard (1918), Macleay (1875, 1877, 1878, 1884), Malkmus *et al.* (2002), Manthey and Grossmann (1997), McCoy (2006), McDowell (1984), McKay (2006), Meise and Hennig (1932), Mertens (1926, 1927, 1930), Obst (1977), Pyron *et al.* (2011, 2013a, 2013b), Schmidt (1932), Sharma (2004), Smith (1943), Stejneger (1933), Sudasinghe (2010), Taylor (1950), Thompson and Thompson (2008), Tiwari and Biswass (1973), Tweedie (1983), van Rooijen and van Rooijen (2007), van Rooijen and Vogel (2008a, 2008b, 2008c, 2009, 2010), Vidal *et al.* (2007), Vijayakumar and David (2006), Vogel (1995), Vogel and van Rooijen (2007, 2008, 2011a, 2011b, 2011c), Wall (1908, 1910, 1913, 1921a, 1921b), Wells and Wellington (1985), Werner (1893), Whittaker and Captain (2004), Whitaker *et al.* (1982), Zeigler and Vogel (1999) and Zhao and Adler (1993).

**GENUS *DENDRELAPHIS* BOULENGER, 1890**

**Type species:** *Ahaetulla caudolineata* Gray, 1834.

**Diagnosis:** The so-called tree snakes or bronzebacks are a group of over 20 moderate-to-large diurnal species found in the region from India across Southern Asia into Australia. Most described species come from south-east Asia.

As a group, they have been of taxonomic interest in the last two decades with numerous new species described by Vogel, Van Rooijen and others.

All are similar in build and habits, being generally slender, slightly laterally compressed with long-whip-like tails, head barely distinct from the neck and a large eye with a round pupil. The ventrals exhibit a sharp ridge running down either side presenting an “arch-shape” in cross section which enables traction when climbing trees and the like.

Color varies strongly between species and within wide-ranging species also varies depending on locality. Scalation is smooth, with apical pits, there are usually 13 dorsal mid-body scale rows, arranged obliquely.

When threatened, snakes will puff up their neck and fore-body, swelling it vertically, often yielding different colored skin between the now parted scales.

At the genus level the group has been relatively stable in recent years in spite of the growing number of named species.

The type species, the Striped Bronzeback *Dendrelaphis caudolineatus* (Gray, 1834) is physically quite different from the Australia/New Guinea species, being of obviously thinner build and glossier scalation.

These snakes were separated into three groups by McDowell 1984, based on hemipenal morphology and other attributes deemed herein as significant differences necessitating taxonomic recognition.

As a result of these obvious differences, seven Australia/New Guinea species, were placed in the newly created genus for all seven species called *Charlespiersonserpens* Hoser, 2012.

Three of these species were further placed within newly named subgenera, one subgenus *Downieea* Hoser, 2012 included one species *papuenis*, while the other subgenus, *Macmillanus* Hoser, 2012 included the species *lorentzi* and a newly described congener, *Charlespiersonserpens* (*Macmillanus*) *jackyhoserae* Hoser, 2012.

Hoser, 2012, stated “*Dendrelaphis* as herein recognized is certainly composite and warranting further divisions at the subgenus level”. This paper moves further in this regard, choosing to give full generic status to the three groups named herein.

The remaining content of the genus *Dendrelaphis* is given below after the descriptions of the other new genera. It is a genus of snakes distributed in Southern Asia and nearby. That assemblage is also likely to be further divided with groups within it requiring further taxonomic recognition.

**GENUS *CHARLESPIERSONSERPENS* HOSER, 2012**

**Type Species:** *Leptophis punctulatus* Gray, 1826

**Diagnosis:** A group of snakes separated from other *Dendrelaphis* by their generally heavier build (like-for-like) and slightly less glossy dorsal body shields (at same point of shedding cycle).

The following suite of characters identifies this genus: Variable dorsal colour, slightly lighter laterally, but all lack longitudinal black stripes on all or most of their body, labials and throat pale, 13 dorsal mid-body scale rows, all smooth and arranged obliquely, 156-221 ventrals, divided anal, 118-160 divided subcaudals, loreal present, 8-9 supralabials, with fourth and fifth or fifth and sixth in contact with the eye, 1 pre-ocular, 2 or 3 postoculars and have a medium or short hemipenis that doesn’t extend past the fifteenth subcaudal.

Snakes within the genus *Dendrelaphis* have a higher average ventral count than seen in this genus *Charlespiersonserpens* Hoser, 2012.

Furthermore for snakes within the genus *Dendrelaphis* only the fourth supralabial makes contact with the eye, with numbers 5 and 6 merely coming close, as opposed to the configuration given above for *Charlespiersonserpens* Hoser, 2012.

Noteworthy is that two species within this genus, namely *papuenis* (Boulenger 1895) and *salomonis* (Günther, 1872) were in 1984 resurrected from synonomy with *punctulatus* and/or *calligastra* by McDowell in 1984, and again by Wells and Wellington in 1985, which has been upheld by later studies.

**Distribution:** The Australian/Papuan region of the Sahul Shelf.

**Content:** *Charlespiersonserpens punctulatus* (Gray, 1826) (type species); *C. calligastra* (Günther, 1867); *C. gastrosticus* (Boulenger, 1894); *C.* (*Macmillanus*) *jackyhoserae* Hoser, 2012; *C.* (*Macmillanus*) *lorentzi* (Lidth De Jeude, 1911); *C.* (*Downieea*) *papuensis* (Boulenger, 1895); *C. salomonis* (Günther, 1872).

***DANNYCOLEUS GEN. NOV.***

**Type species:** *Dendrophis bifrenalis* Boulenger, 1890.

**Diagnosis:** This genus *Dannycoleus gen. nov.* is readily separated from other similar species by having a double loreal shield, which is unique within the tribe Charlepiersonserpenini.

These species are also separated from all other *Dendrelaphis* species (as diagnosed herein), excluding *Shaneblackus gen. nov.* (see below) by having a red colored tongue, which is not the case in all other species in the tribe Charlepiersonserpenini.

The genus *Dannycoleus gen. nov.* is readily separated from *Shaneblackus gen. nov.* (see below) by having a noticeably more elongate head as well as the fact that in *Dannycoleus gen. nov.* the whole side of the ventrals above the lateral keel is a dark olive colour like on the back.

*Dannycoleus gen. nov.* is also diagnosed as follows: Cylindrical, narrow, slender body is present with a dorso-ventrally flattened pear shaped head. The neck region is clear and distinct. The snout is long and compressed and the tip is broad and rounded. The nostrils are laterally oriented and rounded in shape. The pupil is round and the eyes large.

Parietals are longer than the frontal, two loreals, nine upper labials, numbers five and six entering the eye; 154-171 ventrals, divided anal and 144-155 divided subcaudals.

The prehensile tail is 1/3 of the total length of the snake. Dorsally the snake is a copper color. The top of the labials and chin are a cream or light green color. There is a black broad bar at the sides of the head and these run along the eye to the neck region. The lateral corner of the anterior body has black cross strips in a diagonal angle. Two yellow lines run on the lateral sides of the body. Sometimes these lines may be margined by black dots. Ventrally the colour is a yellowish green. Adult snakes grow to about 700-900mm total length. There are 15 dorsal mid-body rows of scales. The vertebrals are clear and enlarged and larger than the outer row.

**Distribution:** Sri Lanka and possibly southern India.

**Etymology:** Named in honour of Danny Cole a lawyer and Barrister from Melbourne, Victoria, Australia in recognition of his important pro-bono (free) public interest legal work as a barrister, defending wrongly charged corruption whistleblowers against criminal charges laid by corrupt government employees.

Also in recognition for his own earlier whistle blowing activity in terms of blowing the lid on malpractice at the Victorian Department of Human Services, where he worked at the time.

**Content:** *Dannycoleus bifrenalis* (Boulenger, 1890) (type species); *D. girii* (Vogel and Van Rooijen, 2011).

***SHANEBLACKUS GEN. NOV.***

**Type species:** *Coluber pictus* Gmelin, 1789.

**Diagnosis:** *Shaneblackus gen. nov.* is diagnosed and separated from all other *Dendrelaphis* (and including *Dannycoleus gen. nov., Brucegowus gen. nov* and *Charlespiersonserpens* Hoser, 2012) as follows: The maxillary teeth number from 23 to 26, the eye is as long as the distance between the nostril and eye. The rostral scale is more broad than deep, and is visible from above. Internasal scales are as long as, or slightly shorter than, the praefrontal scales. The frontal scale is as long as its distance from the rostral or the tip of the snout, but shorter than the parietal scales. The loreal is long and there is one preocular and two postoculars. The temporal scales are 2+2, 1+1, or 1+2. There are usually nine (or rarely seven or eight) upper labials, with the fifth and sixth (or fourth to sixth) entering the eye. This snake has five (rarely four) lower labials in contact with the anterior chin shields the latter shorter than the posterior, which are separated by one anterior and two posterior scales. Scales are in 15 rows, the vertebrals are about as large as the outer scales (which is different to that seen in *Dannycoleus gen. nov.* where they are noticeably clear and enlarged); Ventrals number 151-204, the anal scale is usually, but not always divided, and the divided subcaudals number 103-174. The snake's colouration is olive or brown above with a yellow lateral stripe, bordered below by a dark line between the outer scales and the ventrals. A black temporal stripe on each side of the head passes through the eye, widens or breaks up into spots, separated by bluish-green bands on the nape. The upper lip is yellow and the lower surface yellowish or greenish. In common with *Dannycoleus gen. nov.* there is a red colored tongue. However the genus *Dannycoleus gen. nov.* is readily separated from other similar species of Charlepiersonserpenini by having a double loreal shield, which is unique within the tribe Charlepiersonserpenini.

In *Shaneblackus gen. nov.* the snout-vent may get up to about 740 mm and the tail up to 440 mm.

**Distribution:** *Shaneblackus gen. nov.* is known from Southern Asia, from India to southern China and south to include the Philippines and most of Indonesia, including both sides of Malaysia.

**Etymology:** Named in honour of Shane Black, a reptile keeper, formerly of Malabar in Sydney, New South Wales, Australia and more recently of Queensland in recognition of his excellent work keeping and breeding large numbers of the larger species of Australian elapid snakes, including Coastal Taipans (*Oxyuranus scutellatus*) and Inland Taipans (*Parademansia microlepidota*).

A search warrant was executed on an inexperienced snake handler, named Bryan Grieg Fry in Melbourne, Victoria, by government wildlife officers employed by the Department of Sustainability and Environment (DSE) as the department was then known. The officers had evidence of illegal activity relating to alleged wildlife trafficking and illegal keeping by Fry and his closest associates.

According to wildlife officers Fry sought to avoid charges by acting as an informant on others.

One of the people Fry provided "evidence" about was Shane Black (as well as several others).

Search warrants were executed simultaneously on these people, including Black at his NSW address.

The raid by officers of the NSW National Parks and Wildlife Service (NPWS) not only caused the break up and destruction of Black's top-class breeding facility in NSW, but also the end of his marriage and the premature death of his then former wife, this combined outcome being a direct result of the sequence of events precipitated by Fry.

Black fled the NSW NPWS harassment and moved to Queensland in order to conduct his herpetological activity which continues as of mid 2013.

Meanwhile the informant in the matter, Bryan Fry was tipped off about pending charges against him by DSE officers in Victoria and so he too went to Queensland in order to avoid being charged (Thuys 2013), with a statute of limitations on the matters being 24 months.

**Content:** *Shaneblackus pictus* (Gmelin, 1789) (type species); *S. andamanensis* (Anderson, 1871)
*S. cyanochloris* (Wall, 1921); *S. haasi* (Van Rooijen and Vogel, 2008); *S. inornatus* Boulenger, 1897; *S. ngansonensis* (Bourret, 1935); *S. nigroserratus* (Vogel, Van Rooijen and Hauser, 2012); *S. proarchos* (Wall, 1909), *S. striatus* (Cohn, 1905).

***BRUCEGOWUS GEN. NOV.***

**Type species:** *Dendrophis caudolineolatus* Günther, 1869.

**Diagnosis:** *Brucegowus gen. nov.* is separated from all other snakes in the genus *Dendrelaphis* and the tribe Charlepiersonserpenini as diagnosed herein (and/or by Hoser, 2012) by the following suite of characters: A cylindrical, narrow, slender body is present with a dorso-ventrally flattened pear shaped head. The neck region is clear. The snout is long and compressed and the tip of it is broad and rounded. The nostrils laterally oriented and rounded. A round pupil is present in large eyes. The prehensile tail is half the length as the snout-vent. Maxillary teeth 29-32, posterior largest; snout broadly rounded;

eye as long as its distance from the anterior border of the nostril; internasals shorter than the prefrontals; temporals 1+2; 8 supralabials, 4th and 5th touching the eye; vertebrals feebly enlarged, at mid-body narrower than the outer row of scales, the posterior margin rounded or truncate. Scales in 13:13:9 rows. 149 ventrals, divided anal and 119-128 divided subcaudals.

The colouration is as follows: Dorsally bronze-olive or bronze-orange with the forehead pale green. The anterior of the body has oblique black streaks with a narrow temporal stripe. On top of this stripe is a bronze-brown colour and the lower part is cream colour. Ventrally the body is grey or pale green. The last few ventral scales and the subcaudals have a black stripe running towards the tail and this is unique for the genus *Brucegowus gen. nov.* in terms of other snakes in the tribe Charlepiersonserpenini.

**Distribution:** Sri Lanka and India.

**Etymology:** Named in honour of Bruce Gow, licenced plumber of Park Orchards (outer Melbourne), Victoria, Australia, in recognition for important logistical work at the Snakebusters reptile facility. Gow has over more than a decade assisted on call to maintain the facility which includes crocodile cages and the like with all the usual plumbing paraphernalia. Without his services, we would have been unable to care for the animals properly and of course they are an essential part of the reptile education shows done by Snakebusters in Australia.

In other words, Gow has made an essential contribution to the education of Australians about wildlife and contributed to their conservation.

As with a lot of other tradespeople who build and maintain zoos and other facilities, Gow is one of an army of unsung heros who assist in the wildlife conservation effort.

**Content:** *Brucegowus caudolineolatus* (Günther, 1869) (type species); *B. effrenis* (Wall, 1921).

**SPECIES REMAINING WITHIN THE GENUS *DENDRELAPHIS* BOULENGER, 1890**

*Dendrelaphis caudolineatus* (Gray, 1834) (type species); *D. ashoki* Vogel and Van Rooijen, 2011; *D. biloreatus* Wall, 1908; *D. caudolineatus* (Gray, 1834); *D. chairecaeos* (Boie, 1827); *D. formosus* (Boie, 1827); *D. grandoculis* (Boulenger, 1890); *D. grismeri* Vogel and Van Rooijen, 2008; *D. hollinrakei* Lazell, 2002; *D. humayuni* Tiwari and Biswas, 1973; *D. kopsteini* Vogel and Van Rooijen, 2007; *D. levitoni* Van Rooijen and Vogel, 2012; *D. marenae* Vogel and Van Rooijen, 2008; *D. oliveri* (Taylor, 1950); *D. schokari* (Kuhl, 1820); *D. subocularis* (Boulenger, 1888); *D. tristis* (Daudin, 1803); *D. underwoodi* Vogel and Van Rooijen, 2011; *D. walli* Vogel and Van Rooijen, 2011.

**REFERENCES CITED**


Anderson, J. 1871. On some Indian reptiles. *Proc. Zool. Soc. London* 1871:149-211.

Auffenberg, W. 1980. The herpetofauna of Komodo, with notes on adjacent areas. *Bulletin of the Florida State Museum Biological Sciences* 25(2):39-156.

Auliya, M. 2006. *Taxonomy, Life History, and conservation of giant reptiles in west Kalimantan.* Natur und Tier Verlag, Münster:432 pp.

Baier, F. 2005. Herpetologische Reiseeindrücke aus Sri Lanka. *Elaphe* 13(4):59-64.

Bergman, R. A. M. 1955. *Dendrophis pictus. Proc. Kon. Ned. Akad. Wet. Amsterdam*, C58:206-218.

Boie, F. 1827. Bemerkungen über Merrem's Versuch eines Systems der Amphibien, 1. Lieferung: Ophidier. *Isis van Oken* 20:508-566.

Boulenger, G. A. 1886. On the reptiles and batrachians of the Solomon Islands. *Trans. Zool. Soc. London* 12:35-62.

Boulenger, G. A. 1888. An account of the Reptilia obtained in Burma, north of Tenasserim, by M. L. Fea, of the Genova Civic Museum. *Ann. Mus. Civ. Stor. Nat.* Genova, ser. 2(6):593-604.

Boulenger, G. A. 1890. *The Fauna of British India, Including Ceylon and Burma. Reptilia and Batrachia*. Taylor and Francis, London, xviii+541 pp.

Boulenger, G. A. 1894. *Catalogue of the Snakes in the British Museum (Natural History). Volume II., Containing the Conclusion of the Colubridæ Aglyphæ*. British Mus. (Nat. Hist.), London, xi+382 pp.

Boulenger, G. A. 1895a. On a collection of reptiles and batrachians from Ferguson Island, D'Entrecasteaux group British New Guinea. *Ann. Mag. Nat. Hist.* (6)16:28-32.

Boulenger, G. A. 1895b. Description of two new reptiles obtained by Mr. A. S. Meek in the Trobriand Islands, British New Guinea. *Ann. Mag. nat. Hist.* (6)16:408-409.

Boulenger, G. A. 1897. List of the reptiles and batrachians collected by Mr. Alfred Everett in Lombok, Flores, Sumba and Saru, with descriptions of new species. *Ann. Mag. Nat. Hist.* (6)19:503-509.

Bourret, R. 1935. Notes herpetologiques sur l´Indochine francaise. XI. Sur quelques serpents récolte´s en 1934. *Bull. gén. Instr. Publ.* 1934/35 (9. May):289-296.

Cohn, L. 1905. Schlangen aus Sumatra. *Zool. Anz.* 29:540-548. [1906]

Cox, M. J., Van Dijk, P. P., Nabhitabhata, J. and Thirakhupt, K. 1998. *A Photographic Guide to Snakes and Other Reptiles of Peninsular Malaysia, Singapore and Thailand*. Ralph Curtis Publishing:144 pp.

Das, I. 1999. Biogeography of the amphibians and reptiles of the Andaman and Nicobar Islands, India. In: Ota, H. (ed) *Tropical Island Herpetofauna: Origin, Current Diversity, and Conservation.* Elsevier Science, Amsterdam, Holland:43-77.

Das, I. and De Silva, A. 2005. *Photographic guide to snakes and other reptiles of Sri Lanka.* New Holland Publishers:144 pp.

Daudin, F. M. 1803. *Histoire Naturelle Generale et Particuliere des Reptiles*. Vol. 6. F. Dufart, Paris.

David, P. and Vogel, G. 1996. *The snakes of Sumatra. An annotated checklist and key with natural history notes.* Bücher Kreth, Frankfurt/M.:260 pp.

David, P. and Vogel, G. 2010. A new species of Natricine snake genus *Amphiesma* from Borneo (Squamata: Natricidae). *Russian Journal of Herpetology* 17(2):121-127.

De Haas, C. P. J. 1949. The genus *Natrix* in the collection of the Raffles Museum and its distribution in the Malay Peninsula. *Bull. Raffles Mus.* (19):78-97.

de Lang, R. and Vogel, G. 2005. *The snakes of Sulawesi. A field guide to the land snakes of Sulawesi with identification keys*. Frankfurter Beiträge zur Naturkunde, 25, Edition Chimaira, Frankfurt am Main:312 pp.

de Rooij, N. 1917. *The Reptiles of the Indo-Australian Archipelago. II. Ophidia.* Leiden (E. J. Brill), xiv+334 S.

Deuve, J. 1970. *Serpents du Laos*. Office de la Recherche Scientifique et Technique Outre-Mer, Paris, Mem. no. 39:251 pp.

Devan-Song, A. and Brown, R. M. 2012. Amphibians and Reptiles of Luzon Island, Philippines, VI: The Herpetofauna of the Subic Bay Area. *Asian Herpetological Research* 3(1):1-20.

Doria, G. 1874. Enumerazione dei rettili raccolti dal Dott. O. Beccari in Amboina alle Isole Aru ed alle Isole Kei durante gli anni 1872-73. *Ann. Mus. Civ. Stor. Nat. Giacomo Doria* 6:325-357.

Duméril, A. M. C., Bibron, G. and Duméril, A.H.A. 1854. *Erpétologie générale ou Histoire Naturelle complète des Reptiles. Vol. 7 (partie 1).* Paris, xvi + 780 S.

Flower, S. S. 1897. Notes on a collection of reptiles and batrachians made in the Malay Peninsula in 1895-96; with a list of the species recorded in that region. *Proc. Zool. Soc. London* 1896:856-914.

Flower, S. S. 1899. Notes on a second collection of reptiles made in the Malay Peninsula and Siam, from November 1896 to

September 1898, with a list of the species recorded from those countries. *Proc. zool. Soc. London* 1899:600-697.

Frith, C. B. 1977. A survey of the snakes of Phuket island and adjacent mainland areas of peninsular Thailand. *Nat. Hist. Bull. Siam Soc.* (Bangkok) 26:263-316.

Gadow, H. 1909. *Amphibia and Reptilia*. MacMillan, London:668 pp.

Garman, S. 1901. Some reptiles and batrachians from Australasia. *Bull. Mus. Comp. Zool.* Harvard 39:1-14.

Gaulke, M. 1994. Contribution to the snake fauna of the Sulu Archipelago, with the description of a new subspecies of *Dendrelaphis caudolineatus* (Gray, 1834). *Herpetological Journal* 4 (4):136-144.

Gaulke, M. 1999. Die Herpetofauna von Calauit Island (Calamianes-Inseln, Provinz Palawan, Philippinen) (Amphibia et Reptilia). *Faun. Abh. Staatl. Mus. Tierk.* Dresden 21(19).

Gaulke, M., Demegillo, A. and Vogel, G. 2003. Eine neue Unterart der Mangroven-Nachtbaumnatter von den Philippinen. *Herpetofauna* (Germany) 24(142).

Gmelin, J. F. 1789. *Caroli a Linné Systema naturae*. 13. ed., Tom 1 Pars 3. G. E. Beer, Lipsiae. pp:1033-1516.

Gray, J. E. 1825. A synopsis of the genera of reptiles and Amphibia, with a description of some new species. *Annals of Philosophy*, 10:193-217.

Gray, J. E. 1826. Reptilia. Appendix in: King, P. P. *Narrative of a survey of the Intertropical and Western Coasts of Australia performed between the years 1818 and 1822*. London: John Murray 2:424-434.

Gray. J. E. 1835. *Illustrations of Indian Zoology, chiefly selected from the collection of Major - General Hardwicke. Vol. 2.* London (1833-1834): 263 pp., 95 plates.

Gray, J. E. 1841. A catalogue of the species of reptiles and Amphibia hitherto described as inhabiting Australia, with a description of some new species from Western Australia. Appendix E, pp. 422-449. In: G. Grey, *Journals of Two Expeditions of Discovery in Northwest Australia*. T. and W. Boone, London. Vol. 2.

Gray, J. E. 1842. Description of some hitherto unrecorded species of Australian reptiles and batrachians. *Zoological Miscellany* (London: Treuttel, Würtz and Co):51-57.

Grismer, L. L., Neang, T., Chav, T., Wood, P. L. Jr., Oaks, J. R., Holden, J. and Gr, J. L. 2008. Additional amphibians and reptiles from the Phnom Samkos Wildlife Sanctuary in Northwestern Cardamom Mountains, Cambodia, with comments on their taxonomy and the discovery of three new species. *The Raffles Bulletin of Zoology* 56(1):161-175.

Günther, A. 1858. *Catalogue of Colubrine snakes of the British Museum*. London, I-XVI, 1-281.

Günther, A. 1867. Additions to the knowledge of Australian reptiles and fishes. *Ann. Mag. nat. Hist.* (3)20:45-57.

Günther, A. 1872. Seventh account of new species of snakes in the collection of the British Museum. *Ann. Mag. Nat. Hist.* (4)9:13-37.

Hoser, R. T. 1989. *Australian Reptiles and Frogs*. Pierson and Co., Mosman, NSW, 240 pp.

Hoser, R. T. 2012. Divisions of the Asian Colubrid snake genera *Xenochrophis*, *Dendrelaphis* and *Boiga* (Serpentes: Colubridae). *Australasian Journal of Herpetology* 12:65-76.

Hoser, R. T. 2013. Stopping the shuffle between families: Six new Colubroid snake families named. *Australasian Journal of Herpetology* 17:3-21.

How, R. A. and Kitchner, D. J. 1997. Biogeography of Indonesian snakes. *Journal of Biogeography* 24:725-735.

How, R. A., Schmitt, L. and Maharadatunkamsi, H.. 1996. Geographical variation in the genus *Dendrelaphis* (Serpentes: Colubridae) within the islands of south-eastern Indonesia. *Journal of Zoology* (London) 238(2):351- 363.

Iskandar, D. T. and Colijn, E. 2002. *A checklist of Southeast Asian and New Guinean Reptiles. Part I: Serpentes.* Biodiversity Conservation Project, Jakarta:195 pp.

Janzen, P., Klaas, P. and Ziesmann, S. 2007. Sri Lankas Schlangenfauna. *Draco* 7(30):56-64.

Koch, A. 2011. The Amphibians and Reptiles of Sulawesi: Underestimated Diversity in a Dynamic Environment. pp. 383-404 in: Zachos, F. E and Habel, J. C. (eds.), *Biodiversity Hotspots*. Springer, Berlin.

Kuhl, H. 1820. *Beiträge zur Zoologie und vergleichenden Anatomie.* Hermannsche Buchhandlung, Frankfurt:152 pp.

Lazell, J. D. 2002. The herpetofauna of Shek Kwu Chau, South Chinese Sea, with descriptions of two new colubrid snakes. *Mem. Hong Kong Nat. Hist.* Soc. 25:82 pp.

Lazell, J. and Lu, W. 1990. Four remarkable reptiles from South China Sea islands, Hong Kong Territory. *Asiatic Herpetological Research* 3:64-66.

Leviton, A. E. 1970. Contributions to a review of Philippine snakes, XII. The Philippine snakes of the genus *Dendrelaphis* (Serpentes: Colubridae). *Philippine J. Sci.* 97(4):371-396.

Lim, K. K. P. and Cheong, L. F. 2011. *Dendrelapis haasi* (reptilian:Squamata:Colubridae), a new snake record for Singapore. *Nature in Singapore* 4:9-2.
Lim, K. K. P. and Lim, F. L. K. 1992. A guide to the Amphibians and Reptiles of Singapore. Singapore Science Centre:160 pp.

Lim, K. K. P. and Ng, H. H. 1999. The terrestrial herpetofauna of Pulau Tioman, Peninsular Malaysia. *Raffles Bull. Zool.*, Suppl. No. 6:131-155.

Lidth De Jeude, T. W. V. 1911. Reptilien (Schlangen). *Nova Guinea. Résultats de l'expedition scientifique néerlandaise à la Nouvelle Guinée en 1907 sous les auspices de Dr. H.A. Lorenz 9.* Leiden (E. J. Brill):265-287.

Loveridge, A. 1948. New Guinean reptiles and amphibians in the Museum of Comparative Zoology and United States National Museum. *Bull. Mus. Comp. Zool. Harvard* 101(2):305-430.

Luard, C. E. 1918. The Bronze-backed Tree Snake (*Dendrolaphis tristis*) in Central India. *J. Bombay Nat. Hist. Soc.* 25: 306

Macleay, W. 1875. Notes on a new species of *Dendrophis* from Cleveland Bay. *Proceedings of the Linnean Society of NSW* 1:15-16. [1877 on title page]

Macleay, W. 1877. The ophidians of the Chevert Expedition. *Proceedings of the Linnean Society of NSW* 2:33-41.

Macleay, W. 1878. Notes on a collection of snakes from Port Darwin. *Proceedings of the Linnean Society of NSW* 2:219-222.

Macleay, W. 1884. Notes on some reptiles from the Herbert River, Queensland. *Proceedings of the Linnean Society of NSW* 8:432-436

Malkmus, R., Manthey, U., Vogel, G., Hoffmann, P. and Kosuch, J. 2002. *Amphibians and reptiles of Mount Kinabalu (North Borneo).* A.R.G. Ganther Verlag, Rugell:404 pp.

Manthey, U. and Grossmann, W. 1997. Amphibien and Reptilien Südostasiens. *Natur und Tier Verlag* (Münster):512 pp.

McCoy, M. 2006. *Reptiles of the Solomon Islands.* Pensoft Series, Faunistica 57:212 pp.

McDowell, S. B. 1984. Results of the Archbold Expeditions. No. 112. The snakes of the Huon Peninsula, Papua New Guinea. *American Museum Novitates* 2775:1-28.

McKay, J. L. 2006. *A Field Guide to the Amphibians and Reptiles of Bali*. Krieger Publishing, vii+146 pp.

Meise, W. and Hennig, W. 1932. Die Schlangengattung *Dendrophis. Zool. Anz.* 99(11/12):273-297.

Mertens, R. 1926. Über die Rassen einiger indo-australischer Reptilien. *Senckenberg. Biol.* 8:272-279.

Mertens, R. 1927. Neue Amphibien und Reptilien aus dem Indo-Australischen Archipel, gesammelt während der Sunda-

Expedition Rensch. *Senckenbergiana* 9:234-242.

Mertens, R. 1930. Die Amphibien und Reptilien der Inseln Bali, Lombok, Sumbawa und Flores. Senck. Naturf. Gesell., Frankfurt am Main, *Abhandl.* 42(3):117-344.

Obst, F. J. 1977. Die herpetologische Sammlung des Staatlichen Museums für Tierkunde Dresden und ihre Typusexemplare. *Zool. Abh. Mus. Tierk. Dresden* 34:171-186.

Pyron, R. A., Burbrink, F. T., Colli G. R., de Oca, A. N. M., Vitt, L. J., Kuczynski, C. A. and Wiens, J. J. 2011. The phylogeny of advanced snakes (Colubroidea), with discovery of a new subfamily and comparison of support methods for likelihood trees**.** *Mol. Phylogenet. Evol.* 58:329-342.

Pyron, R. A., Dushantha Kandambi, H. K., Hendry, C. R., Pushpamal, V. and Burbrink, F. T. 2013a. Genus-level phylogeny of snakes reveals the origins of species richness in Sri Lanka. *Molecular Phylogenetics and Evolution* 66(3):969-978.

Pyron, R. A., Burbrink, F. T. and Weins, J. J. 2013b. A phylogeny and revised classification of Squamata, including 4161 species of lizards and snakes. Published online at: http://www.biomedcentral.com/1471-2148/13/93.

Ride, W. D. L. (ed.) *et al.* (on behalf of the International Commission on Zoological Nomenclature) 1999. *International code of Zoological Nomenclature*. The Natural History Museum, Cromwell Road, London, SW7 5BD, UK (also commonly cited as “ICZN 1999”).

Schmidt, K. P. 1932. Reptiles and Amphibians from the Solomon Islands. *Field Mus. Nat. Hist. Zool. Ser*. 18(9):175-190.

Sharma, R. C. 2004. *Handbook Indian Snakes*. Akhil Books, New Delhi:292 pp.

Smith, M. A. 1943. *The Fauna of British India, Ceylon and Burma, Including the Whole of the Indo-Chinese Sub-Region. Reptilia and Amphibia. 3 (Serpentes).* Taylor and Francis, London:583 pp.

Stejneger, L. 1933. The ophidian generic names *Ahaetulla* and *Dendrophis. Copeia* 1933(4):199-203.

Sudasinghe, H. B. S. A. T. 2010. Beobachtung einer *Dendrelaphis bifrenalis* (Reptilia: Colubridae) beim Fressen eines *Polypedates cruciger* (Amphibia: Rhacophoridae) in Sri Lanka. *Sauria* 32(4):75-78.

Taylor, E. H. 1950. The snakes of Ceylon. *Univ. Kansas Sci. Bull.* 33(14):519-603.

Thompson, C. and Thompson, T. 2008. *First contact in the Greater Mekong - new species discoveries.* WWF:40 pp.

Thuys, T. 2013. Recorded phone statement, Department of Sustainability and Environment, Victoria, 9 April, 12.16 PM, 3 min 40 sec (transcribed).

Tillack, F., Ziegler, T. and Quyet, L. K. 2004. Eine neue Art der Gattung *Boiga* Fitzinger 1826 (Serpentes: Colubridae: Colubrinae) aus dem zentralen Vietnam. *Sauria* 26(4):3-13.

Tiwari, K. K. and Biswass, S. 1973. Two new reptiles from the great Nicobar Islands. *J. Zool. Soc. India* 25:57-63.

Tweedie, M. W. F. 1983. *The snakes of Malaya*. Third edition. Singapore National Printers (Pte) Ltd., Singapore:167 pp.

van Rooijen, J. and van Rooijen, M. 2007. The land snakes of the Santubong Peninsula, Sarawak, Borneo: A preliminary list of species with natural history notes. *Russian Journal of Herpetology* 14(1):27-38.

van Rooijen, J. and Vogel, G. 2008a. A new species of *Dendrelaphis* (Serpentes: Colubridae) from Java, Indonesia. *The Raffles Bulletin of Zoology* 56(1):189-197.

van Rooijen, J. and Vogel, G. 2008b. Contributions to a review of the *Dendrelaphis pictus* complex (Serpentes: Colubridae) - 1. Description of a sympatric species. *Amphibia-Reptilia* 29:101-115.

van Rooijen, J. and Vogel, G. 2008c. An investigation into the taxonomy of *Dendrelaphis tristis* (Daudin, 1803): revalidation of *Dipsas schokari* (Kuhl, 1820) (Serpentes, Colubridae). *Contributions to Zoology* 77(1)33-43.

van Rooijen, J. and Vogel, G. 2009. A multivariate investigation into the population systematics of *Dendrelaphis tristis* (Daudin, 1803) and *Dendrelaphis schokari* (Kuhl, 1820): revalidation of *Dendrophis chairecacos* Boie, 1827 (Serpentes: Colubridae). *Herp. J.* 19:193-200.

Van Rooijen, J. and Vogel, G. 2010. On the discovery and origin of a Javan population of the Indochinese colubrid snake *Dendrelaphis subocularis* (Boulenger, 1888): a multivariate study. *Contributions to Zoology* 79(3):85-92.

Vidal, N., Delmas, A., David, P., Cruaud, C., Couloux, A. and Blair Hedges, S. 2007. The phylogeny and classification of caenophidian snakes inferred from seven nuclear protein-coding genes. *C. R. Biologies* 330:182-187.

Vijayakumar, S. P. and David, P, 2006. Taxonomy, Natural History, and Distribution of the Snakes of the Nicobar Islands (INDIA), based on new materials and with an Emphasis on endemic species. *Russian Journal of Herpetology* 13(1):11- 40.

Vogel, G. 1995. *Dendrelaphis striatus* (Cohn) neu für die Fauna Borneos (Serpentes: Colubridae). *Mitt. Zool. Mus. Berlin* 71:147-149.

Vogel, G. and Van Rooijen, J. 2007. A new species of *Dendrelaphis* (Serpentes: Colubridae) from Southeast Asia. *Zootaxa* 1394:25-45.

Vogel, G. and van Rooijen, J. 2008. Contributions to a review of the *Dendrelaphis pictus* (Gmelin, 1789) complex - 2. the eastern forms. *Herpetozoa* 21(1/2):3-29.

Vogel, G. and van Rooijen, J. 2011a. Contributions to a Review of the *Dendrelaphis pictus* (Gmelin, 1789) Complex (Serpentes: Colubridae) - 3. The Indian Forms, with the Description of a New Species from the Western Ghats. *Journal of Herpetology* 45(1):100-110.

Vogel, G. and van Rooijen, J. 2011b. A New species of *Dendrelaphis* (Serpentes: Colubridae) from the Western Ghats - India. *Taprobanica* 03 (02):77-85.

Vogel, G. and van Rooijen, J. 2011c. Description of a new species of the genus *Dendrelaphis* Boulenger, 1890 from Myanmar (Squamata: Serpentes: Colubridae). *Bonn Zoological Bulletin* 60 (1):17-24.

Wall, F. 1908. Two new snakes from Assam. *J. Bombay Nat. Hist. Soc.* 18:272-274.

Wall, F. 1910. Notes on snakes collected in Upper Assam. Part II. *J. Bombay Nat. Hist. Soc.* 19(4):825-845.

Wall, F. 1913. Notes on some interesting snakes recently presented to the Society. *J. Bombay nat. Hist. Soc.* 22:639.

Wall, F. 1921a. *Ophidia Taprobanica or the Snakes of Ceylon.* Colombo Mus. (H. R. Cottle, govt. printer), Colombo. Xxii:581 pp.

Wall. F. 1921b. Remarks on the Indian species of *Dendrophis* and *Dendrelaphis. Records of the Indian Museum* 22:15-162.

Wells, R. W. and Wellington, C. R. 1985. A classification of the Amphibia and Reptilia of Australia. *Australian Journal of Herpetology*, Supplementary Series (1):1-61.

Werner, F. 1893. Herpetologische Nova (1). *Zool. Anz.* 16(414):81-84.

Whitaker, R. and Captain, A. 2004. *Snakes of India*. Draco Books:500 pp.

Whitaker, R., Whitaker, Z. and Mills, D. 1982. Reptiles of Papua New Guinea. *Wildlife in New Guinea* (82/2):1-53.

Zhao, E. and Adler, K. 1993. *Herpetology of China*. SSAR, Oxford/Ohio:522 pp.

Ziegler, T. and Vogel, G. 1999. On the knowledge and specific status of *Dendrelaphis ngansonensis* (Bourret, 1935) (Reptilia: Serpentes: Colubridae). *Russ. J. Herpetol.* 6(3):199-208.

**CONFLICT OF INTEREST**

The author has no conflicts of interest in terms of this paper or conclusions within.

*Australasian Journal of Herpetology* **20:47-51.**
**Published 10 July 2013.**

**ISSN 1836-5698 (Print)**
**ISSN 1836-5779 (Online)**

# Revisiting the Australian "White-lipped Snakes" of the genus *Drysdalia* Worrell, 1961, (*sensu lato*) including two new subgenera and two new subspecies (Serpentes: Elapidae).

**RAYMOND T. HOSER**

**488 Park Road, Park Orchards, Victoria, 3114, Australia.**
***Phone*: +61 3 9812 3322 *Fax*: 9812 3355 *E-mail*: snakeman@snakeman.com.au**
**Received 22 April 2013, Accepted 17 May 2013, Published 10 July 2013.**

## ABSTRACT

The crowned snakes of the genus *Drysdalia* Worrell, 1961 have been the subject of numerous taxonomic and phylogenetic studies, notably including those of Coventry and Rawlinson (1980) and Keogh *et al.* (2000). These studies have resulted in both species and generic rearrangements.

Coventry and Rawlinson (1980) synonymised described taxa to reduce the genus to four well-defined species. Keogh *et al.* (2000) transferred the species *coronata* Schlegel, 1837 to the genus *Elapognathus* Boulenger, 1896.

Revisiting the taxonomy of the four species placed by most authors prior to 2000 in the genus *Drysdalia*, the data shows that the following taxonomic actions are warranted. The species *coronata* should in fact be placed within a subgenus of *Elapognathus*, due to a well-defined divergence from the nominate species in the genus. Likewise for the species *rhodogaster* Jan, 1873, which is appropriately placed in a subgenus within *Drysdalia.*

Furthermore, the species *mastersii* Krefft, 1866 has long been recognized as having three morphologically distinct regional forms (Ehmann 1992). Molecular analysis (Dubey *et al.* 2010) confirms that these snakes warrant taxonomic recognition at the subspecies level.

As a result, this paper formally describes and names two new subgenera and two new subspecies in accordance with the Zoological Code (Ride *et al.* 1999).

**Keywords:** Taxonomy; Nomenclature; genus; *Drysdalia*; *Elapognathus*; subgenus; new; *Staszewskius*; *Hawkeswoodelapidus*; *rhodogaster*; *coronata*; subspecies; *mastersii*; *robwatsoni*; *andrewlowryi*.



### INTRODUCTION

The genus *Drysdalia* was first proposed by Eric Worrell in 1961 for a group of small elapid snakes with a centre of distribution in Southern Australia, being split off from the large paraphyletic genus *Denisonia* Krefft, 1869. The type species for *Drysdalia* was *Hoplocephalus coronoides* Günther, 1858, and added to the genus were the species *Hoplocephalus mastersii* Krefft, 1866 and *Elaps coronatus* Schlegel, 1837.

However this was expanded by Coventry and Rawlinson (1980) to include the species *Alecto rhodogaster* Jan, 1873.

Coventry and Rawlinson (1980) diagnosed the genus as follows: "Small, rather slender snakes ranging from a minimum total length of 100 mm (snout-vent length 80 mm) to a maximum total length of 650 mm (snout-vent length 550 mm). Nostril in single nasal. Frontal longer than broad, less than one and a half times width of supraocular. Internasals present. Suboculars absent. Dorsal scales smooth, 15 scale rows at midbody, very rarely 17. Lower lateral scales not noticeably enlarged. Ventral scales smooth and unkeeled, range from 123 to 157. Subcaudal scales smooth and undivided and range from 32 to 67. Anal scale undivided. Posterior process of maxillary bone short, 3 to 5 solid maxillary teeth follow the hollow fang."

Based on a suite of molecular and morphological data, the species *Elaps coronatus* Schlegel, 1837 was removed from *Drysdalia* by Keogh *et al.* (2000) and placed in the genus genus *Elapognathus* Boulenger, 1896.

*Elapognathus* Boulenger, 1896 is herein defined as including the species *Elaps coronatus* Schlegel, 1837 and *Hoplocephalus minor* Günther, 1863, and is separated from the genus *Drysdalia* by having either a black band across the nape or if lacking any form of banding across the nape and lacking a distinct white strip across the upper labials, has an upper surface that is uniformly dark except for a pale oblique bar on each side of the neck and without any form of striations in the dorsal colouring.

Besides the detailed taxonomic study of Coventry and Rawlinson (1980) the genera *Drysdalia* and *Elapognathus* have had their taxonomy reviewed by a number of authors, many of whom have merged the genera, including for example Wells and Wellington (1985) and Ehmann (1992).

Various species and subspecies described in the past have been synonymised with the four species named so far.

By way of example, few if any authors have recognized *Elapognathus resolutus* Wells and Wellington, 1985, from the

Recherche Archipelago of Western Australia even though there is limited morphological evidence to recognize the taxon at the subspecies level. Notwithstanding this, Aplin (2002) in Storr, Smith and Johnstone (2002) chose to subsume the taxon within "*Elapognathus coronatus*".

A molecular study would resolve the taxonomic status of the Recherche Archipelago populations one way or other, noting that Wells and Wellington based their description on long-recognized phenotypic differences between this population and others of *Elapognathus coronatus*.

The status of "*Elapognathus orri* Wells and Wellington, 1985" is also worth noting. While not recognized by any authors since the original publication, Dubey *et al.* (2010), provided evidence to show that there were three groups of *Drysdalia coronoides* with deeply divergent genomes and potentially worthy of subspecific recognition.

However they were unable to identify regionally distinct populations from their analysis, with three distinct clades in their results having overlapping distributions and potentially being both sympatric and undistinguishable morphologically.

Hence it is unfortunate that I am not in a position to determine one way or other the validity of the species taxon "*Elapognathus orri* Wells and Wellington, 1985".

The best comment I can make in this regard is that there is a need for a detailed assessment of the status of all *Drysdalia coronoides* to establish species and subspecies boundaries.

However the results of Dubey *et al.* (2010) did show a molecular basis to define known regional races of the species *D. mastersii.*

Because both morphological and molecular data for the three regional forms correspond, it is appropriate that these snakes are recognized taxonomically.

The nominate form from the east side of the Spencer's Gulf is designated as the nominate subspecies of *D. mastersii*, while the two western forms (defined by most authors as the central and western variants) are herein described as new subspecies.

At the genus level, the species *Elaps coronatus* Schlegel, 1837 is in my view quite morphologically distinct from the type species within the genus *Elapognathus*, namely *E. minor* (Günther, 1863).

In fact I view it as being sufficiently divergent to warrant being placed in its own monotypic genus.

However available molecular evidence doesn't support the proposition in full, being somewhat ambiguous. Hence I have taken a conservative position and the species is herein placed in a newly defined subgenus within *Elapognathus*.

The species taxon, *Drydsalia rhodogaster* (Jan, 1873), is also significantly divergent from the other two species within *Drysdalia* and in my view sufficiently so morphologically to warrant division from them.

Molecular evidence published supports this proposition. As a result, a subgenus is herein defined for this taxon.

Important published references in terms of the known species within the genera *Elapognathus* and *Drysdalia* as recognized herein include: Boulenger (1896), Cogger (1979, 2000), Coventry and Robertson (1980), De Vis (1905), Dubey *et al.* (2010), Duméril and Bibron (1835), Ehmann (1992), Fleay (1952), Fry (1915), Glauert (1960), Golay *et al.* (1993), Gray (1841), Gray and Neill (1845), Greer (1997), Günther (1858, 1863), Hoser (1989), Hutchinson (1990), Jan (1863), Jan and Sordelli (1873), Keogh *et al.* (2000), Kinghorn (1924, 1926), Krefft (1866, 1869), Macleay (1887), Maryan (1987), McDowell and Cogger (1967), McGovern (1983a, 1983b), Mengden (1983), Schlegel (1837), Shine (1981, 1986, 1994), Storr (1982), Storr, Smith and Johnstone (2002), Wells and Wellington (1985), Wilson and Knowles (1988), Wilson and Swan (2010) and Worrell (1956, 1961, 1963).

**GENUS *DRYSDALIA* WORRELL, 1963.**

**Type species:** *Hoplocephalus coronoides* Günther, 1858.

**Diagnosis:** Small, rather slender snakes ranging from a minimum total length of 100 mm (snout-vent length 80 mm) to a maximum total length of 650 mm (snout-vent length 550 mm). They are separated from all other elapid genera by the following suite of characters: Nostril in single nasal. Frontal longer than broad, less than one and a half times width of supraocular. Internasals present. Suboculars absent. Dorsal scales smooth, 15 scale rows at mid-body, very rarely 17. Lower lateral scales not noticeably enlarged. Ventral scales smooth and unkeeled, range from 123 to 157. Subcaudal scales smooth and undivided and range from 32 to 67. Anal scale undivided. Posterior process of maxillary bone short, 3 to 5 solid maxillary teeth follow the hollow fang.

*Elapognathus* Boulenger, 1896 is herein defined as including the species *Elaps coronatus* Schlegel, 1837 and *Hoplocephalus minor* Günther, 1863, and is separated from the genus *Drysdalia* by having either a black band across the nape (*coronata*) or if lacking any form of banding across the nape and lacking a distinct white strip across the upper labials, has an upper surface that is uniformly dark except for a pale oblique bar on each side of the neck and without any form of striations in the dorsal colouring (*minor*).

**Distribution:** South-east Australia, from the New England Tableland of NSW, through south-east Australia, including southern NSW, the ACT, Victoria, Tasmania, southern South Australia across the Nullabor region into far south-east South Australia in the region of Eucla.

**Content:** *Drysdalia coronoides* (Günther, 1858) (type species); *D. mastersii* (Krefft, 1866); D. *rhodogaster* (Jan, 1873).

**Key to species of *Drysdalia* (taken from Coventry and Rawlinson (1980).**

1 . A. Distinct white stripe edged above by black running along upper labials from below the nostril, under the eye often to the neck ... 2.
B. Lacking distinct white stripe running along upper labials ... *D. rhodogaster.*
2. A. Distinct pale or dark band (sometimes broken medially) across the nape ... 3.
B. Lacking band across the nape ... *D. coronoides.*
3. A. Band across the nape black ... *Elapognathus coronata.*
B. Band across the nape pale yellow-orange ... *D. mastersii.*

**SUBGENUS *STASZEWSKIUS* SUBGEN. NOV.**

**Type species:** *Alecto rhodogaster* Jan, 1873.

**Diagnosis:** The subgenus is monotypic for the species *Drysdalia* (*Staszewskius*) *rhodogaster.* It is the only species in the genus *Drysdalia* that lacks a distinct white stripe running along upper labials and this separates this subgenus from the others in the genus.

Scalation is with 15 dorsal mid-body rows, 141-155 ventrals, 41-54 undivided subcaudals and an undivided anal plate.

Colour: Juveniles at birth: Dorsal surface very dark brown, ventral surface orange-red. Head darker than body, snout dark brown, top of head black. Upper lip dark brown with a black stripe from nostril to eye and a broken black stripe from below eye to neck. Distinct light orange band across nape. Adults: Dorsal surface brown to olive-green, ventral surface yellow to orange. Snout same colour as body speckled with black; top of head black. Black stripe from nostril to eye and a broken black stripe from below eye to neck. A distinct light orange to light brown band 2 to 3 scales wide runs across the nape, sometimes reduced to an ill defined lighter coloured patch (Coventry and Rawlinson, 1980).

**Distribution:** Blue Mountains in New South Wales, more-or less continuously along the eastern edge of the Great Dividing Range south to about Pambula in far southern NSW, on the coast, just north of the Victorian border.

**Etymology:** *Staszewskius* is named in honour of snake keeper Alex Staszewski from Blacktown, NSW, Australia in recognition of his sterling efforts to breed venomous Australian snakes including Death Adders (*Acanthophis antarcticus*), Coastal Taipans (*Oxyuranus scutellatus*) and Inland Taipans (*Parademansia microlepidota*), noting his immense success in breeding these three and other taxa.

***DRYSDALIA MASTERSII* KREFFT, 1866.**

**Type locality:** Flinders Ranges, South Australia. Lectotype BM (NH) 1946.1.17.42 in the British Museum of Natural History, from Flinders Ranges, South Australia.

**Diagnosis:** Scalation is with 15 dorsal mid-body rows, 130-146 ventrals, 32-51 undivided subcaudals and a single anal plate. Colour: Juveniles at birth: Dorsal surface darker than in adults and may be one or other of dark grey, olive grey, olive green, pale grey, greyish brown or yellowish pale brown depending on locality (and subspecies), ventral surface bright orange-red. Head darker than body, with a white stripe running along the upper lip from the nostril under the eye to the neck. Light yellow band across nape.

Adults: Dorsally the adults may be dark grey, olive grey, olive green, pale grey, greyish brown or yellowish pale brown depending on locality (and subspecies), ventral surface orange centrally, grey speckled with black laterally. Head darker than body, sometimes black, a white stripe edged above with black running along the upper lip from the nostril, under the eye to the neck. A light yellow to off white band two to three scales wide runs across the nape. Nape band normally narrowly broken on mid line but often complete (Coventry and Rawlinson, 1980).

**Distribution:** Drier parts of far western Victoria and nearby parts of South Australia with a somewhat disjunct distribution running from far south-east South Australia across the Nullabor and into far south-east Western Australia.

**SUBSPECIES *DRYSDALIA MASTERSII MASTERSII* KREFFT, 1866.**

**Diagnosis:** In most respects as for the species.

The subspecies *Drysdalia mastersii mastersii* is most easily separated from the other subspecies by dorsal colouration. The back, sides and tail are an overall pale grey in *Drysdalia mastersii mastersii*. The subspecies (in common with the subspecies *Drysdalia mastersii robwatsoni subsp. nov.*) also has a reddish or brownish spot or dash seen on the distal apex or half of the scale producing a striated appearance.

It is separated from *Drysdalia mastersii robwatsoni subsp. nov.* (of the Eyre Peninsula and nearby areas) by dorsal colouration, with *Drysdalia mastersii robwatsoni subsp. nov.* being brownish in colouration dorsally as opposed to greyish.

The subspecies *Drysdalia mastersii andrewlowryi subsp. nov.* (from south-east Western Australia and adjacent parts of far west South Australia) is separated from the nominate subspecies and *Drysdalia mastersii robwatsoni subsp. nov.* by colouration, being a very dark grey and lacking the striated appearance of the nominate subspecies due to the lack of a reddish or brown spot or dash on the distal apex or half of the scale.

**Distribution:** South-west Victoria and nearby parts of South Australia, east of the Spencer Gulf and including areas near the Flinders Ranges.

***DRYSDALIA MASTERSII ROBWATSONI SUBSP. NOV.***

**Holotype:** A specimen number D16496 in the National Museum of Victoria, from Port Lincoln, South Australia, Lat. 34.7199° S, Long. 135.8545° E. The National Museum of Victoria is a government owned facility that allows access to specimens by researchers.

**Paratypes:** Specimen numbers D16497, D14698, D14699, D14650 in the National Museum of Victoria, from Port Lincoln, South Australia, Lat. 34.7199° S, Long. 135.8545° E. The National Museum of Victoria is a government owned facility that allows access to specimens by researchers.

**Diagnosis:** In most respects as for the species.

The subspecies *Drysdalia mastersii mastersii* is most easily separated from the other subspecies including *Drysdalia mastersii robwatsoni subsp. nov.* by dorsal colouration. The back, sides and tail are an overall pale grey in *Drysdalia mastersii mastersii*. That subspecies (in common with the subspecies *Drysdalia mastersii robwatsoni subsp. nov.*) also has a reddish or brownish spot or dash seen on the distal apex or half of the scale producing a striated appearance.

*Drysdalia mastersii mastersii* is separated from *Drysdalia mastersii robwatsoni subsp. nov.* (of the Eyre Peninsula and nearby areas) by dorsal colouration, with *Drysdalia mastersii robwatsoni subsp. nov.* being brownish in colouration dorsally as opposed to greyish.

The third subspecies *Drysdalia mastersii andrewlowryi subsp. nov.* (from south-east Western Australia and adjacent parts of far west South Australia) is separated from the nominate subspecies and *Drysdalia mastersii robwatsoni subsp. nov.* by colouration, being a very dark grey and lacking the striated appearance of the nominate subspecies due to the lack of a reddish or brown spot or dash on the distal apex or half of the scale.

**Distribution:** Eyre Peninsula in South Australia and immediately adjacent areas.

**Etymology:** Named in honour of Robert Watson of Stafford Heights, Brisbane, Queensland, Australia, who runs a reptile rescue and relocation service in Brisbane, in recognition of many years work towards conservation of reptiles and educating the public about wildlife and conservation.

***DRYSDALIA MASTERSII ANDREWLOWRYI SUBSP. NOV.***

**Holotype:** Specimen number R24644 at the Western Australian Museum, Western Australia, from Eucla, Western Australia, Lat. 31.6750° S, Long. 128.8830° E.

The Western Australian Museum is a government owned facility that allows access to specimens by researchers.

**Paratype:** Specimen number R18482 at the Western Australian Museum, Western Australia, from Eucla, Western Australia, Lat. 31.6750° S, Long. 128.8830° E.

The Western Australian Museum is a government owned facility that allows access to specimens by researchers.

**Diagnosis:** In most respects as for the species.

The third subspecies *Drysdalia mastersii andrewlowryi subsp. nov.* (from south-east Western Australia and adjacent parts of far west South Australia) is separated from the nominate subspecies and *Drysdalia mastersii robwatsoni subsp. nov.* by colouration, being a very dark grey and lacking the striated appearance seen in the nominate subspecies and *Drysdalia mastersii robwatsoni subsp. nov.* due to the lack of a reddish or brown spot or dash on the distal apex or half of the scale.

The subspecies *Drysdalia mastersii mastersii* is most easily separated from the other subspecies including *Drysdalia mastersii robwatsoni subsp. nov.* by dorsal colouration. The back, sides and tail are an overall pale grey in *Drysdalia mastersii mastersii*. That subspecies (in common with the subspecies *Drysdalia mastersii robwatsoni subsp. nov.*) also has a reddish or brownish spot or dash seen on the distal apex or half of the scale producing a striated appearance.

*Drysdalia mastersii mastersii* is separated from *Drysdalia robwatsoni subsp. nov.* (of the Eyre Peninsula and nearby areas) by dorsal colouration, with *Drysdalia mastersii robwatsoni subsp. nov.* being brownish in colouration dorsally as opposed to greyish.

**Distribution:** Far south-east of Western Australia in heathlands close to the coast and nearby parts of far south-west South Australia.

**Etymology:** Named in honour of Andrew Lowry of Cheltenham, Victoria, Australia, formerly of Mentone, Victoria, Australia for his many contributions to herpetology in Australia of three decades.

**GENUS *ELAPOGNATHUS* BOULENGER, 1896.**

**Type species: *Hoplocephalus minor* Günther, 1863.**

**Diagnosis:** This diagnosis is in effect adapted from Keogh *et al.* (2000).

Small terrestrial hydrophiine elapid snakes with anal and all subcaudals undivided; dorsal scales

smooth and matt; head slightly distinct from neck; eye medium to large; pupil round; 0 to 4 noncanaliculate maxillary teeth behind diastema (usually none in *minor*, but one or more specimens known with 3 posterior alveoli); temporal scales usually 2+2+3 (up to 3+3+4 in *coronatus*); preocular contacts undivided nasal and second supralabial; usually 6 supralabials (in *coronatus*, sometimes 7 when temporolabial reaches lip); parietal separated from lower postocular; 7 infralabials. Venom-gland musculature '*Oxyuranus* type' (*coronatus*) or *Glyphodon* type (m. adductor externus superacialis secondarily simplified and reduced in *minor*). Body form moderate to somewhat stout, round (or facultatively depressed) in crosssection; ventral scales not extending to lateral surface of

the body and with uniformly curved free edge. Dorsal scale rows 15 on neck and at mid-body, a single bilateral posterior reduction to 13. Ventrals fewer than 160 (*minor* 116-129, *coronatus* 130-153). Iris dark with pale ring around pupil; body reddish or greenish grey or brown; top of head darker and with pale-edged dark collar (in *minor*, only on sides of neck); upper lip pale; dorsal bands or blotches

absent; venter yellow or orange with dark speckles or transverse bars; oral lining pale, tongue dark. SVL less than 600 mm, adult males and females approximately equal in size; viviparous; diet usually includes more frogs than skinks. Tail moderately prehensile, used by both species to climb at least in low vegetation.

Most similar to species of *Drysdalia* (*coronoides*, *mastersii*, *rhodogaster*), but distinguished by the

following apomorphic characters: dorsal laminae of nasal bones more extensive, clasping premaxilla and contacting frontal; anteromedial spine of prefrontal absent; lacrimal foramen may be transversely elongated rather than round; postorbital broad and 'strap-like' distally; adductor crests on parietal not meeting to form a sagittal crest posteriorly; neural spine not overhanging anteriorly; diet mainly frogs; tail prehensile and climbs in low vegetation. *Drysdalia* spp. further differ from *Elapognathus* in the following apomorphies: lower average number of dorsal scale rows at first ventral (range 17-21, vs. 19-23), and posterior reduction further behind mid-body (15 to 13 rows at 76-88% ventral scale, vs. 63-88% in *Elapognathus*); posterior process of vomer subequal in length to capsule of Jacobsen's organ; frontal bones (and overlying scale) long, narrow between the orbits and expanded anteriorly; postorbital crest of parietal reduced; trigeminal foramen (V2) narrowly separated from parietal;

retroarticular process in lateral view in line with compound; adductor fossa open laterally; surangular

foramen one-third from anterior end of compound bone; one less pair of macrochromosomes (by fusion); Z sex chromosome modified and differing in relative length ('Group 5' vs. 'Group 1' karyomorph, Mengden, 1985).

**Distribution:** South-west Western Australia only.

**Content:** *Elapognathus minor* (Günther, 1863) (type species); *Elapognathus coronatus* (Schlegel, 1837).

***HAWKESWOODELAPIDUS SUBGEN. NOV.***

**Type species:** *Elaps coronatus* Schlegel, 1837

**Diagnosis:** Because both this subgenus and the nominate subgenus are monotypic, one only needs to separate each of the component species to diagnose each subgenus.

The subgenus *Elapognathus* Boulenger, 1896 is separated from *Hawkeswoodelapidus subgen. nov.* by having a head darker than the body and marked with a distinct "crown" and more than 130 ventrals.

*Hawkeswoodelapidus subgen. nov.* is separated from the subgenus *Elapognathus* Boulenger, 1896 by having a head colour continuous with that of the body and 129 ventrals or less.

*Hawkeswoodelapidus subgen. nov.* is further separated from *Elapognathus* Boulenger, 1896 by the lack of striate dorsals seen in the species *coronata*.

*Hawkeswoodelapidus subgen. nov.* is further diagnosed by the following suite of characters: The distinct "crown" on the head consists of a black streak on the side of the head and a black bar across the neck, as well as a white streak through the lips. *Hawkeswoodelapidus subgen. nov.* is further separated from *Elapognathus* Boulenger, 1896 by its more elongate snout and lower subcaudal count 39-52 (versus 53-61).

The following traits further identify *Hawkeswoodelapidus subgen. nov.*: The head is not distinct from the neck, no canthus rostralis; internasals present; frontal longer than wide, straight-sided, anterior and posterior corners angular; parietals much larger than frontal; preocular usually in broad contact with nasal and widely separated from frontal; 2 postoculars, 2+2 temporals, 6 supralabials, 7 infralabials; moderately large eye with a dark brown iris and a pale sector at the top.

The top of the head is grey, olive or blackish, edged with black (by a streak from lore to temple, usually continuous with a bar across neck). Remaining upper surfaces olive-grey, olive brown or blackish-grey. Black loreo-temporal streak edged below by a white streak, sometimes continuous with narrow pale brown bar immediately behind black bar on neck. The underside is yellow, orange, or orange-red, partly suffused with grey and peppered with black (dark pigment concentrated at the base of the ventrals).

**Distribution:** Confined to south-west Western Australia (Storr, Smith and Johnstone 2002).

**Etymology:** Named in honour of Dr Trevor Hawkeswood, of New South Wales, Australia in recognition for his numerous contributions to the biological sciences, in particular the taxonomy of beetles and other invertebrates, including through the publication of his excellent scientific journal *Calodema*.

**Content:** *Hawkeswoodelapidus coronatus* (Schlegel, 1837).

**REFERENCES CITED**

Boulenger, G. A. 1896. *Catalogue of the snakes in the British Museum, Vol. 3*. London (Taylor and Francis):xiv+727 pp.

Cogger, H. G. 1979. Type specimens of Reptiles and Amphibians in the Australian Museum. *Records of the Australian Museum* 32(4):208.

Cogger, H. G. 2000. *Reptiles and Amphibians of Australia*, 6th ed. Ralph Curtis Publishing, Sanibel Island:808 pp.

Coventry, A. J. and Rawlinson, P. A. 1980. Taxonomic revision of the elapid snake genus *Drysdalia* Worrell, 1961. *Mem. Natl. Mus. Vict.* 41:65-78.

de Vis, C. W. 1905. A new genus of lizard. *Ann. Queensland Museum* (Brisbane) 6:46-52.

Dubey, S., Scott Keogh, J. and Shine, R. 2010. Plio-pleistocene diversification and connectivity between mainland and Tasmanian populations of Australian snakes (*Drysdalia*, Elapidae, Serpentes). *Molecular Phylogenetics and Evolution* 56(3):1119-1125.

Duméril, A. M. C. and Bibron, G. 1835. *Erpétologie Générale ou Histoire Naturelle Complète des Reptiles*, Vol. 2. Librairie Encyclopédique de Roret, Paris:iv+680 p.

Ehmann, H. 1992. *Encyclopedia of Australian Animals: Reptiles.* The Australian Museum, Sydney, NSW, Australia:495 pp.

Fleay, D. 1952. The crowned or coronated snake. *Vict. Nat.* 68:146-150.

Fry, D. B. 1915. Herpetological notes. *Proc. R. Soc. Qld.* 27:60-95.

Glauert, L. 1960. *A Handbook of Snakes of Western Australia*, 2nd edn. Perth:Western Australian Naturalists' Club:62 pp.

Golay, P, Smith, H. M., Broadley, D. G., Dixon, J. R., McCarthy, C., Rage, J. C., Schatti, B. and Toriba, M. 1993. *Endoglyphs and other major venomous snakes of the world. A checklist.* Aire-Genève, Azemiops S. A. Herpetological Data Center:i-xv+1-478.

Gray, J. E. 1841. A catalogue of the species of reptiles and Amphibia hitherto described as inhabiting Australia, with a description of some new species from Western Australia. Appendix E, pp. 422-449. In: G. Grey, *Journals of Two Expeditions of Discovery in Northwest*. T. and W. Boone, London. Vol. 2.

Gray, J. E. and Neill, J. 1845. Catalogue of reptiles and fish, found at King George's Sound. Appendix in: Eyre, E. J. *Journals of Expeditions of Discovery into Central Australia and Overland from Adelaide to King George's Sound in the Years 1840-1*. London: T. and W. Boone 1:412-418.

Greer, A. E. 1997. *The biology and evolution of Australian snakes*. Surrey Beatty and Sons, Chipping Norton, NSW.

Günther, A. 1858. *Catalogue of Colubrine snakes of the British Museum*. London:XVI+281 pp.

Günther, A. 1863. Third account of new species of snakes in the collection of the British Museum. *Ann. Mag. Nat. Hist.* (3)12:348-365.

Hoser, R. T. 1989. *Australian Reptiles and Frogs*. Pierson and Co., Mosman, NSW, Australia:238 pp.

Hutchinson, M. N. 1990. The generic classification of the Australian terrestrial elapid snakes. *Mem. Queensland Mus.* 28:397-405.

Jan, G. 1863. *Elenco Sistematico degli Ofidi descriti e disegnati per l'Iconografia Generale*. Milano, A. Lombardi. vii+143 pp.

Jan, G. and Sordelli, F. 1873. *Iconographie Générale des Ophidiens*. Atlas 1860-1881. Milan:Jan and Sordelli, 50 livr.

Kinghorn, J. R. 1924. Reptiles and batrachians from south and south-west Australia. *Records of the Australian Museum* 14(3):163-183.

Kinghorn, J. R. 1926. Note on *Pseudelaps minutus* Fry. *Records of the Australian Museum* 15(1):65.

Keogh, J. S., Scott, I. A. and Scanlon, J. D. 2000. Molecular phylogeny of viviparous Australian elapid snakes: affinities of *Echiopsis atriceps* (Storr, 1980) and *Drysdalia coronata* (Schlegel 1837) with description of a new genus. *Journal of Zoology* 252:317-326.

Krefft, G. 1866. Descriptions of three species of snakes of the genus *Hoplocephalus. Proc. Zool. Soc. London* 1866:370-371.

Krefft, G. 1869. *Australian Snakes.* Government Printer, Sydney, NSW, Australia.

Macleay, W. 1887. Description of a new species of *Hoplocephalus. Proc. Linn. Soc. NSW* (2)1:1111-1112.

Maryan, B. 1987. Unusual behaviour in a captive crowned snake *Notechis coronatus. Herpetofauna* 17(2):30.

McDowell, S. B. and Cogger, H. G. 1967. *Aspidomorphus*, a genus of New Guinea snakes of the Family Elapidae, with notes on related genera. *Journal of Zoology* 151(4):497-543.

McGovern, J. 1983a. Birth of *Notechis coronatus* in captivity. *Herpetofauna* 15(1):23.

McGovern, J. 1983b. Population of *Notechis coronatus* (Crown Snake) at Poison Creek. *Herpetofauna* 15(2):49.

Mengden, G. A. 1983. The taxonomy of Australian elapid snakes, a review. *Rec. Aust. Mus.* 35:195-222.

Mengden, G. A. 1985. Australian elapid phylogeny: a summary of the chromosomal and electrophoretic data: 185-192. In *Biology of Australasian frogs and reptiles*. Grigg, G., Shine, R. and Ehmann, H. (Eds). Sydney: Surrey Beatty and Sons.

Ride, W. D. L. (ed.) *et al.* (on behalf of the International Commission on Zoological Nomenclature) 1999. *International code of Zoological Nomenclature*. The Natural History Museum - Cromwell Road, London SW7 5BD, UK.

Schlegel, H. 1837. *Essai sur la physionomie des serpens*. Partie Générale: xxviii +251 S. + Partie Descriptive: 606 S. + xvi. La Haye (J. Kips, J. HZ. et W. P. van Stockum).

Shine, R. 1981. Venomous snakes in cold climates: ecology of the Australian genus *Drysdalia* (Serpentes:Elapidae). *Copeia* 1981(1):14-25.

Shine, R. 1994. Sexual size dimorphism in snakes revisited. *Copeia* 1994(2):326-346.

Shine, R. 1986. Natural history of two monotypic snake genera of southwestern Australia, *Elapognathus* and *Rhinoplocephalus* (Elapidae). *Journal of Herpetology* 20:436-439.

Storr, G. M. 1982. The genus *Notechis* (Serpentes, Elapidae) in Western Australia. *Rec. West. Aus. Mus.* 9:325-340.

Storr, G. M., Smith, L. A. and Johnstone, R. E. 2002. *Snakes of Western Australia*. Western Australian Museum, Western Australia:309 pp.

Wells, R. W. and Wellington, C. R. 1985. A classification of the Amphibia and Reptilia of Australia. *Australian Journal of Herpetology, Supplementary Series* (1):1-61.

Wilson, S. K. and Knowles, D. G. 1988. *Australia's reptiles. A photographic reference to the terrestrial reptiles of Australia.* Sydney: William Collins.

Wilson, S. and Swan, G. 2010. *A complete guide to reptiles of Australia*, (3rd ed.), Reed New Holland, Chatswood: New Holland:558 pp.

Worrell, E. 1956. Notes on skull characters of some Australian snakes. *Australian Zoologist* 12(3):206-7.

Worrell, E. 1961. Herpetological name changes. *West Australian Naturalist* 8(11):25.

Worrell, E. 1963. *Reptiles of Australia*. Angus and Robertson, Sydney, Australia:169 pp.

**CONFLICT OF INTEREST**

The author has no conflicts of interest in terms of this paper or conclusions within.

*Hoser 2013 - Australasian Journal of Herpetology 20:47-51.*

*Australasian Journal of Herpetology*

Publishes original research in printed form in relation to reptiles, other fauna and related matters, including the subjects of classification, ecology, public interest, legal, captivity, exposure of frauds, "academic misconduct", etc. It is a peer reviewed printed journal published in hard copy for permenant public scientific record in accordance with the Zoological Code (Ride *et al.* 1999), with a sizeable print run and has a global audience.

Full details of acquiring copies, either printed or in identical form online, editorial policies, publication procedure, author submission guidelines, peer review guidelines, legal matters, advantages of publication in this journal and the like can be found by following links from:

http://www.herp.net

**Published by Kotabi Pty Ltd**
**PO Box 599**
**Doncaster, Victoria, 3108.**
**Australia.**

**ISSN 1836-5698 (Print)**
**ISSN 1836-5779 (Online)**



**Online journals (this issue) do not appear for a month after the actual and listed publication date of the printed journals. Minimum print run of first printings is always at least fifty hard copies.**

*Australasian Journal of Herpetology* 20:52-63.
Published 10 July 2013.

ISSN 1836-5698 (Print)
ISSN 1836-5779 (Online)

# How fast can they crawl? Distribution of snakes in Melbourne, Victoria, Australia.

**RAYMOND T. HOSER**

**488 Park Road, Park Orchards, Victoria, 3114, Australia.**
***Phone*: +61 3 9812 3322 *Fax*: 9812 3355 *E-mail*: snakeman@snakeman.com.au**
**Received 20 June 2013, Accepted 29 June 2013, Published 10 July 2013.**

## ABSTRACT

In spite of Melbourne and environs being Australia's second largest city (population in excess of 4 million people, (CSIRO 2008), inhabited for about 200 years and heavily collected for reptiles, most published information about Melbourne's snakes in terms of what are the locally occurring species is factually incorrect. The basis of this is a regular misidentification of common taxa by persons professing knowledge of them, combined with publication of the same by authors based on this misinformation.

For the first time ever, this paper reports that within a 35 km radius of the Melbourne CBD, there are just six naturally occurring snakes, namely, Tiger (*Notechis scutatus*), Copperhead (*Austrelaps superbus*), Brown (*Pseudonaja textilis*), (the larger taxa) and White-lipped (*Drysdalia coronoides*), Small-eyed (*Cryptophis nigrescens*) and Little-whip (*Unechis flagellum*), (the smaller taxa).

The Red-bellied Black Snake, (*Pseudechis porphyriacus*), often referred to simply as "Black Snake" (including in this paper) is not native to Melbourne and the Eastern Brown Snake does not occur anywhere in Melbourne's south-east, Mornington Peninsula, or adjacent areas, being found generally in a line running due north of the CBD, with some migration south of this line to the city's west.

There is also no real division between Highland and Lowlands Copperheads in the wild state in terms of known distribution in eastern Victoria. Specimens attributable to either taxa are apparently sympatric and freely breed, including producing offspring of either colour variant in the same litter (Hoser 2009). Ranges are ill-defined and clearly continuous and hence *Austrelaps ramsayi* must be regarded as synonymous with *A. superbus* in eastern Victoria unless and until molecular or other evidence to the contrary emerges.

**Keywords:** Melbourne; Victoria; Snakes; Distribution; *Pseudechis porphyriacus*; wrong information.

### INTRODUCTION

I arrived in Melbourne to live at end 1985. My interest in reptiles predated this by about 17 years and had included field trips collecting reptiles to all parts of mainland Australia, including Victoria. I had by that time published papers, virtually completed writing two books and was well experienced in terms of identifying common reptile taxa including all snakes known to be native to Victoria (see list in Coventry and Robertson 1991).

The book, Coventry and Robertson (1991) was acquired by myself at the time of publication and based on anecdotal reports from herpetologists and others, this book in my view was the definitive publication on snakes in Victoria and Melbourne.

In 2001, after a series of fatal and near fatal snakebites involving members of the public, the State Wildlife Authority (known in 2008 as the "Department of Sustainability and Environment" or "DSE") called for applications by interested persons with verifiable expertise to get "snake controller's permits" for Melbourne and Victoria. These permits are for persons to catch and relocate snakes that by their presence have caused fear for persons or fear for their pets.

As I had been the first person issued such a permit anywhere in Australia, when in NSW in 1978, I took advantage of the need for such permits to be issued in light of a recently imposed government ban on public interactions of any forms with wildlife (including snakes), made a formal request for a "controller's permit" and was duly granted such a permit.

This was done at the time (1978) by the NSW National Parks and Wildlife Service having to "invent" such a permit".

For a considerable period post-dating 2001, I was the only licenced snake catcher listed in the Melbourne White pages (the main city phone directory) and due to active touting for business, soon found myself removing snakes from all Melbourne suburbs and areas nearby.

The city has a population in excess of 4 million people according to CSIRO (2008).

Within a short period, I was soon aware of what snakes occurred where and which didn't.

Unlike Sydney, with a huge assemblage of snake species, Melbourne has relatively few, with many suburbs having just one species and most suburbs having only a small number present or dominant.

Hence it soon became possible to safely guess the snake species likely to be caught based solely on location.

It also became apparent that misidentification of snakes by callers, including those who claimed a knowledge of snakes was rife.

In fact, the kinds of misidentifications I got defied the imagination.

How for example could a person confuse a well-banded Tiger Snake with a Red-bellied Black Snake is beyond me, but such misidentifications were common.

It also soon became apparent, that in spite of their abundance throughout many parts of Melbourne, few people had any idea what Copperheads (*Austrelaps superbus*) were, what they looked like and hence when they were seen by the people (including so-called herpetologists), they were invariably misidentified as Blacks, Browns or even Tiger Snakes.

As a government licensed snake catcher, it soon became clear to me what snakes were found where.

Doing live reptile shows from 2004 with the company Snakebusters, I did for two years make major inroads into educating the public about what snakes did in fact occur in Melbourne, safety and other matters.

As a result of media publicity and the judicious use of venomoid snakes at all our live reptile shows, I managed to make Melbourne fatality free in terms of snakebite for the entire period from 2004 to present, a fact I take full credit for

Yet in spite of this knowledge and my best efforts at educating the public, both directly and through my company "Snakebusters", I found from about 2006, myself waging an often losing battle against others who either unwittingly promoted false information, or in some cases knowingly promoted false information so as to be able to (wrongly) claim I had got it wrong (McCarthy 2009).

So as of year 2013, I find that there is in fact a greater ignorance by Melbournians about Melbourne's snakes now and what are in fact the locally occurring species, than there was just ten years earlier!

In the case of this problem a major part comes from, the Victorian Department of Sustainability and Environment (DSE) who in 2005 dropped all expertise requirements in terms of the issuing of reptile licences and displaying permits.

An immediate beneficiary of this largesse was Mr. Sean McCarthy a police protected criminal and relatively newly licenced snake handler who has since 2005 made a career out of spreading hate, lies and dangerous misinformation in order to damage the reputations of other recognized herpetologists to further his own commercial interests.

While it could be argued that his repeated deliberate misinformation on Red Bellied Black Snakes and their alleged abundance throughout Melbourne's suburbs, which is a complete lie (e.g. McCarthy 2009) is not particularly dangerous, other actions of his have been directly responsible for some serious snakebite incidents that should have been avoided (WinTV 2011).

Examples of McCarthy's dangerous misinformation and some serious incidents arising from it, would be so extensive as to be able to fill dozens of issues of *Australasian Journal of Herpetology*, but include for example a widely posted recommendation to inject victims of bites from innocuous white-lipped snakes with Polyvalent antivenom (McCarthy 2011)!

The use of polyvalent anti-venom injected into people is of course a considerably more dangerous action than an effectively harmless bite from a white-lipped snake!

In 2012, McCarthy sought to expand his "snake handling course" enterprise to Tasmania, this being his business where he "educates" people to handle snakes his way, which means with brutal metal tongs that more often than not leave the handled snakes with broken bones and fatally injured and if able, wanting to kill the person that attacked them.

Rather than acting ethically to expand his business, he launched into a scathing attack of Tasmanian handlers Ian Norton and Bruce Munday by posting on a hate forum a Photoshopped image purporting to be of a child free-handling a (dangerously venomous) Tiger Snake at a reptile display, in order to whip up a hysterical hate campaign against them (McCarthy 2012).

McCarthy then used his common tactic of making a false complaint to the wildlife authorities seeking that his competitor get raided and closed down, so that he could then himself move in and take the business (McCarthy 2012).

This he did as well in terms of myself in 2006 (Harrison and McCarthy *et al.* 2011), the ultimate result being numerous illegal raids on myself, my family and my children, including both my young daughters being arrested at gunpoint in their school classrooms on 10 August 2011 and then frogmarched out of the class room for interrogation as well as losses of many hundreds of thousands of dollars fighting frivolous criminal charges laid by his friends employed within the DSE.

Besides the lack of ethics in McCarthy's approach, because of his routine of teaching people cruel and dangerous methods of handling snakes, the snakebite incidence increases along with all the other problems this in turn brings.

The end point, McCarthy's wrong information has led to many people being taught wrong information and getting bitten unnecessarily and people such as myself have had to waste time re-educating people fed a diet of lies, wrong information and dangerous handling methods (Hoser, 2007b).

It is no coincidence that the Australian State where McCarthy has done most of his so-called training courses since 2006, Queensland, is also the State that has seen the largest rise in number of snakebites and snakebite deaths in Australia, many of them involving handlers using metal tongs to handle snakes!

For the record, in the period post-dating Australia's development of antivenoms to treat all the better-known dangerously venomous snakes in the early 1970's, the death from snakebite incidence in Australia dropped to an average of 1.5 per year. Since McCarthy's entry to the "education" (more accurately termed misinformation) business, the bite rate has climbed to an average of about 6 a year, with no less than seven deaths from snakebite so far in 2013 and the this is as of June 2013, with half a year yet to go!

In 2008, when doing a literature search relating to another paper on Melbourne's Copperhead snakes when writing Hoser (2009), I perused my copy of Coventry and Robertson (1991) and was gobsmacked when I saw that information relating to distribution of the large Victorian elapids was so obviously and comprehensively wrong.

Bearing in mind that the book has until now been the major reference source on the subject for many Victorians, it has become clear that I should publish a paper correcting this misinformation.

This is of course the central tenet of this paper ... correcting common and widely disseminated misinformation about the distributions of dangerously venomous snakes and others in Melbourne and nearby areas in Victoria.

The larger taxa (Tiger, Copperhead, Brown and Red-bellied Black) are the central focus of this paper. The three smaller taxa have had their distributions relatively accurately mapped in the past and hence are not of major importance here.

This is particularly as the trio are generally not regarded as medically significant, although I note that in 2007 a DSE licenced snake handler Ron Siggins died after being bitten by a Little-whip Snake and his licence had only been issued after DSE dropped their standards in terms of such licences as already noted above.

I note also that has been one or more recorded deaths attributed to being from a recently described but long recognized Queensland species of Small-eyed Snake (*Cryptophis edwardsi*) a significantly larger species to the one found in and around

Melbourne and other parts of Victoria (Hoser 2012).

Other taxa found in Victoria, but not near Melbourne, are ignored for the purposes of this paper.

**MATERIALS AND METHODS**

The evidence for snakes distributions in this paper is dominantly my own direct collections of reptiles as a licenced snake controller (listed below), when in the field collecting insects (to feed frogs used for our demonstrations) and photographing reptiles and incidental "catches" in the form of road kills and the like.

Excluding the snakes listed in the "controller's list", the unlisted number is similar, but notable in that it is weighted very heavily in favour of the three smaller taxa typically found sheltering under cover in areas not inhabited by people, with the obvious exception of road kills which were of the larger taxa.

In summary this includes collecting in all parts of the Melbourne region and environs.

Museum records have been deliberately avoided as specimens may have been catalogued and wrongly identified. This could only be ascertained via an inspection of each and every specimen, which would logistically be difficult and even if done of dubious worth, because of the next reason.

Snakes, in particular Red-bellied Black Snakes (see later this paper), have a habit of being carried by people vast distances and then escaping into "the wild", be it housing estates, bushland or whatever.

This is because of the common habit of climbing into parked cars (usually the engine area) and then being unwittingly transported to other areas, where they may or may not be detected.

The same occurs in Tiger Snakes to a lesser extent, and even less in Copperheads and even rarely is seen in Eastern Brown Snakes.

Because of this fact, it is assumed in advance that there would be museum specimens (hence records) of specimens of various taxa outside their natural ranges, including all general regions of Melbourne (such as south-east, south-west, etc).

This would be particularly the case for Black Snakes, and probably other taxa, including Carpet Pythons (*Morelia* spp.) which do not naturally occur anywhere near Melbourne, but routinely turn up as escaped "pets".

As it happens in the period post 2010, "Brisbane Carpet Snakes" (*Morelia macdowelli*) are a much more commonly caught snake in Melbourne than Red-bellied Black Snakes and I point out here that no one for a moment is suggesting they are native to here!

As a snake controller, I have caught numerous reptiles "exotic" to Melbourne in suburban areas or nearby bushland, including specimens that appear to healthy and possibly breeding in the Melbourne area.

Taxa included here are Green Tree Snake (*Charlespiersonserpens punctulatus*) and various pythons. Other snake controllers have caught taxa as diverse as Taipans (*Oxyuranus scutellatus*), North American Corn Snakes (*Elaphe guttata*) and Central American Boa Constrictors (*Boa constrictor*).

These taxa are mentioned here as they are clearly not locally occurring and to show that mere capture of a given taxon in Melbourne does not mean it naturally occurs here.

Numbers of snakes quoted in the following section actually understate the total as many specimens were not included.

Included in the omitted snakes were most of those which had been killed prior to my arrival at the address. In some cases these had been dead for some days.

A large number of specimens of smaller taxa (White-lipped, Little Whip and Small-eyed Snakes) were among these snakes, having been killed in mistake for young of larger taxa, which was why I was called to the addresses. The basis of the enquiries to me were usually to ostensibly look for the "mother and father".

This is mentioned as my controller's book records gives little evidence of the three smaller taxa, even though I have managed to sight numerous specimens, (dead and live) and been able to accurately gauge their actual distributions.

Included snakes are all those listed in my "snake controller's record of capture book".

With the exception of about a dozen Tiger Snakes passed to a university student (Heath Butler) for research under a DSE issued permit, and non-local species (including Red-bellied Black Snakes), all were released into areas the species were known to occur as per the permit conditions.

The other reptiles were handed to the DSE where they were either repatriated to where they had come from, owners of escaped pets, passed to zoos or similar or euthanazed and lodged with the Museum Victoria.

I should also mention that a large number of "exotics" and/or "vagrants" passed to the DSE were illegally passed on to other licenced keepers with improper relationships with corrupt DSE officers.

On one occasion I caught what was clearly a Highlands Copperhead (known generally as *Austrelaps ramsayi*) from Parkwood Secondary College in Ringwood North.

As per the rules I handed the snake in to Tom Thuys of DSE. A few days later, Michael Alexander of business "Black Snake Productions" posted a picture on his Facebook page of his illegally and newly obtained snake, being the same animal, complete with tick left on the neck (Alexander, 2012).

The species "*Austrelaps ramsayi*" is known in Victoria as an "unscheduled species" and hence not allowed to be kept by privately licenced reptile keepers including myself and/or Michael Alexander.

I note this to point out that in Victoria the laws and the rules are an optional extra for certain "protected" individuals and the whole system as operated and enforced by the Victorian DSE is a complete and utter farce that not only wastes the time of law-abiding persons such as myself, but is also putting lives at risk by the various actions of DSE staff.

Sick, severely injured or dead reptiles caught by myself under the controllers permit, were lodged with the Museum of Victoria if they were of reasonable preservation to be useful to biologists.

In the period Jan 2001 to end June 2008 in Melbourne and environs I caught the following reptiles on "snake call outs" as recorded in my record book.

Tiger Snake 145

Copperhead 82

Eastern Brown Snake 38

Little-whip Snake 3

Small-eyed Snake 2

White-lipped Snake 0

Carpet Python (*Morelia* spp.) 7

Green Tree Snake (*Charlespiersonserpens punctulatus*) 1

Red-bellied Black Snake 4

Eastern Bluetongue (*Tiliqua scincoides*) 54

Blotched Bluetongue (*Tiliqua nigrolutea*) 12

"Cunningham's Skink" (*Egernia* sp.) 1

Brush-tailed Possum (*Trichosaurus vulpecula*) 1

Based on my own observations, it is clear that the first six snake taxa are local to Melbourne and that the last three are not. The other non-snake animals reported were also native to Melbourne.

I would have added later year records to this paper (first draft written in 2008), but had my DSE record books unlawfully removed from my house, along with a lot of other records, during an illegal armed raid on 17 August 2011, at which time myself, my wife and children were arrested in our own home at gunpoint for a total of nine hours in an eleven person raid.

At the conclusion of the raid, the house, office and reptile keeping facility and even our cars had been smashed and trashed.

During the violent armed raid, three snakes were killed and many others permanently injured.

Of these, some had to be euthanized in order to stop their suffering and others remained permenantly injured for the rest of their lives.

Also taken were masses of files, back issues of Australasian Journal of Herpetology issues 1-8, computer equipment and pretty much everything else of use and value.

A lot was later returned in a generally damaged and unusable condition in breach of a court order on 22 August that year.

My controllers licence was cancelled on the same date as the illegal raid of 17 August 2011 by Glenn Sharp and Emily Gibson of the DSE and four days later I refused a call to remove a Copperhead from Somerton, a northern Melbourne suburb.

The man who had found the snake on his property and phoned me was unable to get any other snake catchers to his residence and begged me to go to his residence.

However not only was I was not legally allowed to go and catch the snake, but furthermore, police and DSE officers were maintaining a 24/7 vigil outside my home to make sure I did not leave to either catch snakes or do wildlife shows as that permit had been cancelled as well.

As would be expected in Australia and in the absence of any licenced snake catcher being willing or able to attend the house on a Saturday, the man decided to kill the snake in order to "protect" his family. In the process, he was bitten, taken to hospital and in a coma for some days.

As a result of this incident, that almost resulted in the death of a Melbourne resident, a direct result of the illegal actions of Sharp and Gibson on 17 August 2011, a government tribunal (VCAT) via Judge Morrish, restored my snake catching and education permits the following Tuesday.

As to why the armed raid by Gibson and Sharp on 17 August 2011 was illegal, it was because they lied in a series of statements they made to Magistrate Marc Anthony Sargent at Ringwood Magistrates Court in order to get the search warrant in the first instance.

**BLACK AND BROWN SNAKES**

Coventry and Robertson (1991) state that both Black and Brown snakes are common throughout metropolitan Melbourne and environs, including all parts of the Mornington Peninsula.

In fact, Black Snakes are absent from all areas within 35 km of the Melbourne CBD, including all areas south of the CBD, which includes the Mornington Peninsula and running further south to the Victorian south coast.

Brown Snakes are found north and west of the Melbourne CBD being common as close to the city as Footscray North, Preston and Coburb and are also found very slightly south-west of the CBD, but not south of the CBD or on the Mornington Peninsula or environs as stated in the book by Coventry and Robertson.

The basis of the distribution maps in the text are so-called dot maps with "confirmed records" followed by a lighter shading of "probable distribution", which generally overlaps and joins up the dots.

The authors say that the "confirmed records" are derived from reliable records held by the wildlife department in a computer database.

However this in turn is based largely on identifications by field workers who may or may not have herpetological training.

The database is notoriously unreliable with all attributed reports of Black and Brown snakes from south of Melbourne being readily corrected to be Copperheads, which occur in both black and brown colourations (and other colour phases), even within a single locality and are routinely confused by people as being of the wrong taxa.

A record of the same department for a Death Adder on the Murray River at Walhalla Island, North-west Victoria, by Peter Menkhorst (an alleged DSE mammal expert), based on an illustration in a book by Hal Cogger and quoted as accurate for many years (in spite of my repeated protests) was later ascertained to be a record for a Devis Banded Snake (*Denisonia devisi*), previously unknown from Victoria, but since found to be common in the relevant region as also predicted by myself for many years.

**COPPERHEADS**

Further unreliability of the distribution information in the Coventry and Robertson text is seen in their treatment of Copperheads (Genus *Austrelaps*), which gives broadly overlapping ranges for the two identified forms, "lowland" (*A. superbus*) and "highland" (*A. ramsayi*).

The alleged diagnostic feature between the taxa in this book and in the original paper separating the two "species" by Rawlinson (1990), is the differentiation of the white markings on the labial scales (the "highland" Copperhead having more distinct markings and/or white triangles not seen in the lowland form).

It should also be noted that the species "*A. superbus*" and "*A. ramsayi*" were described by two different people and not in the context of knowledge of the other described form. In other words, they were not described as similar species within a single genus as is the placement by Rawlingson in 1991 and herpetological authors since that date.

As it happens, the labial markings as a diagnostic characterc is far more fluid than originally thought and varies between specimens, the result being that field workers in some areas are unable to assign a specimen to either the highland (*ramsayi*) or lowland (*superbus*) "species".

Hoser (2009), showed quite clearly that altitude alone appears to determine the markings on the labials in some populations, making differentiating between one or other "species" problematic.

As there is no gap in the known ranges of either taxa and the only alleged diagnostic character separating the forms (the labials) varies, even between specimens of the same litter, and all obviously interbreed in the wild, there remains at the present time, no firm basis for attempting to split the south-east Australian Copperheads into two species (Hoser 2009).

At best the variation appears to be clinal, rather than based on specific separation.

Hence for the purposes of this paper (and in reflection of my own considered views), all Copperheads in south-east Australia are best presently referred to the species *Austrelaps superbus* and better treated as subspecies.

A separate and geographically isolated form of *Austrelaps* from the Adelaide Hills (South Australia) and south-west of there, referred by authors to the taxon *A. labialis* is not relevant to this paper, save to say that as a cold-climate species, it's distribution is disjunct, reflecting a retraction in range over the past 12,500 years since the termination of the last ice-age.

However I should note that since the publication of Hoser (2009), Pyron, Burbrink and Weins (2013) produced an online paper that gave a molecular basis to separate the species *A. superbus* and *A. labialis*, although their results did not give locality data for their samples.

**THEY WERE HERE ALREADY!**

During the last glacial period, Tasmania was attached to the Australian mainland. As the world warmed about 12,500 years ago and sea levels rose, Tasmania was cut off from Victoria.

It is reasonable to infer that the herpetofauna in both places was the much the same.

Observed in Tasmania now are three snake taxa, namely Tiger (*Notechis scutatus*), Copperhead (*Austrelaps superbus*) and White-lipped Snake (*Drysdalia coronoides*).

All three taxa remain common in the southern half of Victoria,

including all areas south of and including the colder parts of the Great Dividing Range. That includes the region of Melbourne (The State capital of Victoria), and at least 100 km north of Melbourne.

The three taxa are also found in colder parts of NSW including areas as far north as Sydney.

Hence none of these taxa are regarded as northern invaders of Victoria (which for *N. scutatus* is contrary to a view by Rawlinson 1991).

In terms of *N. scutatus*, I do note however that the distribution of the taxon is disjunct in warmer places (such as south-east Queensland) and yet continuous in the south, meaning that the range has contracted southwards since the end of the last glacial maximum and Rawlinson (1991) was wrong to infer the taxon is a recent northern invader.

**THOSE NOT ORIGINALLY FROM MELBOURNE**

After temperatures rose at the end of the last ice-age maximum, northern taxa were able to migrate south to invade new areas.

Melbourne is situated on a large bay in the south of Victoria, Australia (with coast stretching about 100 km further south on both sides), making Melbourne and it's southern environs a logical southern point for northern species to be migrating towards in terms of this paper.

These migrating snakes included species within the main groups of Australian snakes (namely pythons, small elapids (skink feeders as adults) and large elapids (usually just over a metre as adults and also able to feed on rodents)).

These included taxa such as Murray/Darling Carpet Snakes (*Morelia metcalfi*), Diamond Pythons (*Morelia spilota*), as pythons, Small-eyed Snakes (*Cryptophis nigrescens*) and Little-Whip Snakes (*Unechis flagellum*) as small elapids, Eastern Brown Snakes (*Pseudonaja textilis*), Red-bellied Black Snakes (*Pseudechis porphyriacus*) and Death Adders (*Acanthophis antarcticus*) as large elapids.

That the species are recent arrivals is inferred by the fact that,

1 – They are not in Tasmania

2 – Their distributions are effectively continuous to their southernmost points and there are no outlier populations beyond this. That is they are not relictual populations.

This means that these species have invaded Victoria (and/or Australia's south-east) from further north and at the time of settlement by Europeans (when habitat was unbroken by farms, roads and the like), their ranges were probably still expanding.

**THE INNACCURATE RECORDS**

Before continuing, it is worth noting some inaccuracies that have crept into the records, which if taken at face value may confuse the picture given here of snakes invading from further north.

The book, "The Snakes of Victoria" by John Coventry and Peter Robertson (1991) is based on records and specimens at the Museum of Victoria, which while as good as for any other State Museum, have been shown to have defects in terms of reptiles sourced from Melbourne.

Some reptiles lodged as coming from Melbourne may in fact have been stowaways or so-called "vagrants" from elsewhere. This situation has arisen as for considerable periods, curators of reptiles at this Museum have either not been herpetologists, or had a primary interest in reptiles, or alternatively have been appointed from elsewhere and with no immediate knowledge of the local herpetofauna, other than what they have read in the popular literature or identification manuals such as Cogger (2000).

This is mentioned in the context of the Red-bellied Black Snake, a snake that occasionally turns up in Melbourne and hence shows up on the Melbourne Museum's own database, but is not native here.

Another species here the Copperhead (*Austrelaps superbus*), commonly looks identical and is separated by the subcaudal scales being all single as opposed to being mainly or all divided in the Red-bellied Black.

Lay persons see Copperheads that are black with a red belly and then mistakenly identify it as the better known Red-bellied Black Snake.

Even reptile hobbyists and alleged "experts" whom I'd assume would know better routinely confuse the two species on a regular basis.

As recently as June 2008, a Melbourne Zoo reptile keeper Jon Birkitt told a local newspaper that a snake killed in the northern suburb of Roxburgh Park by a resident was a Red-bellied Black Snake (Brown 2008). I later ascertained that in fact it was a Copperhead.

The journalist said to me "surely the man from the zoo would know?"

Add to that the small number of "genuine" Red-bellied Black Snakes lodged in the Museum and there becomes a general perception that Red-bellied Black Snakes are native to Melbourne, even if somewhat uncommon or hard to find. This is perpetuated in the literature and among local herpetologists so that when I arrived in Melbourne in 1985 (after 18 years in Sydney), I was led to believe that Red-bellied Black Snakes were a common species here.

This is also what most books and literature report, including that of myself (e.g. Hoser 1989), which was based on reports I'd erroneously believed as coming from reliable sources and/or based on misidentified snakes.

It is only after catching snakes in all suburbs of Melbourne for many years that it's become apparent that Red-bellied Black Snakes are not a part of Melbourne's fauna.

It's that simple!

The species is however common in areas about 125 km east of Melbourne, starting just east of Traralgon, and about 70 km north of Melbourne (starting north of the Great Dividing Range), beyond either point of which it is a common species.

Specimens commonly turn up in Melbourne after climbing into parked cars that are then driven from the relevant areas back to Melbourne, or alternatively in boxes of fruit and vegetables shipped from the growing regions in northern Victoria where these snakes dominate.

As a licenced snake catcher (Hoser 2007a) who catches many snakes a year, I catch an average of one Red-bellied Black Snake a year in Melbourne, all of which so far have had their original (non-Melbourne) source identified with a reasonable degree of certainty.

In recent years however, I have caught a gravid female at Toorak, passed by myself (by law) to the DSE, who then in turn illegally gave the snake to another "protected" licenced keeper who then later masqueraded as having "bred" the snake.

He then advertised for sale all 20 offspring at $200 a pop to other less fortunate hobbyists unable to legally obtain snakes from wild-caught sources or catch their own, as to do so is highly illegal in all Australian states.

A year later, I caught a newborn Red-bellied Black Snake within the grounds of a Primary School in Seaford. This was located immediately adjacent to a large industrial estate and so it can be assumed with confidence that this snake or it's mother had been brought in with materials into the estate in the recent past.

In 2003 or thereabouts, I caught a large female Red-bellied Black snake that had apparently stowed away in a car returning from near the Victorian town of Omeo in the north-east of the state that had set up a home in a back yard compost bin within the most heavily built-up part of the suburb of Langwarrin in Melbourne's outer south-east.

When I caught the snake I noted she had just given birth to a litter of young. Most were not recovered.

In the decade since, several other Red-bellied Black Snakes have been caught in the same heavily populated part of Langwarrin by myself and other licenced snake catchers.

However the species has never been found in Langwarrin away from this pocket and is clearly not a part of the native fauna in the local reserves.

In terms of large elapid species, these reserves have only Copperheads and Tiger Snakes, in line with the rest of Melbourne's south-east and Mornington Peninsula.

As another note of interest, I did until about 2009, catch an average of two Queensland Carpet Pythons (*Morelia macdoweli*) a species not found within 1,000 km of Melbourne, per year, all obviously being either escaped pets or "stowaways".

I mention this as no one has yet claimed these to be native to Melbourne, even though they turn up here.

Since 2009, to 2013 the number has escalated to an average of 6 a year (for myself), with other snake catchers also getting ever increasing numbers of pythons as well, and added to this list is a newer influx of other python species such as Black-headed Pythons.

Most are clearly escaped pets!

In line with other large elapids, Red-bellied Black Snakes are as a rule, very common where they occur naturally. There are no such sites in Melbourne, again indicating they are not from here.

However at the southern and eastern limits of the range of these snakes, this is the very case.

These snakes are common.

The same applies for other taxa "invading" from the north, be they Death Adders, Carpet Snakes or Eastern Brown Snakes.

Notwithstanding the fact that almost all the specimens of Red-bellied Black Snakes that are caught on "call outs" tend to come from the most heavily urbanised areas in Melbourne or otherwise settled areas lacking snakes, the fact is that in the last decade it's become apparent to myself and all the other licenced snake catchers in Melbourne that the species is not native to Melbourne and that there is no place or suburb that the snakes can be found and caught.

All other elapids native to Melbourne (six species), are common where they occur and easily found.

With rare exceptions as noted above, regular "call outs" for Red-bellied Black Snakes invariably turn out to be Copperheads.

**RED-BELLIED BLACK SNAKES ... THEY HAVE NEVER BEEN NATIVE TO MELBOURNE**

For all taxa moving south in Australia there is a pattern whereby at the leading edge of their southernmost limits they are very common, readily found and readily caught. This is seen for Green Tree Snakes (*Charlespiersonserpens punctulatus*) south of Sydney, Brown Tree Snakes (*Boiga irregularis*) north of Sydney Harbour, Death Adders (*Acanthophis antarcticus*) around Bega in southern NSW, Murray/Darling Carpet Pythons in the Warby Ranges 10 km south of Wangaratta, Brown Snakes on Melbourne's northern fringe and so on. The same is seen for the Red-bellied Black Snakes around Tallarook at about the southernmost limit of their known distribution, roughly 70 km north of Melbourne on the north-side of the physical barrier of the Great Dividing Range (a zone infested with cannibalistic Copperheads, preventing or making difficult migration of invading northern species further south).

For Black Snakes this abundance is not seen in Melbourne. It's simply not possible to go anywhere in Melbourne to find a Black Snake on demand.

Hence it's unlikely the species has ever been native to Melbourne (except as stowaways or similar) since at least the beginning of the last glacial period!

As it happens, and based on the northern limits of the species (north Queensland), it is reasonable to assume that the species is recent, as if it had been around for a long period, it'd have invaded New Guinea at times of cooler climate (lower sea level) as recently as 12,500 years before present, which simply hasn't occurred.

Hence there has probably never been a time when Red-bellied Black Snakes have been native to Melbourne.

The sometimes mooted idea that the species may be rare and cryptic in Melbourne is also laughable, based on what is well-known about the species.

The fact is that they are large and hard to miss where they occur.

**FURTHER MISINFORMATION ON RED-BELLIED BLACK SNAKES**

On the Museum Victoria website at:

http://museumvictoria.com.au/DiscoveryCentre/Infosheets/Snakes-found-in-Victoria/Red-bellied-Black-Snake/ is an account for the species.

Under the heading "Distribution and habitat" it reads:

"It is widespread in eastern Victoria; north of the Dividing Range it is often associated with water courses. It is also relatively common in Melbourne's east and has been recorded around Bacchus Marsh, Park Orchards, Bayswater, along the Plenty River in the South Morang area and around the Merri Creek in the Campbellfield to Somerton area."

The Bacchus Marsh record is credible in that the Lederderle Gorge north of there, broadly equates with the known south-west limit for the species (near Melbourne), but also happens to be well outside of the suburban Melbourne boundary. This area is about 40-45 km west/north-west of the CBD.

The other records, all well within the Melbourne metropolitan area (broadly along the 25 km line from the CBD running from the north (Somerton) to the east (Bayswater)) are clearly erroneous and based on Copperheads of identical colour, which are the dominant species, in all these areas.

Such specimens (black with red belly) are regularly caught by myself in all these areas and invariably are misidentified by others as "Red-bellied Black Snakes".

The mention of Park Orchards as a location for Red-bellied Black Snakes is perhaps the best evidence of a general misidentification of Copperheads.

This is the suburb I have lived in over the last 12 years. It is semi-rural and in that time, of dozens of snakes I have seen here, none have been Red-bellied Black Snakes.

However again Copperheads of the same colour are common here and even more-so along the ridgeline running from the Maroondah Highway ridge, along North Ringwood, Warranwood and Wonga Park. Beyond that area, to the upper Yarra Valley (north or east) amelanistic (as in plain red) Copperheads become the more common colour phase for the species.

As of 2008 and in the years immediately prior, the reptile curator at the Museum Victoria was Jane Melville a professional herpetologist.

Not resident of Melbourne before she took up the position, her own actual collecting experience of Melbourne's snakes was effectively nil, which is a situation she happily concedes. Her herpetological experience and training is extensive, including with regards to central Asian agamids, but not in terms of Melbourne's snakes.

Hence her only real knowledge of snakes in Melbourne is what others have told her, including the general view that Red-bellied Black Snakes are native to Melbourne.

Her predecessor, Diane Bray, had her main interest in fish and managed the reptile collection in the absence of a "dedicated" curator, the position being vacant on the retirement of John Coventry some years prior.

Her main role was to catalogue and file specimens as lodged by the public and in response to public requests to examine specimens and the like.

This of course was in addition to her main line of work which was studying and classifying fish.

As all the relevant taxa, (Copperheads and Black Snakes) are

common in the south-east Australian region, get moved about people often and as a result turn up all over the place, it isn't surprising that until now, no one has ever actually tried to resolve the southern-most distribution limits of the Black Snake taxon.

I also plead guilty to aiding the misinformation about Red-bellied Black Snakes in Melbourne until recent years (e.g. Hoser 1989). I was advised by herpetologists and others of the fact and repeated it in good faith, including in printed material.

I now know this information to be erroneous and generally based on misidentified Copperheads, aided at times by the occasional "stowaway" Red-bellied Black Snake, giving apparently credible evidence of the concept of Red-bellied Black Snakes in Melbourne.

Obviously an important reason to publish this paper is to correct the continued misinformation once and for all.

Noting that in the event of a snakebite a misidentification can have fatal results if the wrong anti-venom is administered, it is a matter of life-and-death that the misinformation about Red-bellied Black Snakes as a Melbourne native is corrected before a life is lost as a result of a human error.

**GENUINE RED-BELLIED BLACK SNAKE CALL OUTS**

For the record, I shall identify here, where myself or fellow licenced snake catchers have found (genuine) Red-bellied Black Snakes in Melbourne on reptile call outs in the period 2003-8 and their original source.

·- Alphington, came in with shipment of paper (myself).

·Broadmeadows, found next to railway yard where goods from northern Victoria are shipped in (myself).

·- Toorak Road, Glen Iris, on footpath, apparently having alighted from a car that had recently travelled to North-east Victoria (Scott Eipper).

·- Langwarrin (X 2), both snakes having alighted from cars driven to the Omeo region of North-east Victoria. Both snakes in the same street came from cars driven to the region on a weekly basis over several years and had lodged in the two houses either side of the man who did the trips, with both snakes taking up residence in "compost bins" (both caught by myself and one being a female that had recently given birth as evidenced by the folds of skin at the posterior end of the body).

- ·Mount Martha shopping strip, for two specimens apparently imported with fruit and found in a fruit shop (Barry Goldsmith).

·- Montmorency, where a snake was removed from a car that had been driven back from a fishing trip at Barmah Forest, northern Victoria (myself).

·- Hampton Park shops. Came in with box of fruit from Goulbourn River Valley as reported in the local newspaper.

Notable is that none of the above locations were near any bushland or likely refuges for the species, indicating all had been brought into the localities by human means.

This contrasts sharply with the usual snake catching call outs for the native Melbourne species which almost always occur in residences and businesses that immediately abut bushland reserves or similar situations.

As to how often snakes get into cars and then get driven to other locations, is seen from my own capture records. I get about 2 calls a year for such snakes.

However in northern and eastern Victoria, where Black Snakes are common, this species is clearly the one most commonly seen entering cars or engines, with snake catchers in these regions reporting a much higher incidence of this.

By way of example, twice when doing snake shows at agricultural shows (Swan Hill and Orbost), I have had to adjourn proceedings to remove a Red-bellied Black Snake that had lodged underneath a car's bonnet on top of the engine. Please note that in these situations, I have literally been passing through these towns for one or two days only and not been employed as the local snake catcher.

Also worth noting is some malicious misinformation posted on the internet about these snakes.

A website controlled by convicted serial wildlife smuggler David John Williams (also with convictions for animal cruelty to reptiles) and side-kick Shane Hunter, reported in 2005-2008 that Red-bellied Black Snakes were common in Melbourne until I, Raymond Hoser exterminated them all for illegal venomoid surgery experiments.

The claims are a lie.

As it happened, as of early 2008, the only Red-bellied Black Snakes I had owned in the last 30 years were a trio, given to me by Bob Gleeson of Campbelltown (Mount Annan), New South Wales in early 2004, made venomoid shortly thereafter (see Hoser 2004) and still alive in mid 2013! The handful caught by myself, (referred to above) were all handed into the government authority (calling themselves Department of Sustainability) to be repatriated where they originated from, which is a term and condition of my catch-release permit, for non-native reptiles whose origins can be ascertained.

As mentioned already, the DSE themselves don't comply with their own laws and rules and treat handed in reptiles as something to trade illegally!

In April 2008, I acquired some newborn juveniles from a Cranebrook, NSW keeper, Dean Carroll, which later bred 3 years later and those retained by myself remain in good health as of 2013.

**SOUTHERN LIMITS FOR THE OTHER TAXA**

In terms of their southward migration, the Eastern Brown Snakes have a continuous distribution from Melbourne's northern outskirts (where they are very common) right through Australia and into New Guinea (also cut off from Australia by rising sea levels during present interglacial).

However no Brown Snakes are found south of the Melbourne CBD or beyond into areas such as the Mornington Peninsula, Wonthaggi or West Gippsland.

This is spite of the distance being small and habitat perfectly suitable for these snakes, with the species being found in identical habitat (and climate) elsewhere in Australia.

As for Red-bellied Blacks and the other large taxa, where Brown Snakes occur, they are common and highly visible. That they could be "hiding" from myself and other licenced snake catchers in the Mornington Peninsula, most notably Barry Goldsmith is simply not plausible.

Put simply, the snakes are not there.

I should mention that in 2012, Goldsmith caught one on the Mornington Peninsula that clearly derived from elsewhere, this snake being exceptional among hundreds of Tiger Snakes and Copperheads he had caught in recent years.

The Little-whip Snake (*Unechis flagellum*) mirrors that of the Brown Snake in terms of distribution to the north and west of Melbourne, although at the southern limits west of Melbourne (and up to 200 km west) in some areas one or other taxon is found up to 20 km further south than another.

As noted earlier, the Red-bellied Black Snakes have a similar distribution to that of the Browns in South-east Australia, the only obvious difference being that they are not quite as far south.

East of Melbourne the main ridge of the Great Dividing Range is higher (often capped with snow). Due north of Melbourne the height of the ranges is lower and this remains the case further west.

This is mentioned because for both Blacks, Browns and Little-Whip Snakes, all seem to have had more success in crossing the Great Dividing Range west of Melbourne than from the east. In fact the Red-bellied Black Snakes are only found south of the Great Dividing range in a small area about 80-100 km north-

west of Melbourne in the general vicinity of Castlemaine with reliable reports of the species from the nearby Lederderle Gorge, north-west of Bacchus Marsh.

That river in turn runs into the Werribee River (on Port Phillip Bay), giving the species a long-term route into Melbourne and environs.

Carpet Pythons never got as far south as the Great Dividing Range. If one draws a horizontal line through the Warby Range 10 km south of Wangaratta, in turn about 200 km north of Melbourne and runs it across Victoria to include regions north of this line you find the Murray/Darling Carpet Pythons (*Morelia metcalfi*).

Further north again and on the NSW side of the Murray River, you find Death Adders (see below).

While the highest and coldest mountains of the Great Dividing Range are north-east of Melbourne, and for one reason or other have formed a largely impenetrable barrier to invading snakes from further north, a second invasion front has been along the coastal strip running from NSW and into Victoria, with the most mobile species getting to the eastern edge of the Latrobe Valley at around Rosedale.

Here we find the western limit (on that front) for Brown and Black Snakes.

Diamond Pythons (*Morelia spilota*) the coastal equivalent of the Murray Darling Carpet (*Morelia macdoweli*) made similar progress to the Carpets and also crossed the border to Victoria (here being further south), but only made it about 50 km (at best) over the border) giving it similar penetration south.

Death Adders, as already mentioned never quite got as far as the Victorian border.

All the taxa referred to so far reflect a suite of species who's current range is centred on about the latitude of mid NSW, about 800 km straight line north of Melbourne.

That is the faunal suite characteristic of the modern day Murray/Darling basins and NSW coastal plains and ranges, each invading south via the logical lowland routes.

Other taxa whose ranges come from further north (as the center of distribution) have also migrated towards Victoria, either just crossing the border, or not quite. Included here, but not considered in the context of this paper are taxa such as *Pseudonaja aspidorhyncha* (southern form of Western Brown Snake and recently reclassified as a different species to *P. nuchalis*, by resurrection of the name first proposed by McCoy in 1879), Coral Snake (*Simoselaps australis*), *Denisonia devissi* (Devis Banded Snake) and Mulga (King Brown) Snake (*Cannia australis*), all of whom have a centre of distribution about 800 km straight line north of the other suite of species or perhaps even further north.

**NO DEATH ADDERS IN VICTORIA**

For Death Adders, the situation is that there are no known extant populations of Death Adders in Victoria. There are old (1800's) records of Death Adders along the Murray River of Victoria, in the vicinity of Swan Hill in North-west Victoria.

There are no known museum specimens to back up these records, only notes!

Bearing in mind that locations given for specimens in the 1800's were often inaccurate in that the locations given often related to point of shipping, rather than point of capture, it is possible that the specimens referred to may have come from some distance north of that given.

The region has long been degraded for agriculture to such an extent that the snakes are likely to be extinct from the exact localities given.

Nearby areas of suitable habitat (including for example Sunset Country), lack Death Adders (ascertained from extensive searching by herpetologists for the species in the areas), leading to a general view that the old records may be inaccurate due to the fact that otherwise it would make sense for Death Adders to be in areas such as Sunset Country Victoria, (North-west of the state), where they are not.

However, for the purposes of this article it makes little difference whether or not the north-west Victorian records are accurate as Death Adders have also migrated south along the NSW coast and ranges to within about 100 km of the Victorian border, where they are very common. I also note that on that score, this is very well known and backed up by extensive numbers of specimens in the Australian Museum in Sydney. However none have been recorded on the Victorian side of the border in identical bushland and in spite of extensive collecting by herpetologists.

If they were there, they would certainly have been found by now and they haven't been!

The (old) alleged inland Victorian locations for Death Adders, broadly equate with the latitude known for the taxon along the coast, and based on mobility of the taxon as compared to the known distribution limits for other invading taxa (Diamond/Carpet Snakes and Red-bellied Blacks), there is a remote possibility that the old records may represent a historical southern inland NSW/Victoria limit for the Death Adder taxon.

Accepting this proposition does also allow for the prospect that the species (obviously) did not travel the extra few hundred kms to the zone of excellent habitat to the west and south-west of there in north-west Victoria.

**DISTRIBUTIONS EXPANDING – EASTERN BROWN SNAKES**

While 200 years of European settlement is a split second in geological time, and in that time a lot of movement of reptiles has been arrested due to the building of broad acre farms, major highways, towns and the like, some southern migration of the above taxa has continued.

Brown Snakes were in the 1980's confined to Melbourne's north, north-west and Maribynong Valley, although also common due west of Melbourne at Melton, Bacchus Marsh and nearby.

Few if any were seen south of the Yarra River.

By 2000, records south of the River were increasingly common and in areas of the city of Manningham formerly only known to have Tiger Snakes (including Westerfolds Park), Brown Snakes started to become common.

Likewise for parts of Ivanhoe that previously never had snakes other than Tigers.

These are all heavily urbanised suburbs at the limit of the known range of Brown Snakes.

In 2007, a Brown Snake was caught in the You Yangs about 60 km south-west of Melbourne, about 20 km straight line south from Bacchus Marsh, due west of the city of Melbourne.

Collectors from the area expressed surprise that a Brown Snake had turned up so far south.

South of the You Yangs is Lara and Geelong, with Brown Snakes unknown from these areas or south of there.

However there are no physical barriers preventing the snakes invading these regions.

Inspections of the animals from north-west Melbourne, reveal they are the same taxon as those from the southern Murray/Darling basin, namely (*Pseudonaja textilis bicucullata*), distinguished by several traits from other subspecies. The most notable trait is the common presence of one or more single subcaudals. No other subspecies of *P. textilis* is known to have specimens with this trait

**LITTLE-WHIP SNAKES**

Coventry and Robertson 1991 state that the species is found in all Melbourne suburbs. Put bluntly, they are not!

Broadly the distribution of the taxon mirrors that of the Eastern Brown Snake in the region north and west of Melbourne. However, they appear to have penetrated all of south-west Victoria where suitable habitat exists in the form of stony plains and similar nearby environments, including granite hills, basalt

rises and the like.

They are not as a rule found in the heavily forested regions east and south of Melbourne, meaning that in Melbourne the eastern limit for the taxon is about the Plenty River Valley with none naturally occurring at any time in the region running south of the same line that limits the modern distribution of Eastern Brown Snakes.

In other words, this taxon does not occur in any of the wetter eastern suburbs or anywhere south or south-east of Melbourne in any area beyond the eastern shoreline of Port Phillip Bay.

North of the Yarra River, Little-whip Snakes appear to be found no further east than the Plenty River Valley. Beyond that point, Small-eyed Snakes appear to take over the ecological position of the species.

This indicates that both taxa compete directly and may limit one another's (or one or other's) distributions. I do note however that in some locations such as the western side of the Plenty River Gorge the two species are in fact sympatric, this being an area at the boundary of the known ranges of both species.

Brown Snakes by contrast are found east of the Plenty Valley to the very edge of the colder parts of the main Great Dividing Range, which is within a few kms of Yarra Glen/Healesville.

**SMALL-EYED SNAKES**

These are found in hilly areas north and east and even south of Melbourne, where I have caught them.

There are also records from hilly areas on all sides of Melbourne in National Parks, but I have no direct experience of the taxa at locations west or south-west of Melbourne.

They have migrated into Victoria using the eastern side of the Great Dividing Range (and possibly also the wetter parts of the western edge) as their main line of movement into the region.

They are cold tolerant and able to invade areas devoid of numbers of other taxa.

**WHITE-LIPPED SNAKES**

The distribution of the taxon broadly mirrors that of Copperheads in Victoria. Hence it is found in cooler regions on all sides of Melbourne.

It is typically found in "pockets" where they are very abundant and easily found. Other areas of apparently similar habitat often lack the species.

As for Copperheads, numerous colour morphs may occur at the same locality.

**DISTRIBUTIONS EXPLAINED, IT'S NOT TOO COLD ... AT THE MOMENT**

That these taxa moved south during the recent interglacial is not really in dispute.

A perusal of any relevant reptile book sets out the distribution maps for each taxon and for each there is a distinctly southern limit. With temperature being an obvious limiting factor on reptile's distributions, there has until now been no questioning of the doctrine that temperature alone has been the main limiting factor for the distributions of these taxa.

Surely as you go south it gets colder?

However perusal of these species at ground level reveals a starkly different picture.

With the exception of *Unechis flagellum*, all the invading taxa are found in the vicinity of Sydney, NSW. However species in the same genus are also found around Sydney NSW, including for example *Unechis dwyeri*.

All the invading taxa, including *Unechis dwyeri* are found in the Blue Mountains and/or nearby hilly regions that are higher in altitude and significantly colder than either Melbourne, coastal Victoria south of Melbourne or the plains and ranges north of Melbourne, and anywhere else between where they are found and these co-joined regions.

Furthermore, in the case of Victoria, it is not as one moves south it gets colder, or at least in terms of a form of cold that matters to the survival of the reptiles.

By contrast, the reverse is true. North of Melbourne where many of these invading taxa occur, the elevation is higher and hence the temperatures cooler. Beyond the great dividing range, further north again is inland and so considerably colder for the winter months, which include at least three months of cold weather from June to end August. Heading south, elevation drops and temperatures rise (including in the critical cooler months, where the near sea influence occurs) and so lack of heat cannot be a limiting factor in terms of these species moving south.

In other words it is not cold that prevented any of the invading taxa from getting to Melbourne or beyond.

I ignore consideration of temperature for the warmer months as within Melbourne this sits well within what the snakes can cope with and while heat is thought of as desirable for snakes, the fact is that inland areas to the north have an excess of this in the summer months (forcing snakes to hide from it in any event), and again cannot be treated as a factor keeping species out of Melbourne and other southern parts of Victoria.

While all invading taxa have certain habitat requirements or preferences, observations of these taxa (those discussed in this paper) in their known ranges shows that they are adaptable and invasive of habitats and can apparently tolerate habitats beyond their known distribution limits.

This we know because they survive and thrive in the same habitats within their known ranges!

While it may be possible to argue that taxa like Death Adders require virgin bushland and that perhaps aboriginals in years past burnt and degraded too much bush to prevent their southern migrations, this argument cannot possibly be used to explain failure of wide-ranging habitat liberal taxa like Black, Brown or Carpet Snakes to get further south.

The large elapid taxa in particular live in all kinds of habitat, including severely degraded as seen by their abundance in the most intensively farmed regions and in all other habitats in their known distribution ranges.

With climate or "cold" being eliminated as a factor stopping the spread of these species south, one must look at other possible factors.

The most obvious thing seen by comparing the invading taxa and where their southernmost limits of distribution are, is that the more mobile taxa got further south.

Brown Snakes, the most mobile of the large elapids, got furthest south. Black Snakes also quite mobile, broadly shadowed the Brown snakes, except in western Victoria, where the Brown snakes got about 50 km further south (on average).

Less mobile, the Carpet Snakes, crossed the Victorian border, but only just, making it an average of about 100 km north of the Black Snakes, while the Death Adders, (based on known distributions along the NSW coast), didn't quite get as far as the Victorian border.

As for whether or not these taxa can survive in Melbourne, the result is already known. They can!

Escapees thrive here!

All the Black Snakes, Carpet Snakes and Diamond Snakes that I catch in Melbourne tend to be well-fed on local food and in good general health.

**ANOTHER FACTOR – OTHER SNAKES**

However, how fast a snake can crawl can't be the whole explanation.

Studies of invasive species, such as Cane Toads (*Bufo marinus*) in Northern Australia have shown travelling speeds of several km a year for the invasion front. We also see that not far behind the invasion front these animals become numerous to what is commonly described as plague proportions.

The same is seen with the snakes migrating south as documented above.

Just inside the known outer limits of the range of these snakes in southern Australia, numbers of the relevant species are high, or at least relatively speaking.

Bega is one of the best areas in New South Wales to find Death Adders and sits just behind the southern leading edge of the southernmost part of the species range.

Brown Snakes are in huge quantity in the Sunbury/Bulla area, again just 25 km from the leading edge of the southernmost point in the species range near Melbourne.

Blacksnakes are in plague proportions at Tallarook/Seymour, an area probably within 20-30 km of the southernmost point in the species range due north of Melourne.

Now these newly introduced feral Cane Toads are radically different to the snake taxa that have evolved in this continent and so it'd be expected that factors may be wildly different for them as opposed to taxa that have co-evolved over millions of years.

Assuming the last glacial period to have ended about 12,500 years BP, it would appear that short of some unknown calamity, even at just 1 km a year, any of the invading taxa could have covered all habitable parts of Victoria by now, if invading a new area was as simple as moving in.

I have of course omitted "mini-ice ages" that may have impacted on migrations and for good reason.

The small elapid species, namely *Unechis flagellum* and *Cryptophis nigrescens* as a species pair, have in sharp contrast to the large species managed to successfully colonise almost all possible areas of suitable habitat that can support them, or at least all that in which they obviously prefer.

That these invaders haven't been knocked out by a calamity, would indicate that none has been big enough to affect the overall picture.

Also the speed and success of the invasion of the smaller elapids (as opposed to the larger ones) would indicate that what has slowed the invasions of the larger species hasn't affected them in the same way.

Hoser 2005 detailed a well-defined pecking order in terms of snakes. That paper showed that a major determinant of snakes distributions in given localities was other snakes.

Since that paper was published, further research here has shown that the key factors indicating likely dominance of taxa (between snakes and/or lizards) identified here are in order of importance listed as:

- Egg-laying versus live-bearing
- Ambush versus stalking (in feeding)
- Lack of cold tolerance
- Potential mobility of snake

Habitat partitions and adaptations are also important in the real world situation, but were excluded from testing at our facilities for several reasons, including difficulties in standardising tests for this.

Perhaps a major impediment to the successful colonisation of regions south was other snakes of other species, as in those already there.

Two of three were large elapids.

This may mean that in terms of the invading snakes and in a world devoid of modern human influences, unless and until the invading snake taxon gets sufficient numbers in the region of the invading front, then they cannot push their species to new regions.

The end-point of the argument being that competition for already occupied habitat by invading taxa may greatly slow the migration of these taxa.

As an alternative explanation, most snakes being forced to new habitat (by whatever means) do, for a variety of factors (but mainly due to already resident snakes) fail to survive.

A similar scenario is seen for translocated reptiles and other animals (see Hoser 1995).

This is particularly so for sedentary and less mobile taxa as seen in the Death Adders and Pythons.

In the case of the high mountain barriers north and east of Melbourne referred to earlier, one part of this barrier starts at about Kinglake and runs around through just east of Healesville, through the Dandenong Ranges, Warragul and into the Stresleki Ranges. Another runs through the high country and into Victoria.

In the high country of NSW and into Victoria, Black and Brown snakes have made progress but not in terms of the high mountain barriers skirting the north-east of Melbourne.

These mountains are (naturally) covered in dense forests and the dominant species here are Copperheads.

Copperheads are strongly cannibalistic of other snakes and when numerous literally eat out all competing snakes!

Hence where Copperheads are strongest forward migration of other snakes would seem to be slowest.

In the case of Melbourne this is readily seen.

Running due east of Melbourne from Kew (about 5 km east of the CBD) is a long ridge running along the Maroondah Highway to the Dandenongs.

Except around the Yarra River at Kew (the start of the ridge), where there are Tiger Snakes associated with the Yarra Valley, the only snake native to the ridge-line are Copperheads.

The same pattern repeats in the region south of here, although further south along major waterways and the Port Phillip Bay where the Yarra drains, Tiger Snakes are again found.

North of this ridgeline is the Yarra Valley, where Tiger Snakes dominate and as mentioned earlier, Brown Snakes are found as far south as here.

Historically it seems that this ridge of dense forest, with its copperheads was a sufficient barrier to prevent southward movement of Brown Snakes.

However with the urbanisation of the area and a general drop in snake numbers overall, this ridge is now open to movement of other snakes, the result being that for the first time, in 2008, a young Brown Snake was found at the summit of the ridge in Ringwood.

Areas formerly only with Copperheads have also had Tiger Snakes turn up.

This is significant as in the backdrop of urbanisation, Copperheads numbers usually increase relative to Browns and Tigers, where all three taxa occur.

Because Black Snakes aren't native to Melbourne, no comparisons can be made. However in Sydney, the Black Snakes dominate urban areas and nearby rural areas as well, with their relative position improving against the competing taxa Browns and Tigers.

However of note in Melbourne and in spite of suburbs full of people killing snakes, the fact is, that a decrease in density of Copperheads has enabled the northern invaders an easier means to invade new areas to the south.

What also needs to be noted, is that even in the heavily urbanized human environment, snakes are often able to traverse suburbs undetected and also to mate and breed in refugia, parks and the like in sufficient numbers in order to maintain viable populations.

Bushland pockets in the most urbanized parts of inner Melbourne still maintain healthy and self-perpetuating populations of snakes (usually Tigers), but in relevant suburbs, also Copperheads, Browns and the three smaller species.

**SAME FACTORS OTHER REPTILES?**

Looking at lizard/lizard inter-relationships and pecking orders between taxa has been beyond the scope of my own investigations and this paper.

For lizards the picture is considerably more complex. While, as for snakes there are distinct size classes here in Australia, the picture is made more complex for several reasons, including a less rigid adherence of taxa to size classes (as adults), more species diversity, greater differentiation of taxa in terms of physical attributes and adaptations, habitat partition and so on. Yes, snakes are conservative in that all are long, thin, legless and (in Australia) tend to seek out the same preferred hiding spots, food (other smaller vertebrates), watering points and the like.

However in terms of snakes and lizards one thing has become clear.

While large lizards eat small snakes and vice-versa, and this is a common situation, when both are of similar size the trend is for lizards to submit and move on.

The best example of this is seen in Bluetongues (*Tiliqua* spp.) versus snakes of the same size. When they meet, it is the lizards that will move on.

This has been tested and shown many times.

As to why, the reason appears to be related to the same factors as for the snakes. The Bluetongues are live-bearers for a start. Secondly, in that they have legs, they are inherently more mobile than the snakes without.

Using the criteria given above for predicting pecking orders, it's obvious that most snakes would outrank most of the lizards.

Hence the seen outcome could have been predicted using the criteria given above.

Looking at modern (present) distribution of Bluetongues, what was postulated for snakes is also seen in the Bluetongues.

The Eastern Bluetongue (*Tiliqua scincoides*) is not found in Tasmania, and hence it can be inferred that they are also a recent (from the north) arrival into the southern half of Victoria in the post glaciation period (since about 12,500 YBP).

Blotched Bluetongues (*T. nigrolutea*) are found throughout Tasmania (alone for the genus), and in Victoria are found in cooler regions, but not warmer ones, with the climatic boundary line being around Melbourne's climatic features.

In Melbourne, the trend is that for cooler suburbs, such as the outer east to have Blotched Bluetongues, while the warmer ones have eastern Bluetongues.

While Blotched Bluetongues form part of the cold climate suite of species including Copperheads, White-lipped Snakes (*Drysdalia coronoides*) and others, versus the Eastern Bluetongue's position as a part of the northern invading suite species such as eastern Brown Snakes, Red-bellied Black, Lace Monitor (*Varanus varius*) and so on, both Bluetongues are sympatric where their general ranges meet.

The two Bluetongue taxa are sympatric across wide parts of Melbourne including Belgrave South, much of the Mornington Peninsula and Park Orchards.

The picture becomes blurred in other parts of Melbourne due to the large number caught, relocated and released by private individuals.

However what is obvious is that in the environment unaffected by people, Blotched Bluetongues have a competitive advantage in the coldest regions (seen by their exclusive occupation of these habitats) and Eastern Bluetongues where it is warmer (seen by their exclusive occupation of these areas). There is obviously a strong overlap in survival ability in terms of intermediate temperature zones, which is why both taxa persist indefinitely in such zones.

However in terms of the southern migration of the Eastern Bluetongues, what is obvious is that unlike the invading snakes from further north, Eastern Bluetongues have been able to penetrate much farther south than the snakes from the same faunal suite, enabling them to colonise (virtually) all areas of suitable climate in the state, including areas well south of Melbourne, that have yet to be reached by even the relatively mobile Eastern Brown Snakes.

The ridgeline of Maroondah Highway that formed either an effective barrier (so far) to southward migration of Brown Snakes (or was in any event the southern limit), has been breached by the Eastern Bluetongues.

The ridgeline itself remains exclusively Blotched Bluetongues (save for perhaps the odd escaped Eastern Bluetongue pet and similar), indicating that historically at least, the barrier was never breached by Eastern Bluetongues. However it seems that via the most logical route, (the lower Yarra River valley and basalt plains to the west, and then along the shoreline of Port Phillip Bay), eastern Bluetongues have moved south in all directions to populate the Mornington and Bellarine Peninsulas, Barwon Valley and even the south-eastern suburbs running parallel to the south-eastern freeway, (Dandenong, Berwick, Pakenham, Belgrave South), where they now dominate large areas.

Put simply, these lizards were able to move faster into new areas to colonise them than the snakes.

Given time, it seems that the likely end point (and barring major climatic shifts and similar), will be taxa such as Eastern Brown Snakes occupying much the same areas. Taken further, and perhaps a few hundred years beyond present, it seems likely that even Red-bellied Black Snakes would (and without human assistance) also colonise these more southern regions including all suburbs of Melbourne.

Obviously the exact time frame would depend on how fast the invasion front moves.

**DIFFERENT STARTING POINTS**

A counter-argument to the proposition put here in terms of southward migrating taxa is that perhaps the relevant species of snake (or lizard) were either in the southern Victorian region before the others in the same faunal assemblage arrived, or alternatively had a further south starting point.

This may be the case for a number of species with a more northern centre of distribution as mentioned earlier in this paper.

However in terms of the relevant taxa to this paper as named at the outset, these arguments do not appear to hold.

All appear to have similar climate tolerances and a similar adaptability to all relevant habitats, as evidenced by their modern day distributions, particularly further north in NSW where in high altitude regions the taxa survive in areas cooler than those presently occupied in Victoria.

**MORNINGTON PENINSULA AND SOUTH-EAST SUBURBS**

This includes all areas south of the line running from the CBD to the Dandenong Ranges and all areas south of the main dividing range through Warragul to the Latrobe Valley and including all areas including and east of the Streslecki Ranges, south of here and to Port Phillip Bay's Eastern shoreline.

In summary, the only large elapids here are Tiger and Copperhead.

There are no red-bellied Black Snakes or Brown Snakes.

All snakes locally identified as such are simply Copperheads. The only potential exceptions are stowaways or their offspring, which may occasionally turn up.

While stowaway Black Snakes are occasionally seen, stowaway Brown Snakes are rare as the species rarely climbs and hence they rarely enter cars and get driven around.

I do note however that firewood collection and transport remains a major source of vagrant snakes of all kinds, with hollow logs always being a favoured resting place for snakes.

Adding to the confusion are newly licenced snake handlers who haven't a clue about snakes or their identification and should never have been licenced by the DSE.

One such pair are Sean and Stacey McCarthy who at end of 2005 and with no meaningful expertise in reptiles bought a business name "Snake handler".

Business names can be bought for about $70 from the Office of

Fair Trading Victoria.

Making false claims about their alleged expertise they sought media opportunities to tout their knowledge and business. In doing this they made statements to newspapers claiming that Brown snakes were native and common in the South-eastern Suburbs.

With alleged "experts" stating that Brown Snakes are common in the south-eastern suburbs, it is not surprising that persons with no real knowledge of snakes would readily identify any large brown coloured snake as an "Eastern Brown Snake" if they saw one.

The most common colour phases for Copperheads in the relevant area are Black (with red or yellow belly), usually misidentified as "Black Snakes", yellowish brown (being misidentified as Brown snakes) and orangeish red to red, also usually misidentified as a Brown snake.

Thick-set adult male Copperheads that tend to flatten out their head and neck are also commonly misidentified as Tiger Snakes.

In 2009, Sean McCarthy was posting on Facebook that Red-bellied Black Snakes were a common native in the Melbourne suburb of Eltham. The statement was another of his fabrications!

After I corrected his mistake, instead of saying "thank you" McCarthy sponsored a Facebook hate page called "Ray Hoser, Melbourne's biggest Wanker", which besides saying something significant about McCarthy's ethics, was also a good reason to never correct wrong information posted on the web about reptiles!

Little-whip Snakes are not found in the Mornington Peninsula region, which is contrary to the position stated by Coventry and Robertson 1991. In Melbourne, the range of that species ends with the basalt to the north and west.

White-lipped Snakes are found in the Mornington Peninsula region and common in pockets, these usually being in coastal heath type habitats (such as Tootgarook) and hilly areas.

There are records of Small-eyed Snakes in the region, with the taxon common throughout all parts of the Dandenong Ranges, including Beaconsfield.

While I haven't personally caught Small-eyed Snakes at likely parts of the Mornington Peninsula (e.g. around Arthur's Seat), their presence could be anticipated, especially in view of the absence of limiting or competing species like Little-whip Snakes.

**CONCLUSION**

In light of the above, the only remaining conclusion to be drawn in terms of modern day distributions of invading snakes in southern Victoria as named, is that what's seen is a direct result of the relative mobility of the relevant taxa. This means the more mobile taxa were able to colonise further south faster and not as a result of any added pre-adaptation to the invaded habitat or innate ability to survive there.

Due to the apparently slow speed of the invasion fronts of all snake taxa in Eastern Australia, as compared to feral invasive species introduced to Australia within the last 200 years, it appears that there are one or more factors at play greatly slowing the forward invasions. The most obvious factor worthy of investigation appears to include snake/snake interactions and how resident and dominant snakes (in particular Copperheads) are able to block successful colonisation by invaders, which may themselves be mainly individuals forced out of their habitat by others of the same or similar species.

Of note is that in south-west Western Australia, where there are no Copperheads, equivalent invasive species such as Brown Snakes, Carpet Snakes and Death Adders are found literally to the furthest points south, indicating a considerably different situation in that state in the post-glacial maximum period.

As Copperheads are the only obvious difference in the two situations, they appear to be a major likely culprit that slowed the southern migrations of large elapid species in Victoria.

**REFERENCES CITED**


Alexander, M. 2012. Post on Facebook Wall of Black Snake Productions, 17 February 2012.

Anonymous 2008. Red-bellied Black Snake *Pseudechis porphyriacus.* Museum Victoria webpage at: http://museumvictoria.com.au/DiscoveryCentre/Infosheets/Snakes-found-in-Victoria/Red-bellied-Black-Snake/ downloaded on 3 July 2008.

Brown, K. 2008. Snakes a risk in Hume even in cold. *Hume Leader*, 18 June.

Cogger, H. G. 2000. *Reptiles of Australia.* Reed Publishing, Chatswood, NSW.

Coventry, J. and Robertson P. 1991, *Snakes of Victoria*, Department of Conservation and Environment, East Melbourne, Victoria.

CSIRO (Anonymous 2008). Melbourne. Webpage at: http://www.cossa.csiro.au/lb/lbbook/urban/urban6.htm

Harrison, T., McCarthy, S. *et al.* 2011. Ray Hoser, Melbourne's Biggest Wanker. Facebook hate page May-July 2011.

Hoser, R. T. 1989. *Australian Reptiles and Frogs*. Pierson and Co., Mosman, NSW, Australia:238 pp.

Hoser, R. T. 1995. Release into Hell. *Monitor:Journal of the Victorian Herpetological Society* 7(2):77-88.

Hoser, R. T. 2004. Silcone snakes cause sensation in Australia and elsewhere. *Hard Evidence* (November 2004) 4(6):25-29.

Hoser, R. T. 2005. Pecking orders in large venomous Snakes from South-east Australia … ecological and distributional Implications. *Boydii* (*Journal of the Herpetological Society of Queensland*), Spring 2005.

Hoser, R. T. 2007a. The Snakebuster: the trials of a licenced snake catcher in Melbourne (Australia). *Bulletin of the Chicago Herpetological Society* (March, 2007) 42(3):50-51.

Hoser, R. T. 2007b. Call to outlaw the use of Tongs for catching and handling deadly snakes. *Bulletin of the Chicago Herpetological Society* (June, 2007) 42(6):92-95.

Hoser, R. T. 2009. One or two mutations doesn't make a new species … The taxonomy of Copperheads (*Austrelaps*) (Serpentes:Elapidae). *Australasian Journal of Herpetology* 1:1-28.

Hoser, R. T. 2012. Some new small-eyed snakes from Australia and New Guinea (Serpentes:Elapidae). *Australasian Journal of Herpetology* 13:3-7.

McCarthy, S. 2009. Internet posts claiming Red-bellied Black Snakes are long-term natives to Melbourne and common in Melbourne bushland reserves at: http://www.aussiepythons.com/forum/australian-snakes/red-bellied-blacks-around-melbourne-103027 dated 11 February, 15 February and others.

McCarthy, S. 2011. Facebook post, White-lipped snake bite. 11 January 2011.

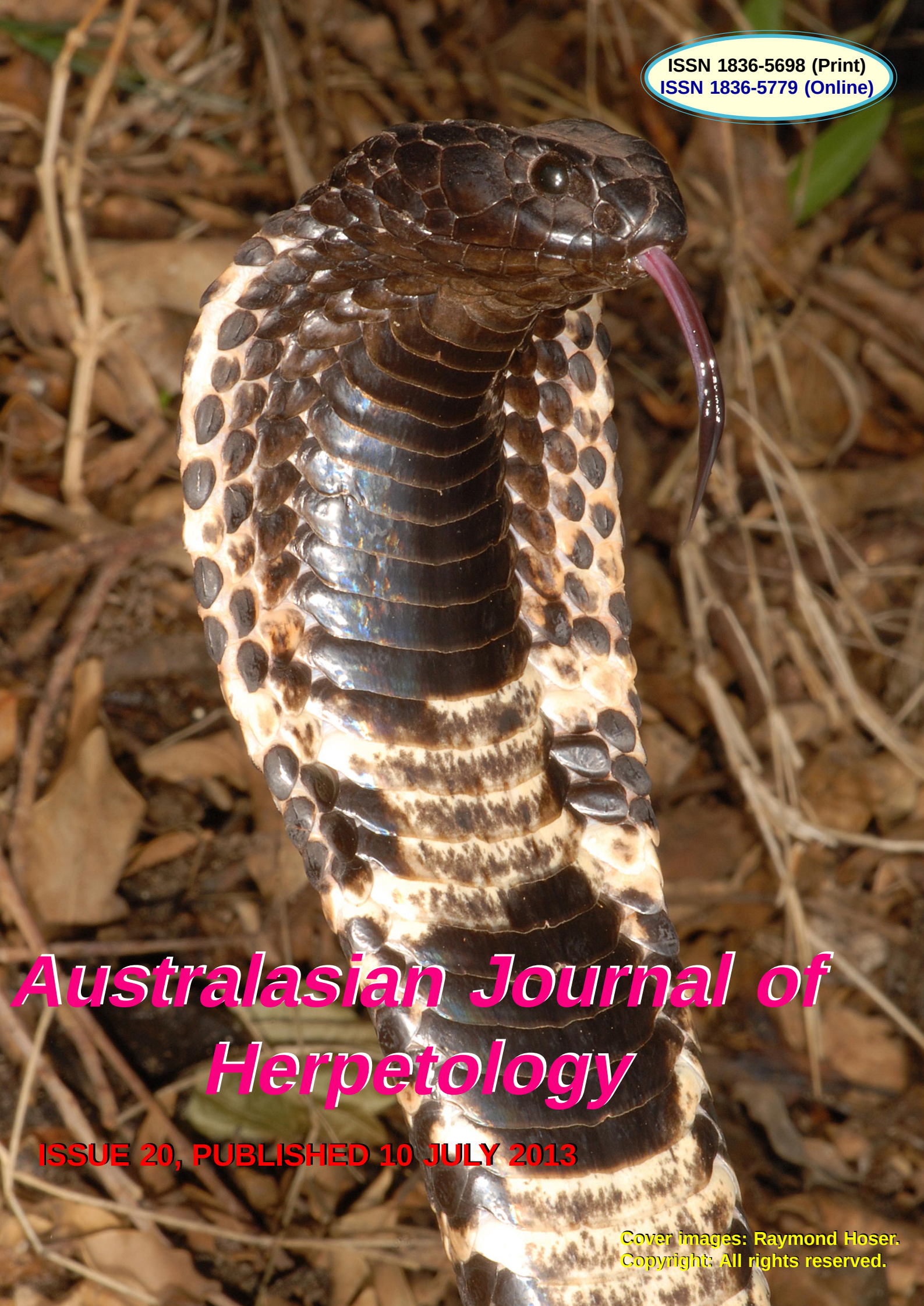
McCarthy, S. 2012. Ten pages of posts on Aussie Pythons Internet Chat Forum at http://www.aussiepythons.com/forum/general-reptile-discussion-42/stupid-act-187762/ dated 14 June onwards in June 2012.

Rawlinson, P. A. 1991. Taxonomy and distribution of the Australian tiger snakes (*Notechis*) and copperheads (*Austrelaps*) (Serpentes, Elapidae). *Proceedings of the Royal Society of Victoria* 103(2):125-135.

WinTV 2011. Snake Wrangler, 21 Jan, news article re snake bite of Paul Fisher posted at: http://www.wintv.com.au/central_queensland/news/item/38571


**Hard copy of this paper was originally published on 10 July 2013.**

ISSN 1836-5698 (Print)
ISSN 1836-5779 (Online)



# Australasian Journal of Herpetology

ISSUE 20, PUBLISHED 10 JULY 2013