Issue 12, 30 April 2012

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

Australasian Journal of Herpetology

Contents on page 2.

Issue 12, 30 April 2012

Australasian Journal of Herpetology

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

CONTENTS

Australasian Journal of Herpetology **12:3-5.**
Published 30 April 2012.

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

A New Genus of Coral Snake from Japan (Serpentes:Elapidae).

Raymond T. Hoser

488 Park Road, Park Orchards, Victoria, 3134, Australia.
***Phone*: +61 3 9812 3322 *Fax*: 9812 3355 *E-mail*: viper007@live.com.au**
Received 10 March 2012, Accepted 8 April 2012, Published 30 April 2012.

ABSTRACT

This paper reviews new phylogenetic studies of the Coral Snakes recently placed in the genus *Sinomicrurus* Slowinski et. al., 2001.

The species *japonicus* is found to be sufficiently divergent from cogeners to warrant being placed in its own genus.

As a result, this taxon is placed within the new genus *Funkelapidus* gen. nov, which is herein formally named and defined in accordance with the Zoological Code.

Keywords: Taxonomic revision; new genus; species; *Funkelapidus*; *Sinomicrurus*; *japonicus*; systematics.

INTRODUCTION

Numerous studies have recently been completed in terms of the so-called Asian Coral snakes.

Slowinski et. al. (2001) decided to split them all between three genera, namely *Calliophis* Gray, 1834, (into which they subsumed the genus *Maticora* Gray, 1834), *Hemibungarus* Peters, 1862, (which they made monotypic for *Hemibungarus calligaster* Weimann, 1835) and for five species they created a new genus named *Sinomicrurus* Slowinski et. al., 2001.

The currently recognized species within this now widely recognized genus are, *Sinomicrurus macclellandi* (Reinhardt, 1844) (the type species), *S. hatori* (Takahashi, 1930), *S. japonicus* (Günther, 1868), *S. kelloggi* (Pope, 1928) and *S. sauteri* (Steindachner, 1913).

Due to the small size, similar habits and their relatively inoffensive nature, these five species of snake have not come to the attention of taxonomists from the point of view of close studies and investigation of differences at the level between species within the single genus.

Ota et. al. (1999) has recently investigated *S. japonicus* and in 1999 described a subspecies of this taxon.

Studies of the snakes as a group have tended to be in terms of relationships to other snakes (other genera) rather than between each other and whether they should or should not be split up within the group.

This view is clearly obvious by the comments made in the published results of studies like Lawson et. al. (2005), Pyron et.al. (2011) and Slowinski et. al. (2001).

However within this genus as currently recognized, there are two clear and phylogenticially distinct groups of snakes. These are the Japanese Coral Snake, currently known as *Sinomicrurus japonicus* (including subspecies and variants), versus all the others in the group; see Cox, et. al. (1998), Mori (1982), Orlov. et. al. (2003), Ota (2000). Ota et. al. (1999), Pope (1935), Stejneger (1907), Stejneger (1910), Wall (1908a), Wall (1908b), Whitaker and Ashok (2004), Zhao and Adler (1993), Ziegler et. al. (2007).

Most recently the deep divergence between these superficially physically similar snakes was highlighted in the results of the molecular phylogenetic analysis of Pyron et. al. 2011.

However a revisiting of the mtDNA data by Slowinski et. al. (2001) yielded a similar result (see fig 2. page 236) the relevant data of which seems to have been overlooked by both themselves and other herpetologists.

This may in part be due to the conflicting diagram based on certain morphological characters, seen in Fig 1, p. 236 of Slowinski et. al. (above and on the very same page) which showed *japonica* well inside the cluster of other species placed within their newly erected genus *Sinomicrurus.*

However, the morphological convergence of these small elapids has almost certainly masked the actually divergent histories of the relevant taxa.

Both the Fig 2 diagram in Slowinski et. al. (2001) and Fig C on page 336 of Pyron et. al. (2011) clearly and unmistakably showed the species *japonica* to be widely divergent of the other species now classified within the genus *Sinomicrurus*, which as a group, clustered very closely in both diagrams, based on the mtDNA evidence.

In terms of distance apart, in Slowinski et. al.'s results they found *Micruroides euryxanthus* and *Micrurus fulvius* to be closer together than the taxon *japonicus* and the other species within *Sinomicrurus.*

It should also be stressed herein that *Micrurus* and *Micruroides* are two widely recognized separate genera, (refer for example to Campbell and Lamar 2004) who's status is not in dispute among taxonomists.

Pyron et. al's results of 2011 found the divergences between *Micruroides euryxanthus* and *Micrurus fulvius* to be about the same as that between the species *japonica* and the other taxa within *Sinomicrurus.*

Based on the results of Pyron et. al (2011), similar (near identical) earlier published results published in Campbell and Lamar (2004) and obvious physical differences within the relevant snakes (morphology, hemipenes and colouration), the new world genus *Micrurus* has been further split (Hoser 2012).

As a result of the compelling differences within *Sinomicrurus sensu lato* as shown by the various relevant studies, it is clear that the genus *Sinomicrurus* as currently recognized needs to be split into two. It would also be inconsistent not to split the genus *Sinomicrurus* as currently recognized.

The *macclellandi* group remains within *Sinomicrurus* as it contains the type species, while the species *japonicus* is herein placed in a new genus that is diagnosed and named.

GENUS *FUNKELAPIDUS* GEN. NOV.

Type species: *Hemibungarus japonicus* Günther, 1868

(Known currently as *Sinomicrurus japonicus*)

Diagnosis: The snakes of this genus (monotypic for the species *japonicus*) are easily separated from all those remaining in the genus *Sinomicrurus* on the basis of dorsal coloration of the head and neck.

In *Funkelapidus* gen. nov. there is no prominent white or yellowish-white crossband running across the back of the head or nearby neck.

In snakes of the genus *Sinomicrurus*, the white crossband or nape is usually wider than the eye or wider. It usually runs across the head either from about the eye, or slightly further back, depending on both species and local variation.

In *Funkelapidus* gen. nov. the snake usually has an orange body with medium to thick black bands (slightly white etched), and a dark head (especially at front), although this is of medium or mottled colour in some individuals. There is no white bar on the head, and the only light on the head may be some longitudinally spreading from the neck on either side of the spinal column.

Orange parts are at least 3-4 times wider than black and a distinct black vertebral stripe runs down the mid-body.

Some specimens are completely striped with longitudinal stripes running the length of the body, with the stripes commencing in the region of the back of the head or neck, but not possibly able to be confused with the broad crossband or nape seen in snakes remaining in *Sinomicrurus.*

Adults range between 30-60 cm, with any larger specimens being rare.

In other words these are small snakes.

The tail ends sharp and this is diagnostic for the genera *Sinomicrurus and Funkelapidus.*

Snakes of the genera *Sinomicrurus* and *Funkelapidus* can be separated from the other locally occurring Asian Coral snakes, known often as either the "Long-glanded Coral Snakes" and/or Slender Coral Snakes (Genus *Calliophis*) by several means.

Slowinski et. al. 2001 provided a diagnosis to separate the taxon *japonicus* from the other snakes in the genus *Sinomicrurus* and all others in the genera *Calliophis* and *Hemibungarus.* It is paraphrased here as part of this new genus diagnosis to properly identify and separate the taxon *japonicus.*

The diagnosis exclusive for the taxon *japonicus* is: 13 mid-body scale rows, divided anal, pattern is not characterized by small black spots on the dorsum with two black bands or rings on tail, 7 supralabials, maxillary teeth behind the fangs, temporals 1+1, no uninterrupted pale crossband on back of head.

Another similar (in appearance species) snake from the same general region is the Philippine Coral Snake *Hemibungarus calligaster* (monotypic for that genus, Slowinski et. al. 2001), and it is easily separated by colour pattern.

Its dominant dorsal colour is black, with numerous thin white rings along the body length, an appearance never seen in *Funkelapidus.* In *Hemibungarus* orange is confined to the front, rear or flanks and usually presents as blotches.

Three subspecies of *F. japonicus* have been described. These are:

F. japonicus boettgeri (Fritze, 1894)
F. japonicus japonicus (Günther, 1868)
F. japonicus takarai (Ota, et. al., 1999).

Distribution: This species is endemic to Japan, and is found on the Amami and Okinawa groups of the central Ryukyu Islands (Ota 2010). The total land area of the Ryukyu Islands is 3,090 km², but the area in which this species is distributed is estimated to be 2,631 km².

Conservation: Deforestation is occurring within this species' relatively restricted known range, causing continuing declines in habitat quality on some of the islands. While, based on its island distribution, the species is likely to occur in more than ten locations, the population should be monitored in the event of decline.

An unexpected decline would be most likely in the event of some form of pest species becoming established in the snake's habitat as opposed to direct human impact through collecting, killing or even habitat loss.

It would be prudent for captive populations of the snake to be established to protect the species from an unforeseen natural calamity that may affect wild stocks.

Common name: Japanese Coral Snake.

Etymology: Named in honor of well-known herpetologist and reptile veterinarian, Dr. Richard Funk, who as of March 2012, was aged 67, still in good health and playing with snakes, living and working in Mesa, Arizona, USA.

He is depicted on the front cover of this journal in recognition of his work.

Of note is that he gave expert evidence in a Victorian court tribunal, called VCAT in February 2012. He repeatedly gave evidence as a globally recognised expert witness who had performed over 200 snake devenomizing surgeries (venomoid surgery). His evidence was that Raymond Hoser's venomoids were totally safe, he had free handled them himself and inspected them prior to the hearing and that it was simply not possible for them to regenerate venom as claimed by Hoser's business competitors.

Funk's evidence was backed up by video evidence of the venomoids biting people with no ill effect and various experimental test results, autopsies of snakes that had died some years post surgery and so on.

He also said that all the Hoser snakes were in immaculate health, properly handled and treated.

and that they were all properly treated and handled.

The government side who were both competitors of the Snakebusters reptile education business and regulators of Snakebusters, were using their position as regulator to remove a competitor that they could not match in standard.

They had no one with any expertise whatsoever in venomoid surgery, but ran their case that the Hoser venomoids were a major public hazard, even though Snakebusters were alone in their business arena with a perfect safety record.

The corrupt Judge, named Pamela Jenkins, biased against Hoser from the outset and close associate of Felcity Hampel, now a judge and adversely named in several chapters of the book *Victoria Police Corruption* (Volume 2) (Hoser 1999), later issued two corrupt written judgments making bizarre and totally false claims.

Included was that "Mr Fink", (yes she called him this repeatedly) thought Hoser's venomoids were dangerous and that he ("Fink") would never free handle them (the photo on the cover of this journal taken before the hearing proves the second statement to be a lie).

She then went on to say in writing that "No weight could be given to the evidence of Mr Fink" a point she forcefully repeated in both written judgments (Jenkins 2012a, 2012b).

Instead she relied on an anonymous post on the "Snakegetters" website at: http://www.snakegetters.com/demo/vet/venomoid-faq.html, sponsored by "tongs.com", tendered by Melbourne Zoo reptile keepers (part of the DSE umbrella) to allege that all the Hoser venomoids were a serious public risk and highly dangerous.

That post by an anonymous author claimed that venom glands may regenerate after being removed. However the merit of the claim would be immediately doubted as it was made on a site selling snake tongs, a cruel and brutal device used to handle (and injure) dangerously venomous snakes, the device of which is made redundant if the snakes in question are rendered harmless by venomoid surgery.

In other words, the commercial self-interest in the claims on the site would be obvious to all!

On 9 March 2012, Jenkins summarily shut down the successful Snakebusters business, not only depriving numerous clients of reptile education shows and the like, but also putting Victorians at risk because of the unavailability of alternative reptile educators of the same expertise and standard.

On 26 April 2012, Jenkins repeated her generally false claims in her second written judgment and demanded Raymond Hoser pay $20,000 compensation to the government as punishment for losing the proceedings, even though she had stripped him (myself) of all income and the tribunal (VCAT) is one where the rules are written that each side bears their own costs, making her money demand highly illegal.

For the record, Jenkins has previously been found guilty by the Supreme Court of Victoria for making false statements in a judgment.

The case on the public record was when she attacked a corruption whistleblower, the previous case being where she improperly found solicitor Mark Morgan guilty of contempt of court in September 2007.

The conviction was overturned when the appeal court judges found she had totally misrepresented one or more statements by another judge to twist their meaning to be different to that intended in order to convict Morgan when he shouldn't have been.

Morgan had been a lawyer acting on behalf of people bashed in their own home by corrupt Victorian Police.

Of note in terms of Dr Funk, is that he was forced to wait for the best part of a week in the courthouse foyer in Melbourne, Australia for the best part of a week before he was made to give "evidence". When in the witness box in the court room, the corrupt judge Pamela Jenkins was rude and abusive to Dr. Funk and treated him with hatred and contempt.

In spite of this incredibly harsh treatment, Dr. Funk never complained about his mistreatment and time wasting once!

Species remaining in the genus *Sinomicrurus* Slowinski et. al. 2001.

Sinomicrurus macclellandi (Reinhardt, 1844) (the type species),

Sinomicrurus hatori (Takahashi, 1930),

Sinomicrurus kelloggi (Pope, 1928),

Sinomicrurus sauteri (Steindachner, 1913).

REFERENCES CITED

Campbell, J. A. and Lamar, W. W. 2004. *The Venomous Reptiles of the Western Hemisphere.* Comstock, Ithaca, USA.

Cox, M. J., Van Dijk, P. P., Jarujin, N. and Thirakhupt, K. 1998. *A Photographic Guide to Snakes and Other Reptiles of Peninsular Malaysia, Singapore and Thailand.* Ralph Curtis:144 pp.

Fritze, A. 1894. Die Fauna der Liu-Kiu-Insel Okinawa. *Zool. Jahrb. Syst.* 7:852-926.

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.

Hoser, R. T. 1999. *Victoria Police Corruption* (2 Vols):1536 pp.

Hoser, R. T. 2012. A reclassification of the Rattlesnakes; species formerly exclusively referred to the Genera *Crotalus* and *Sistrurus* and a division of the elapid genus *Micrurus*. *Australasian Journal of Herpetology* 11:2-24.

Jenkins, P. 2012a. Legal judgement, DSE versus Raymond Hoser, 9 March 2012.

Jenkins, P. 2012b. Legal judgement, DSE versus Raymond Hoser, 26 April 2012.

Lawson, R., Slowinski, J. B., Crowther, B. I. and Burbink, F. T. 2005. Phylogeny of the colubroidea (Serpentes): New evidence from the mitochondrial and nuclear genes. *Molecular phylogenetics and evolution* 37:581-601.

Mori, M. 1982. *Japans Schlangen, Vols. 1-3* (80, 102, 123 pp.). Tokyo (Igaku-Shoin Ltd.) [bilingual edition in German and Japanese]

Orlov, N., Ananjeva, A., Ryabov, S. and Rao, D. Q. 2003. Venomous snakes in Southern China. *Reptilia* (GB)(31):22-29.

Ota, H. 2010. *Sinomicrurus japonicus*. In: IUCN 2011. IUCN Red List of Threatened Species. Version 2011.2. (online at: http://www.iucnredlist.org/apps/redlist/details/177491/0).

Ota, H. 2000. Current status of the threatened amphibians and reptiles of Japan. *Popul. Ecol.* 42: 5-9.

Ota, H., Akiko, I. and Jun-Tsong, L. 1999. Systematic review of the Elapid snakes allied to *Hemibungarus japonicus* (Günther, 1868) in the East Asian Islands, with description of a new subspecies from the central Ryukyus. *Journal of Herpetology* 33(4):675-687.

Pope, C. H. 1928. Seven new reptiles from Fukien Province, China. *American Museum Novitates* 320:1-6.

Pope, C. H. 1935. *The Reptiles of China. Turtles, Crocodilians, Snakes, Lizards*. Amer. Mus. Nat. Hist., New York, Nat. Hist. Library:604 pp.

Pyron, R. A., et al. 2010. 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.

Reinhardt, J. T. 1844. Description of a new species of venomous snake, *Elaps macclellandi. Calcutta Journal of Natural History* 4:532-534.

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").

Steindachner, F. 1913. Über zwei neue Schlangenarten aus Formosa. *Anz. Kaiserl. Akad. Wiss. Wien,* Math.-Nat. Ser. 50:218-220.

Stejneger, L. H. 1907. Herpetology of Japan and adjacent territory. *Bull. US Natl. Mus.* 58: xx, 1-577.

Stejneger, L. H. 1910. The batrachians and reptiles of Formosa. *Proc. US Natl. Mus.* 38:91-114.

Wall, F. 1908a. Remarks on some recently acquired snakes. *J. Bombay Nat. Hist. Soc.* 18:778-784.

Takahashi, S. 1930. *Synopsis of the terrestrial snakes of Japan* [in Japanese]. Shunyo-do, Tokyo.

Wall, F. 1908b. Notes on a collection of snakes from the Khasi Hills, Assam. *J. Bombay nat. Hist. Soc.* 18: 312-337.

Whitaker, R. and Ashok, C. 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. N., 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.

Australasian Journal of Herpetology 12:6-8.
Published 30 April 2012.

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

A revision of the Asian Pitvipers, referred to the genus *Cryptelytrops* Cope, 1860, with the creation of a new genus *Adelynhoserea* to accommodate six divergent species (Serpentes:Viperidae:Crotalinae).

Raymond T. Hoser

488 Park Road, Park Orchards, Victoria, 3114, Australia.
***Phone*: +61 3 9812 3322 *Fax*: 9812 3355 *E-mail*: viper007@live.com.au**
Received 24 March 2012, Accepted 2 April 2012, Published 30 April 2012.

ABSTRACT

The Asian Pitvipers, recently placed in the genus genus *Cryptelytrops* Cope, 1860, have long been recognized as a distinct group.

Recently a number of phylogentic studies including Pyron et. al. (2011) and Malhorta et. al. (2011) have confirmed simple observations of morphology to show that within this assemblage of about a dozen described species, six species of these snakes differ significantly from other members of the genus *Cryptelytrops senso lato.*

The type species for the genus *Cryptelytrops* is the morphologically distinct taxa *C. purpureomaculatus*.

This paper formalizes the obvious phylogenetic divergence by placing the six divergent species in a new genus according to the current Zoological Code (Ride et. al. 1999).

Placed in *Adelynhoserea* gen. nov. are the species formerly placed in the genus *Cryptelytrops*, namely *C. cardamomensis, C. Honsonensis, C. kanburiensis*, *C. macrops, C. rubeus* and *C. venustus.*

Keywords: new genus; *Trimeresurus*; *Adelynhoserea*; *Cryptelytrops*; *purpureomaculatus; cardamomensis; honsonensis; kanburiensis; macrops*; *rubeus; venustus*; Viperidae; Crotalinae*;* Hoser; snake; genus; Asia.

INTRODUCTION

The Pitviper genus *Trimeresurus* Lacépède, 1804 *sensu lato* has been subject of intense research in recent years, with numerous new taxa being formally described and proposals made to split the genus as recognized to smaller divisions.

Notable recently published studies on the systematics of these snakes include those of Das and Yaakob (2007), David, et. al. (2006), David, et. al. (2011), Gumprecht (1998), Gumprecht, et. al. (2004), Guo, et. al. (2007), Guo, et. al. (2009), Guo and Wang, (2011), Malhotra and Thorpe (2004), Malhorta, et. al. (2011), McDiarmid, et. al., (1999), Tu et al. (2000) and Zhao and Adler (1993).

Recent divisions within *Trimeresurus senso lato* or re-interpretations of the genus, has resulted in the transfer of species to the following genera: *Garthius* Das and Yaakob, 2007, *Ovophis* Burger, 1981, *Protobothrops* Hoge and Romano-Hoge, 1983, *Sinovipera* Guo and Wang, 2011, *Tropidolaemus* Wagler, 1830, *Triceratolepidophis* Ziegler, et. al., 2000, *Parias* Gray, 1849, *Crypteletrops* Cope, 1860, *Peltopelor* Günther 1864, *Himalayophis* Malhotra and Thorpe, 2004, *Popeia* Malhotra and Thorpe, 2004, *Viridovipera* Malhotra and Thorpe, 2004, *Oxyus* Hoser, 2012 (see below) as well as the retention of a generally monophyletic group within the original *Trimeresurus* Lacépède 1804.

Various other generic names have been proposed for different species within the above group, but have not necessarily come into use for a variety of reasons.

Some of the above cited generic names may even be

questionable under the current and most recently past zoological codes as published by the ICZN.

By way of example, the series of names proposed by Malhorta and Thorpe 2004 (namely *Himalayophis* Malhotra and Thorpe, 2004, *Popeia* Malhotra and Thorpe, 2004 and *Viridovipera* Malhotra and Thorpe, 2004) were not defined in accordance with the current (1999/2000) code (several articles) and therefore unless properly defined since, remain unavailable for the purposes of zoological nomenclature.

It would clearly be prudent for me to properly describe the relevant genus level taxa so that names are in fact "available". However as a matter of correct ethics, I have instead refrained from doing so and herein provide Anita Malhorta the opportunity now to correct the anomaly and retain "naming rights" over the subject genera and to stabilize the nomenclature.

Ceratrimeresurus Liang and Liu, (2003) was synonymised with *Protobothrops* in 2008 (David et. al. 2008). *Ermia* Zhang, 1993 is not an available name for snake taxa (already a genus name for something else) and *Zhaoermia* Gumprecht and Tillack, 2004 was later found to be synonymous with *Protobothrops* (Guo et. al. 2007).

Within the genus *Cryptelytrops* as recently resurrected, there is a distinct division between two main groups.

About half the described species including the type species, *C. purpureomaculatus* are clearly very similar. However six species have been known to be divergent, these being the species formally described as "*Cryptelytrops cardamomensis* Malhorta et. al., 2011*",* "*Cryptelytrops honsonensis* Grismer et al., 2008" "*Trimeresurus kanburiensis* Smith, 1943", "*Trimeresurus macrops* Kramer, 1977", "*Cryptelytrops rubeus* Malhorta et. al., 2011*",* and "*Trimeresurus venustus* Vogel, 1991".

A recent phylogenetic study by Pyron et. al. (2011) also showed sufficient division between the two above groups of snakes to warrant generic distinction.

This follows on from a similar finding in the data of Malhorta and Thorpe (2004), see figs A and B.

Authors of both papers failed to make taxonomic acts in relation to the placement of the divergent species within a different genus.

As no name is currently available for the six divergent species, a new genus, *Adelynhoserea* gen. nov. is created according to the Zoological Code (Ride et. al. 1999) to accommodate the six species.

The recently described species, namely *Cryptelytrops honsonensis* (Grismer et al.

2008) from an island off the coast of southern Vietnam, has been provisionally included within the genus *Adelynhoserea* gen. nov. as described below on the basis of information provided by the authors. The newly described taxon is apparently most closely related to the species *venustus.*

GENUS *ADELYNHOSEREA* GEN. NOV.

Type species: *Trimeresurus macrops* Kramer, 1977.

Diagnosis: Separated from all other Asian Pitviper species which also have the typical "green pitviper" colouration or variation of it (uniform green dorsal colour and a lateral stripe present on the first few dorsal scale rows in one or both sexes), except other species within *Cryptelytrops* as currently defined, by the presence of a fused first supralabial and nasal scale, these being a trait common to both *Cryptelytrops* and *Adelynhoserea* gen. nov.

Adelynhoserea gen. nov. can be distinguished from *Cryptelytrops* primarily by the relatively larger size of the eye (most obvious in adults), the relatively wider supraoculars, and the shape of the head, which is elongate-oval in *Cryptelytrops*, but widens quite abruptly behind the eyes in *Adelynhoserea* gen. nov. to give a characteristically triangular-shaped head.

Distribution: Hilly, rocky parts of Thailand, Laos, Vietnam, Cambodia, including Hon Son Island, Vietnam.

Etymology: Named in honour of my daughter Adelyn Hoser, who has spent the first 13 years of her life teaching many thousands of Australians about snakes and other reptiles.

Unfortunately this has included the shattering of lies and false information being peddled by people who have entered the "reptile industry" in recent years, motivated solely by a desire to make vast amounts of money as fast as possible, with no regard for truth, education or public safety.

These people have been backed by corrupt and dishonest friends in senior positions within Australian wildlife departments, in particular the Victorian Department of Sustainability and Environment (DSE).

These people in their total hatred of truth and decency, have subjected Adelyn Hoser to extreme stress and trauma by having her assaulted and impounded for about an hour when attending school on 10 August 2011 and then on 17 August 2011 dragged her out of bed in her own home at the crack of dawn in an illegal armed raid that went for 9 hours and involved 11 wildlife officers and heavily armed gun-toting police.

These people destroyed Adelyn's possessions and had no remorse for their disgusting mistreatment and abuse of the 13-year-old child.

In reality, Adelyn deserves to have many genera of snakes named in her honor in recognition of the great work she has done in 13 years!

Species within the genus *Adelynhoserea* gen. nov.

Adelynhoserea macrops (Kramer, 1977) (Type species).

Adelynhoserea honsonensis (Grismer et al., 2008)

Adelynhoserea cardamomensis (Malhorta et. al., 2011)

Adelynhoserea kanburiensis (Smith, 1943)

Adelynhoserea rubeus (Malhorta et. al., 2011)

Adelynhoserea venustus (Vogel, 1991)

Species remaining within the genus *Cryptelytrops* Cope, 1860

Cryptelytrops purpureomaculatus (Gray, 1832) (Type species)

Cryptelytrops albolabris (Gray, 1842)

Cryptelytrops cantori (Blyth, 1846)
Cryptelytrops erythrurus (Cantor, 1839)

Cryptelytrops insularis (Kramer, 1977)

Cryptelytrops septentrionalis (Kramer, 1977)

REFERENCES CITED

Das, I. and Yaakob, N. 2007. Status of knowledge of the Malaysian herpetofauna. pp. 31-81 in: L. S. L. Chua, 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.

David, P., Vogel, G., Vijayakumar, S. P. and Vidal, N. 2006. A revision of the *Trimeresurus puniceus*-complex (Serpentes: Viperidae: Crotalinae) based on morphological and molecular data. *Zootaxa* 1293:1-78.

David, P., Tong, H, Vogel, G. and Tian, M. 2008. On the status of the Chinese Pitviper *Ceratrimeresurus shenlii* Liang and Liu in Liang, 2003 (Serpentes:Viperidae), with an addition of *Protobothrops cornutus* (Smith, 1930) to the Chinese snake fauna. *Asiatic Herpetological Research* 11:17-23.

David, P., Vogel, G. and Dubois, A. 2011. On the need to follow rigorously the Rules of the Code for the subsequent designation of a nucleospecies (type species) for a nominal genus which lacked one: the case of the nominal genus *Trimeresurus* Laceìpeìde, 1804 (Reptilia: Squamata: Viperidae). *Zootaxa* 2992:1-51.

Grismer, L. L, Ngo, V. T. and Grismer, J. L. 2008c. A new species of insular pitviper of the genus *Cryptelytrops* (Squamata:Viperidae) from southern Vietnam. *Zootaxa*, 1715:57-68.

Gumprecht, A. 1998. Die Bambusottern der Gattung *Trimeresurus* Lacépède. Teil II: Die Grossaugen-bambusotter

Trimeresurus macrops Kramer, 1977. *Sauria,* 20:25-36.

Gumprecht, A., Tillack, F., Orlov, N. L., Captain, A. and Ryabow, S. 2004. *Asian pitvipers*. Geitje Books, Berlin:368 pp.

Guo, P., Jadin, R. C., Malhotra, A. and Li, C. 2009. An investigation of the cranial evolution of Asian pitvipers (Serpentes: Crotalinae), with comments on the phylogenetic position of *Peltopelor macrolepis*. *Acta Zoologica* 91:402-407.

Guo, P., Malhotra, A., Li, C., Pook, E. and Creer, S. 2007. New evidence on the phylogenetic position of the poorly known Asian pitviper *Protobothrops kaulbacki* (Serpentes: Viperidae: Crotalinae) with a redescription of the species and a revision of the genus *Protobothrops*. *Herpetological Journal* 17:237-246.

Guo, P. and Wang, Y. 2011. A new genus and species of cryptic green pitviper in (Serpentes: Viperidae:Crotalinae) from southwest China. *Zootaxa* 2918:1-14.

Malhotra, A. and Thorpe, R. S. 2004. A phylogeny of four mitochondrial gene regions suggests a revised taxonomy for Asian pitvipers (*Trimeresurus* and *Ovophis*). *Molecular Phylogenetics and Evolution* 32: 83 -100.

Malhorta, A., Roger, S., Thorpe, M. and Stuart, B. L. 2011. Two new species of pitviper of the genus *Cryptelytrops* Cope 1860 (Squamata: Viperidae: Crotalinae) from Southeast Asia. *Zootaxa* 2757:1-23.

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

Oshima, S. 1920. Notes on the venomous snakes from the islands of Formosa and Riu Kiu. *Annu. Report. Inst. Sci. Govt. Formosa*, (ser. 8) 2:1-99.

Pyron, R. A., et. al. 2010. 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.

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").

Tu, M.-C. et al. 2000. Phylogeny, Taxonomy, and Biogeography of the Oriental Pitvipers of the Genus *Trimeresurus* (Reptilia: Viperidae: Crotalinae): A Molecular Perspective. Zoological Science 17:1147-1157.

Vogel, G. 1991. Eine neue *Trimeresurus*-Art aus Thailand, *Trimeresurus venustus* sp. nov. (Reptilia: Serpentes: Crotalidae). *Sauria* 13(1):23-28.

Zhao, E. and Adler, K. 1993. *Herpetology of China*. SSAR, Oxford/Ohio, 1-522.

Australasian Journal of Herpetology

Publishes original research in printed form in relation to reptiles, other fauna and related matters.

It is a peer reviewed printed journal for permenant public scientific record, with a sizeable print run and has a global audience.

Full details at: http://www.herp.net

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

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

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 **12:9-11.**
Published 30 April 2012.

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

A division of the South-east Asian Ratsnake genus *Coelognathus* (Serpentes: Colubridae).

RAYMOND T. HOSER

488 Park Road, Park Orchards, Victoria, 3134, Australia.
***Phone*: +61 3 9812 3322 *Fax*: 9812 3355 *E-mail*: viper007@live.com.au**
Received 10 March 2012, Accepted 8 April 2012, Published 30 April 2012.

ABSTRACT

A number of recent studies of the ratsnake genus *Elaphe sensu lato* have shown it to be a paraphyletic group.

Recent studies published include those of Helfenberger (2001), Utiger et. al. (2002), Utiger et. al. (2005) and Burbin and Lawson (2007).

As a result *Elaphe* has been subdivided into several genera that better reflect that phlogeny of similar species.

Notably and relevant here, is that in 2002, Utiger et. al. resurected the genus *Coelognathus* Fitzinger, 1843 to accommodate five superficially similar Asiatic ratsnakes.

Further studies since then, including that of Pyron et. al. (2011) have shown that this genus contains a genetically diverse assemblage of snakes of deep historic splits in lineage.

As a result the genus is split three-ways.

The type species *radiatus* (*Coluber radiatus* Boie, 1827) remains within the genus *Coelognathus.* The species *helena* (*Coluber helena* Daudin, 1803) is placed in the herein resurected genus *Cynophis* Gray, 1849.

For the remaining three species, namely *erythrurus* (*Plagiodon erythrurus* Duméril, Bibron and Duméril, 1854), *subradiatus* (*Coluber subradiatus* Schlegel, 1837) and *flavolineatus* (*Coluber flavolineatus* Schlegel, 1837) there are no available names.

They are therefore herein placed in a new genus, *Euanedwardsserpens* gen. nov, which is formally named and defined in accordance with the Zoological Code.

Keywords: Taxonomic revision; new genus; species; *Coelognathus*; *Elaphe;* *Euanedwardsserpens*; systematics; Colubrid; ratsnake; *radiatus*; *helena*; *erythrurus*; *subradiatus*; *flavolineatus*.

INTRODUCTION

Ratsnakes have been the subject of taxonomic interest in the period 2000-2012 with several reclassifications being made and most generally accepted.

Better-known studies published include those of Helfenberger (2001), Utiger et. al. (2002), Utiger et. al. (2005) and Burbin and Lawson (2007).

As a result, Eurasian species are now classified within the following genera, *Coelognathus, Elaphe, Euprepiophis, Gonyosoma, Oocatochus, Oreocryptophis, Orthriophis* and *Rhadinophis and Zamenis.*

A recent reclassification by Hoser (2012) has seen the genera *Orthriopsis* Utiger et. al., 2002 and *Zamenis* Wagler, 1830 subdivided.

In terms of the five species within the nominate genus *Zamenis*, *Zamenis* retained the species *Z. longissimus* and *Z. lineata*, the genus *Callopeltis* Fitzinger, 1834 was resurected in accordance with the Zoological code (Ride et. al. 1999) for the species *Z. situla*, while a new genus *Richardwellsus* gen. nov. was formally erected and named to accommodate the species *persica* and *hohenackeri.*

For the four species in the genus *Orthriophis*, *O. taeniurus* and *O. moellendorffi*, remained within that genus, while a new genus *Martinekea* gen. nov. was formally erected and named to accommodate the species *O. cantoris* and *O. hodgsoni.*

While the morphological similarities of ratsnakes has resulted in a tendency to lump them within one or a few relatively large genera, an increasing body of published evidence based on studies and even astute captive observations by hobbyists is revealing even more diversity than imagined even a few decades ago.

Such published studies include the following; Burbin and Lawson (2007), Gohil (1983), Helfenberger (2001), Niehaus and Schultz (1987), Metha (2003), Schultz (1996), Smith (1990), Smith (1993), Somaweera (2004), Staszko and Walls (1994), Wall (1913), Whitaker and Captain (2004), Lawson, et. al. (2005) and others.

Molecular studies including the recent study by Pyron et. al. (2011) have continued to consistently show the deep rooted differences between snakes within both *Elaphe sensu lato* and more relevant here, between the snakes of the genus *Coelognathus* as defined by Utiger et. al. in 2005 and more fully by Helfenberger 2001, these diagnoses for this group of snakes being relied upon for the purposes of this paper.

As inferred in the abstract, the genus as currently understood fits within three broad groups.

The Radiated Ratsnake *Coelognathus radiatus* is quite divergent from the rest as is the Trinket Snake *Coelognathus helena.* Both are sufficiently divergent from one another to be placed in separate genera.

The remaining trio, namely the Yellow-stripe Ratsnake *Coelognathus flavolineatus*, Indonesian Ratsnake *Coelognathus subradiatus* and the Phillippines Ratsnake *Coelognathus erythrurus* are similar in most respects and form a natural group.

I should herein note that the wide-ranging species *subradiatus* is in my view a composite assemblage composing more than one easily defined species-level taxa and in need of urgent taxonomic revision.

As a result of these facts, the above-named snakes are herein arranged as follows.

The type species *radiatus* (*Coluber radiatus* Boie, 1827) remains within the genus *Coelognathus.* The species *helena* (*Coluber helena* Daudin, 1803) is placed in the herein resurected genus *Cynophis* Gray, 1849.

For the remaining three species, namely *erythrurus* (*Plagiodon erythrurus* Duméril, Bibron and Duméril, 1854)*, subradiatus* (*Coluber subradiatus* Schlegel, 1837) and *flavolineatus* (*Coluber flavolineatus* Schlegel, 1837) there are no available genus names.

They are therefore placed in a new genus, *Euanedwardsserpens* gen. nov, which is formally named and defined below.

All ratsnakes in the genus *Coelognathus sensu lato* fit the broad definition of large (usually up to about 2 metres in length), somewhat aggressive, diurnally active ratsnakes with a vertically compressed body. All have an ability to flare the neck with air to a considerable extent as part of their threat display which involves the neck being held off the ground in a characteristic "s-shape" or similar. This enables the neck in particular to flare to (sometimes) more than four times as high as wide and often yields bright coloured skin between the scales.

Snakes typically hold their mouth open when in a threat display.

All are oviparous.

In order to best define the three relevant genera, it is often easiest to do this by identifying the component species, which in effect defines each genus.

GENUS *COELOGNATHUS* FITZINGER, 1843

Helfenberger (2001) separated *Coelognathus* from the other Eurasian ratsnakes based on anatomical and osteological features as well as electrophoretic loci to diagnose that genus *senso lato*, including the genera *Euanedwardsserpens* gen. nov. and *Cynophis* as diagnosed and identified below.

These snakes are medium to large and relatively long and slender, have correspondingly high ventral scale and precaudal vertebra counts and have a distinctly long and slender head, which separates them from all other ratsnake genera except *Orthriophis* which physically appear similar.

However snakes of these two genera are easily separated by viewing the head coloration. In *Orthriophis* the post-orbital stripe runs more-or-less parallel with the jawline, whereas in *Coelognathus* it distinctly points downwards towards the back of the jaw, although this may be either broken, or one of two such lines, the other running in an upward direction, but not parallel to the jawline.

The species *C. radiatus* (now the entire content of this genus as defined herein) is separated from all other Asian ratsnakes (including those of genera *Cyanophis* and *Euanedwardsserpens* gen. nov. by having a short interpulmonary bronchus (see plate 1A-D, Fig 4, Tables 1-2 in Utiger et. al. 2005).

Coelognathus radiatus also differs from the other relevant taxa (*Cyanophis* and *Euanedwardsserpens* gen. nov.) by the possession of a relatively short and stout hemipenis, versus long-slender and subcylindrical (sometimes tapering distally) (particularly) in the snakes of the genus *Euanedwardsserpens* gen. nov..

Snakes of all three genera (*Coelognathus, Cyanophis* and *Euanedwardsserpens* gen.) are also typified by the following traits: no anterior subocular (rarely present in the species *subradiatus*), paravertebral reductions of the dorsal scale rows, single anal plate, the hemipenis bears basal spines, the tracheal lung is either absent or rudimentary and barely vascularized, and the left lung is often absent or small.

GENUS *CYANOPHIS GRAY*, 1849

Snakes of the genera *Coelognathus* and *Euanedwardsserpens* gen. nov. as defined herein always have three supralabials in contact with the eye.

By contrast *Cyanophis helena* does not.

GENUS *EUANEDWARDSSERPENS* GEN. NOV.

Type species: *Coluber flavolineatus* Schlegel, 1837

(Known in most contemporary texts as either *Elaphe flavolineatus* or *Coelognathus flavolineatus*).

Diagnosis: A group large ratsnakes found in the Southeast Asian region, typified by a vertically compressed body and an angled relatively pointed head and snout.

Often defensive (interpreted commonly as "aggressive") to people when encountered and to a greater degree than most other ratsnake genera, with specimens commonly struggling against the handler if handled.

Helfenberger (2001) separated *Coelognathus* from the other Eurasian ratsnakes based on anatomical and osteological features as well as electrophoretic loci and used this to diagnose that genus senso lato, including (in effect) the genera *Euanedwardsserpens* gen. nov. and *Cynophis* in terms of their common attributes.

This information is relied upon herein as part of this diagnosis as relevant.

These snakes are medium to large and relatively long and slender, have correspondingly high ventral scale and precaudal vertebra counts and have a distinctly long and slender head, which separates them from all other ratsnake genera except *Orthriophis*. However these genera are easily separated by

viewing the head colouration. In *Orthriophis* the post-orbital stripe runs more-or-less parallel with the jawline, whereas is *Coelognathus* it distinctly points downwards towards the back of the jaw, although this may be either broken, or one of two such lines, the other running in an upward direction.

If in any doubt, *Orthriophis* is also separated from the genera *Coelognathus, Cyanophis* and *Euanedwardsserpens* gen. by having a divided anal plate as opposed to a single one.

Snakes of the ratsnake genus *Gonyosoma* Wagler, 1828 also have a divided anal.

Separation of the three relevant genera (namely *Coelognathus*, *Cyanophis* and *Euanedwardsserpens* gen. nov.) is done as follows:

The species *Coelognathus radiatus* (now the entire content of that genus as defined herein) is separated from all other Asian ratsnakes (including those of genera *Cyanophis* and *Euanedwardsserpens* gen. nov.) by having a short interpulmonary bronchus (see plate 1A-D, Fig 4, Tables 1-2 in Utiger et. al. 2005).

Snakes of the genera *Coelognathus* and *Euanedwardsserpens* gen. nov. as defined herein always have three supralabials in contact with the eye.

By contrast *Cyanophis helena* does not.

Coelognathus radiatus also differs from the other relevant taxa (*Cyanophis* and *Euanedwardsserpens* gen. nov.) by the possession of a relatively short and stout hemipenis, versus long-slender and subcylindrical (sometimes tapering distally) (particularly) in the snakes of the genus *Euanedwardsserpens* gen. nov..

If the snake does not identify as being within the genera *Coelognathus* or *Cyanophis* it will be in the genus *Euanedwardsserpens* gen. nov.

Common name: Ratsnake.

Etymology: Named in honour of Australian-based herpetologist, Euan Edwards. He has worked behind the scenes for many of the better-known names in contemporary herpetology, often doing the so-called “hard work” for which he may not receive any accolades, but without which, we’d all be far worse off.

SPECIES WITHIN *EUANEDWARDSSERPENS* GEN. NOV.

Euanedwardsserpens flavolineatus (Schlegel, 1837) (Type species).

Common name: Yellow Stripe Ratsnake.

Euanedwardsserpens erythrurus (Duméril, Bibron and Duméril, 1854).

Common name: Phillippines Ratsnake.

Euanedwardsserpens subradiatus (Schlegel, 1837).

Common name: Indonesian Ratsnake.

SPECIES WITHIN *CYANOPHIS GRAY*, 1849.

Cyanophis helena (Daudin, 1803) (Type species).

Common name: Trinket Snake.

SPECIES WITHIN *COELOGNATHUS* FITZINGER, 1843.

Coelognathus radiatus (Boie, 1827) (Type species).

Common name: Radiated Ratsnake.

REFERENCES CITED

Burbrin, F. T. and Lawson, R. 2007. How and when did Old World ratsnakes disperse into the New World? *Molecular Phylogenetics and Evolution* 43(1):173-189.

Gohil, K. K. 1983. An Albino Trinket Snake (*Elaphe helena*). *Hamadryad*, Madras 8(1):14.

Gray, J. E. 1849. Description of three new genera and species of snakes. *Ann. Mag. Nat. Hist.* (2)4:246-248.

Helfenberger, N. 2001. Phylogenetic relationship of Old World Ratsnakes based on visceral organ topography, osteology, and allozyme variation. *Russ. J. Herpetol.* (Suppl.):1-56.

Hoser, R. T. 2012. A taxonomic revision of the colubrinae genera *Zamenis* and *Orthriopsis* with the creation of two new genera (Squamata:Colubridae). *Australasian Journal of Herpetology* 11:59-64.

Lawson, R., Slowinski, J. B., Crowther, B. I. and Burbink, F. T. 2005. Phylogeny of the colubroidea (Serpentes): New evidence from the mitochondrial and nuclear genes. *Molecular phylogenetics and evolution* 37:581-601.

Niehaus, G. and Schultz, K. 1987. Die hinterasiatischen Kletternattern der Gattung Elaphe. Teil XI *Elaphe helena* (Daudin, 1803). *Sauria* 9(4):3-7.

Metha, R. S. 2003. Prey Handling Behaviour of Hatchling *Elaphe helena* (Colubridae). *Herpetologica* 59(4):469-474.

Pyron, R. A., et al. 2010. 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.

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.

Schultz, K. 1996. *A Monograph of the Colubrid Snakes of the Genus Elaphe Fitzinger*. Koeltz Scientific Books:439 pp.

Smith, T. 1990. The Trinket Snake, *Elaphe helena. The Herptile*. 15(1).

Smith, T. 1993. The Captive Care and Breeding of Two Asiatic Ratsnakes. *The Reptilian* (1):2.

Somaweera, R. 2004. Guest Article: Sri Lankan Colubrid Snakes. *Sri Lankan Naturalist* 6(3-4):32-46.

Staszko, R. and Walls, J. G. 1994. *Rat Snakes: A hobbyist’s Guide to* Elaphe *and kin*. TFH Books.

Utiger, U., Helfenberger, N., Schätti, B., Schmidt, K., Ruf, M. and Ziswiler, V. 2002. Molecular systematics and phylogeny of Old and New World Ratsnakes, *Elaphe*, auct. and related genera (Reptilia, Squamata, Colubridae). *Russian Journal of Herpetology* (9)2:105-124.

Utiger, U., Schätti, 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). *Russian Journal of Herpetology* 12(1):39-60.

Wall, F. 1913. A Popular treatise on the common Indian snakes. Part 19. *Coluber helena. J. Bombay nat. hist. Soc.* 22:22-28.

Whitaker, R. and Captain, A. 2004 *Snakes of India: The Field Guide*. Draco books.

Australasian Journal of Herpetology

Publishes original research in printed form in relation to reptiles, other fauna and related matters.

It is a peer reviewed printed journal for permenant public scientific record, with a sizeable print run and has a global audience.

Full details at: http://www.herp.net

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

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

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 **12:12-15.**
Published 30 April 2012.

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

A new genus of Asian Snail-eating Snake (Serpentes:Pareatidae).

RAYMOND T. HOSER

488 Park Road, Park Orchards, Victoria, 3134, Australia.
***Phone*: +61 3 9812 3322 *Fax*: 9812 3355 *E-mail*: viper007@live.com.au**
Received 12 March 2012, Accepted 8 April 2012, Published 30 April 2012.

ABSTRACT

The family Pareatidae as recognized at start 2012, consisted of three widely recognized genera, namely *Aplopeltura* (one species), *Asthenodipsas* (3 species) and *Pareas* (eleven species).

However numerous studies have shown that nine species within *Pareas* are widely divergent of the nominate species and another.

This paper recognizes this divergence by formally creating and naming a new genus *Katrinahoserserpenea* gen. nov. for these species and also assigns a more divergent species to its own subgenus *Dannyleeus* subgen.nov. within this new genus according to the Zoological Code.

Keywords: Taxonomic revision; new genera; genus; species; *Dannyleeus*; *Katrinahoserserpenea; Pareas*; *Xenochrophis*; *Dendrelaphis*; *Boiga*; systematics.

INTRODUCTION

Numerous studies have been completed in terms of the snail eating snakes within the Pareatidae, currently occupying three genera.

At start 2012, these were: *Aplopeltura* (one species), *Asthenodipsas* (3 species) and *Pareas* (eleven species).

However almost without exception the taxonomic studies on these snakes have been mainly preoccupied with delineating species rather than genera.

Alternatively the genera themselves have been scrutinized from the perspective of their positions in higher taxonomic hierarchies at the family level and higher (e.g. Lawson et. al. 2005), rather than whether or not snakes are appropriately placed within given genera which have been previously assigned.

However in the wake of several molecular studies of snakes within these genera, including most notably that of Guo et. al. (2011) it is clear that *Pareas* in particular is paraphyletic.

The molecular results of Guo et. al. (2011) directly reflected the previously recorded morphological differences between the tested taxa, which composed all or most of the Pareatidae.

Table One (page 61) showed the taxa *Pareas carinatus* and *P. nuchalis*, to be more divergent from the rest of *Pareas* than the other two genera within the Pareatidae.

As a result of these results alone it is clear that the genus *Pareas* as recognised in early 2012 needed to be divided.

As *P. carinatus* is the type species for the genus, it is the other eight species that need to be placed in a new genus.

Relevant publications about *Pareas*, which in combination provide further evidence in support of the division of the genus *Pareas* as defined to 2012 include those of Angel (1920), Barbour (1912), Boie (1828), Boulenger (1900), Boulenger (1914), Cantor (1839), Chen et. al. (2006), Cox et. al. (1998), Das et. al. (2009), de Rooij (1917), Dowling and Jenner (1988), Geissler et. al. (2011), Götz (2001), Götz (2002), Grossmann and Tillack (2003), Guo and Xuejiang (2006), Guo and Xuejiang (2009), Guo and Zhao (2004), Guo et. al. (2011), Hu et. al. (1980), Huang (2004), Inger, et. al. (1990), Jan (1866), Malkmus (1996), Malkmus et. al. (2002), Mell (1922), Mell (1931), Mertens (1930), Nguyen et. al. (2009), Ota et. al. (1997), Pauwels et. al. (2003), Pope (1928), Rao (1992), Schlegel (1837), Schmidt and Kunz (2005), Sclater (1891), Smedley (1931), Smith (1943), Stejneger (1910), Stuebing and Inger (1999), Taylor (1965), Van Denburgh (1909), Vogt (1922), Voris (2006), Wagler (1830), Whittaker and Captain (2004) and Zhao and Adler (1993).

GENUS *PAREAS* WAGLER, 1830

Diagnosis: The Oriental Slug Eating Snakes family Pareatidae, were for many years considered a subfamily of the Colubridae (Pareinae), although as long ago as 1956 Alfred Romer

considered them distinct at the family level based on morphology.

Molecular evidence has suggested that this small group of snakes is in fact a lineage distinct from the family Colubridae (Vidal et al. 2007). They are smallish (usually under 600 mm as adults), of moderate to thin build, slightly vertically compressed and have a head distinct from a narrow neck, the snout often being blunt.

Members of the family Pareatidae are unique among Southeast Asian snakes and diagnosed in having large scales overlapping on their chins rather than having them separated by a straight groove. These snakes are known to feed mainly on terrestrial molluscs.

They have short skulls; relatively large eyes; a large nasal gland; have a relatively low number of scales at mid body (13-15 rows); the chin shields have no midline groove, and extend across the chin; they are nocturnal; they feed mostly upon gastropods and small vertebrates; and they lay eggs.

Observations on captive snakes eating snails suggests that they rest the upper jaw on a snail (preferred food) and use the mandibles to pull the snail's body out of its shell. These are thought to represent a basal lineage of the advanced snakes (Caenophidia).

As of early 2012 there were 3 recognized genera and about 15 species currently recognized, all inhabiting Southeast Asia.

Genus *Aplobeltura* is monotypic for the species *A. boa.*

Asthenodipsas consists of three species, namely *A. laevis*, *A. malaccanus* and *A. vertebralis.*

Snakes of the genus *Pareas* as presently recognized consists of about eleven species and are diagnosed by being small and slender with a blunt snout, no mental groove and no teeth on the anterior part of the maxillary.

Snakes in the genera *Aplobeltura* and *Asthenodipsas* are considerably thinner in build and more vertically compressed than seen in *Pareas* as recognized to date.

Pareas is herein now restricted to the species taxa *P. carinatus* and *P. nuchalis* (see the relevant diagnoses below).

Those two species differ from taxa in the genus *Katrinahoserserpenea* gen. nov. by cephalic scalation and distribution pattern.

P. carinatus and *P. nuchlalis* share three anterior temporals in contrast to the one or two (rarely three) anterior temporals in *Katrinahoserserpenea* gen. nov. species.

The frontal scale in *P. carinatus* and *P. nuchalis* is hexagonal with the lateral sides parallel to the body axis; this scale in *Katrinahoserserpenea* gen. nov. is almost diamond-shaped or shield-shaped with the lateral sides converging posteriorly.

The two anterior chin shields are longer than broad in *Katrinahoserserpenea* gen. nov., whereas in *P. carinatus* and *P. nuchlalis* they are broader than long; this is a consistent way to separate the two genera.

The snakes remaining in the genus *Pareas* occur mainly throughout the Indochinese Peninsula and Sunda Islands. By contrast most species of *Katrinahoserserpenea* gen. nov. occur in central and southern China and the northern Indochinese Peninsula, with only two species *Katrinahoserserpenea margaritophorus and K. hamptoni* being found in the southern Indochinese Peninsula.

GENUS *KATRINAHOSERSERPENEA* GEN. NOV.

Type species: *Amblycephalus Boulengeri* Angel, 1920

Diagnosis: Snakes of the genus *Pareas* as presently recognized consists of about eleven species and are diagnosed by being small and slender with a blunt snout, no mental groove and no teeth on the anterior part of the maxillary. This obviously applies to this genus.

Pareas is herein now restricted to the species taxa *P. carinatus* and *P. nuchalis*.

Those two species differ from taxa in the genus *Katrinahoserserpenea* gen. nov. by cephalic scalation and distribution pattern.

P. carinatus and *P. nuchlalis* share three anterior temporals in contrast to the one or two (rarely three) anterior temporals in *Katrinahoserserpenea* gen. nov. species.

The frontal scale in *P. carinatus* and *P. nuchalis* is hexagonal with the lateral sides parallel to the body axis; this scale in *Katrinahoserserpenea* gen. nov. is almost diamond-shaped or shield-shaped with the lateral sides converging posteriorly.

The two anterior chin shields are longer than broad in *Katrinahoserserpenea* gen. nov., whereas in *P. carinatus* and *P. nuchlalis* they are broader than long; this is a consistent way to separate the two genera.

Another consistent way to separate the genera is by the fact that in *Katrinahoserserpenea* gen. nov. there is a pre-frontal that enters they eye, whereas in *P. carinatus* and *P. nuchlalis* there is no prefrontal.

The snakes remaining in the genus *Pareas* occur mainly throughout the Indochinese Peninsula and Sunda Islands. By contrast most species of *Katrinahoserserpenea* gen. nov. occur in central and southern China and the northern Indochinese Peninsula, with only two species *Katrinahoserserpenea margaritophorus and K. hamptoni* being found in the southern Indochinese Peninsula.

Distribution: Asia, with the centre of distribution (most species) being China.

Common name: Asian Snail-eating Snakes.

Etymology: Named in honor of my mother, Katrina Hoser, for services to herpetology over 50 years.

Species within the genus *Katrinahoserserpenea* gen. nov.

Katrinahoserserpenea boulengeri (Angel, 1920) (type species)

Katrinahoserserpenea chinensis (Barbour, 1912)

Katrinahoserserpenea formosensis (Van Denburgh, 1909)

Katrinahoserserpenea hamptoni (Boulenger, 1905)

Katrinahoserserpenea iwasakii (Maki, 1937)

Katrinahoserserpenea margaritophorus (Jan, 1866)

Katrinahoserserpenea monticola (Cantor, 1839)

Katrinahoserserpenea nigriceps Guo and Deng, 2009

Katrinahoserserpenea stanleyi (Boulenger, 1914)

***DANNYLEEUS* SUBGEN. NOV.**

Type species: *Dipsas monticola* Cantor, 1839

Diagnosis: Separated from all other species within the genera *Katrinahoserserpenea* gen. nov. (subgenus *Katrinahoserserpenea* subgen. nov.) and *Pareas* by the following suite of characters: It is of a dark or light-brown dorsal color, many dorsal scales having small black dots forming a transverse line or reticulation, there is a pre-frontal that enters the eye, there's no preocular and the loreal enters the eye, smooth dorsal scales, vertebral enlarged, the fourth upper labial enters the eye, there are more than 190 ventrals, more than 72 subcaudals and a black "X"-shaped mark behind the parietals.

The subgenus is monotypic for the species *Katrinahoserserpenea monticola* (Cantor, 1839).

Distribution: West China, including Tibet to India.

Etymology: Named in honor of Danny Lee of Sydney, Australia, a good friend of mine of many decades and for various services to wildlife and conservation over the period 1977-1997.

***KATRINAHOSERSERPENEA* SUBGEN. NOV.**

Type species: *Amblycephalus Boulengeri* Angel, 1920

Diagnosis: The diagnosis for this subgenus, is effectively a reversal of the diagnosis for the subgenus *Dannyleeus* subgen. nov..

Dannyleeus (the rest of the genus), is separated from all other species within the genera *Katrinahoserserpenea* gen. nov. (subgenus *Katrinahoserserpenea* subgen. nov.) and *Pareas* by the following suite of characters: It is of a dark or light-brown

Hoser 2012 - Australasian Journal of Herpetology 12:12-15.

dorsal color, many dorsal scales having small black dots forming a transverse line or reticulation, there is a pre-frontal that enters the eye, there's no preocular and the loreal enters the eye, smooth dorsal scales, vertebral enlarged, the fourth upper labial enters the eye, there are more than 190 ventrals, more than 72 subcaudals and a black "X"-shaped mark behind the parietals.

In *Katrinahoserserpenea* gen. nov. there is a pre-frontal that enters the eye, whereas in *P. carinatus* and *P. nuchlalis* (the entirety of the genus *Pareas*) there is no prefrontal.

For further differences, see under the diagnosis for *Katrinahoserserpenea* gen. nov. above.

Distribution: Asia, centred in the region of China.

Content: All of the genus *Katrinahoserserpenea*, except the species *Katrinahoserserpenea monticola* (Cantor, 1839).

Etymology: Named in honor of Katrina Hoser (see for the genus *Katrinahoserserpenea* gen. nov.).

SPECIES REMAINING IN THE GENUS *PAREAS* WAGLER 1830.

Pareas carinatus (Boie, 1828) (Type species)

Pareas nuchalis Boulenger, 1900

REFERENCES CITED

Angel, M. F. 1920. Liste de reptiles récémment déterminés et entrés dans les collections et description d'une nouvelle espèce du genre *Amblycephalus*. *Bull. Mus. nation. Hist. nat.*, Paris 1920:112-114.

Barbour, T. 1912. Some Chinese Vertebrates: Amphibia and Reptilia. *Memoirs of the Museum of Comparative Zoölogy* 40(4):125-136.

Boie, H. 1828. Auszüge aus Briefen von Heinr. Boie zu Java an Hn. Schlegel, *Conservator anim. vertebr. am Königl. niederl. Museum.* Isis van Oken, Jena, 21(10):1.025-1.035.

Boulenger, G. A. 1900. Description of new reptiles and batrachians from Bomeo. *Proc. Zool. Soc.* London:182-187.

Boulenger, G. A. 1914. Descriptions of new species of snakes in the collection of the British Museum. *Ann. Mag. Nat. Hist.* (8)14(84):482-485.

Cantor, T. E. 1839. Spicilegium serpentium indicorum [part 1]. *Proc. Zool. Soc.* London 1839:31-34.

Chen, X., Zhu, M., Hou, M., and Qu, W. 2006. A new record of Colubridae family, *Pareas boulengeri*, in Henan Province. *Sichuan Journal of Zoology* 25(2):269. [In Chinese]

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, A., Uttam Saikia, B. H.,Murthy, C. K., Dey, S. and Dutta, S. K. 2009. A herpetofaunal inventory of Barail Wildlife Sanctuary and adjacent regions, Assam, north-eastern India. *Hamadryad* 34(1):117-134.

de Rooij, N. D. 1917. *The Reptiles of the Indo-Australian Archipelago.* II. Ophidia. Leiden (E. J. Brill):xiv + 334 S.

Dowling, H. G., and Jenner, J. V. 1988. *Snakes of Burma: checklist of reported species and bibliography.* Smithsonian Herp. Inf. Serv. (76):19 pp.

Geissler, P., Nguyen, T. Q., Poyarkov, N. A. and Böhme, W. 2011. New records of snakes from Cat Tien National Park, Dong Nai and Lam Dong provinces, southern Vietnam. *Bonn zoological Bulletin* 60(1):9-16.

Grossmann, W. and Tillack, F. 2004. Die Bergschneckennatter Asthenodipsas vertebralis (Boulenger 1900) im Biotop und im Terrarium (Squamata: Colubridae: Pareatinae). *Sauria*, Berlin 26(2):9-22.

Götz, M. 2001. Die Schneckennatter *Pareas carinatus* Wagler 1830 - Terrarienhaltung, Beutefangverhalten und Zucht. *Salamandra* 37(1):49-58.

Götz, M. 2002. The feeding behavior of the snail-eating snake *Pareas carinatus* Wagler 1830 (Squamata: Colubridae). *Amphibia-Reptilia* 23(4):487-493.

Guo, P. and Zhao, E. 2004. *Pareas stanleyi*:A record new to Sichuan, China and a Key to the Chinese Species. *Asiatic Herpetological Research* 10:280-281.

Guo, K. and Deng, X. 2006. A new record of Colubridae family, *Pareas boulengeri*, in Hunan Province. *Sichuan Journal of Zoology* 25(2):270.

Guo, K. and Deng, X. 2009. A new species of *Pareas* (Serpentes: Colubridae: Pareatinae) from the Gaoligong Mountains, southwestern China. *Zootaxa* 2008:53-60.

Guo, Y., Yunke, W., Shunping, H., Haito, S. and Zhao, E. 2011. Systematics and molecular phylogenetics of Asian snail-eating snakes (Pareatidae). *Zootaxa* 3001:57-64.

Hu, B., Met-Hua, H., Zhan-Tai X., Zhao, E., Jing, Y., Huang, Q. and Zong, Y. 1980. Atlas of Chinese Snakes [in Chinese]. Shanghai Press Sci. Technol., Shanghai:166 pages

Huang, Q. 2004. *Pareas chinensis* (Babour, 1912) should be a junior synonym of *Pareas formosensis* (Van Denburgh, 1909). *Sichuan Journal of Zoology* 23(3):209-210.

Inger, R. F., Zhao, E., Bradley, S. H. and Guanfu, W. 1990. Report on a collection of amphibians and reptiles from Sichuan, China. *Fieldiana:Zoology* (58):i-iii:1-24.

Jan, G. 1866. in: Bocourt, F., Notes sur les reptiles. les batraciens et les poissons recueillis pendant un voyage dans le Royaume de Siam. *Nouv. Arch. Mus. nat. Hist.*. Paris. 2(2):4-20.

Lawson, R., Slowinski, J. B., Crowther, B. I. and Burbink, F. T. 2005. Phylogeny of the colubroidea (Serpentes): New evidence from the mitochondrial and nuclear genes. *Molecular phylogenetics and evolution* 37:581-601.

Malkmus, R. and Sauer, H. 1996. Ruhestellung von *Pareas nuchalis* und Erstnachweis dieser Art im Nationalpark Mount Kinabalu/Malaysia. *Salamandra* 32(1):55-58.

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.

Mell, R. 1922. Beiträge zur Fauna Sinica. i. Die Vertebraten Südchinas; Feldlisten und Feldnoten der Säuger, Vögel, Reptilien, Batrachier. *Archiv für Naturgeschichte* 88(10):1-134.

Mell, R. 1931. List of Chinese snakes. *Lingnan Sci. Jour.,* Canton, 8[1929]:199-219.

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.

Nguyen, V. S., Ho, T. C. and Nguyen, Q. T. 2009. *Herpetofauna of Vietnam.* Chimaira, Frankfurt:768 pp.

Ota, H., Lin, J. T., Hirata, T. and Chen, S. L. 1997. Systematic review of Colubrid snakes of the genus *Pareas* in the East Asian islands. *Journal of Herpetology* 31(1):79-87.

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.

Pope, C. H. 1928. Four new snakes and a new lizard from South China. *American Museum Novitates* 325:1-4.

Pyron, R. A., et al. 2011. The phylogeny of advanced snakes (Colubroidea), with discovery of a new subfamily and comparison of support methods for likelihood trees. *Mol. Phylogenet. Evol.* 58:349-342.

Rao, D. Q. and Yang, D. T. 1992. Phylogenetic systematics of Pareinae (Serpents) of southeastern Asia and adjacent islands with relationship between it and the geology changes. [In Chinese, English summary]. *Acta zool. Sinica*, 38(2):139-150.

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").

Romer, A. S. 1956. *Osteology of the Reptiles*, University of Chicago Press:1-772.

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, D. and Kunz, K. 2005. *Ernährung von Schlangen.* Natur und Tier Verlag, Münster:159 pp.

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.

Smedley, N. 1931. Notes on some Malaysian snakes. *Bull. Raffl. Mus.* (5):49-54.

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.

Song, M. 1987. Survey of the reptiles of southern Shaanxi. *Acta Herpetologica Sinica* 6(1):59-64.

Stejneger, L. 1910. The batrachians and reptiles of Formosa. *Proc. US Natl. Mus.* 38:91-114.

Stuebing, R. B. and Inger, R. F. 1999. *A Field Guide to the Snakes of Borneo.* Natural History Publications (Borneo), Kota Kinabalu, Malaysia. viii + 254 pp.

Taylor, E. H. 1965. The serpents of Thailand and adjacent waters. *Univ. Kansas Sci. Bull.* 45(9):609-1096.

Van Denburgh, J. 1909. New and previously unrecorded species of reptiles and amphibians from the island of Formosa. *Proc. Cal. Acad. Sci.* (4)3 (3):49-56.

Vidal, N., Delmas, A. S., David, P., Cruaud, C., Couloux, A. and Hedges, S. B. 2007. The phylogeny and classification of caenophidian snakes inferred from seven nuclear protein-coding genes <http://evo.bio.psu.edu/hedgeslab/Publications/PDF-files/185.pdf>. Comptes Rendus Biologies 330:182-187.

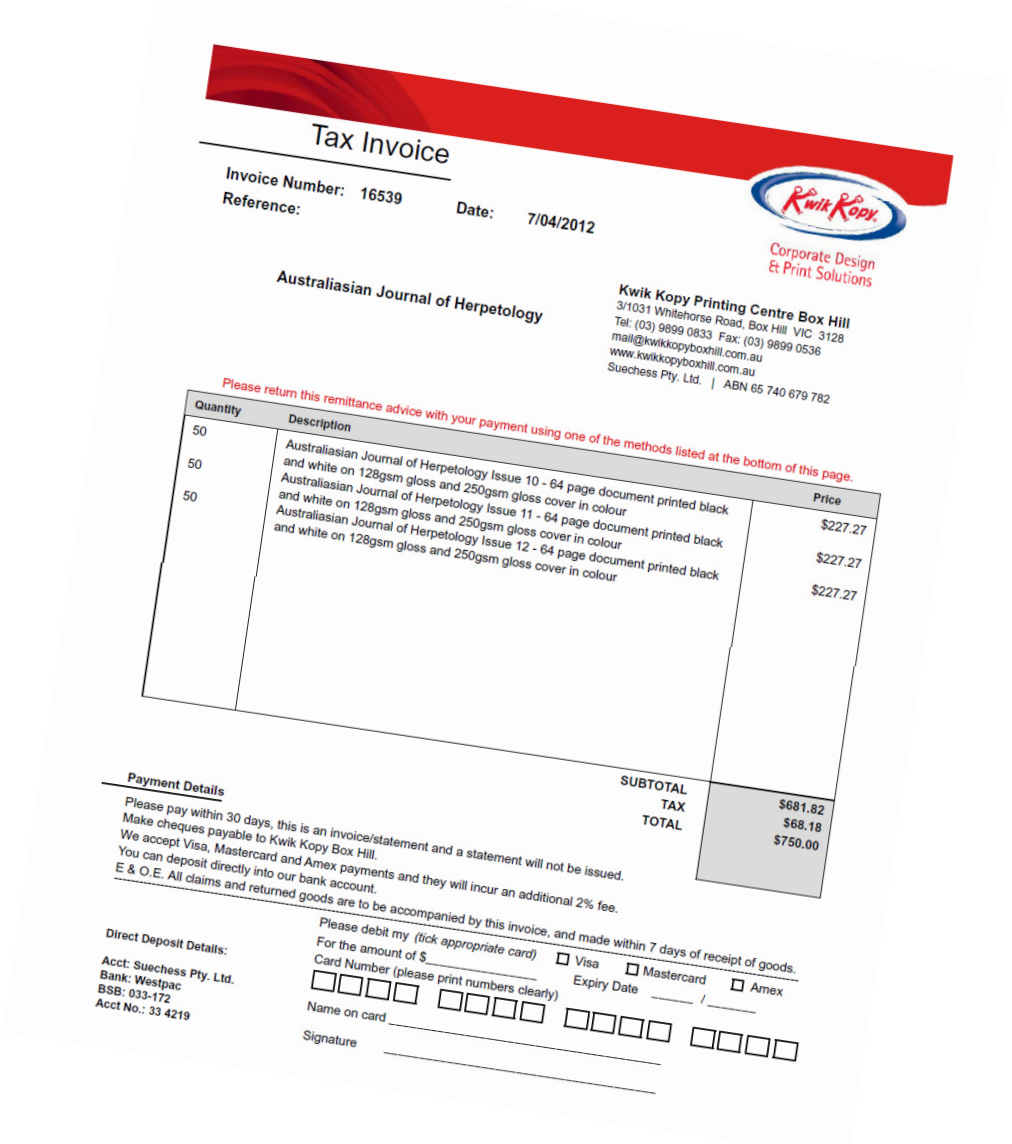
Vogt, T. 1922. Zur Reptilien- und Amphibienfauna Südchinas. *Archiv für Naturgeschichte* 88A(10):135-146.

Voris, H. K. 2006. Assessment of Biodiversity among Southeast Asian Amphibians and Reptiles. *The Natural History Journal of Chulalongkorn University* 6(1):1-10.

Wagler, J. G. 1830. *Natürliches System der Amphibien, mit vorangehender Classification der Säugetiere und Vögel. Ein Beitrag zur vergleichenden Zoologie.* 1.0. Cotta, München, Stuttgart, and Tübingen:354 pp.

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.



Tax Invoice

Invoice Number: 16539
Reference:

Date: 7/04/2012

Kwik Kopy Corporate Design & Print Solutions

Australiasian Journal of Herpetology

Kwik Kopy Printing Centre Box Hill
3/1031 Whitehorse Road, Box Hill VIC 3128
Tel: (03) 9899 0833 Fax: (03) 9899 0536
mail@kwikkopyboxhill.com.au
www.kwikkopyboxhill.com.au
Suechess Pty. Ltd. | ABN 65 740 679 782

Please return this remittance advice with your payment using one of the methods listed at the bottom of this page.

Quantity	Description	Price
50	Australiasian Journal of Herpetology Issue 10 - 64 page document printed black and white on 128gsm gloss and 250gsm gloss cover in colour	$227.27
50	Australiasian Journal of Herpetology Issue 11 - 64 page document printed black and white on 128gsm gloss and 250gsm gloss cover in colour	$227.27
50	Australiasian Journal of Herpetology Issue 12 - 64 page document printed black and white on 128gsm gloss and 250gsm gloss cover in colour	$227.27

SUBTOTAL $681.82
TAX $68.18
TOTAL $750.00

Payment Details

Please pay within 30 days, this is an invoice/statement and a statement will not be issued.
Make cheques payable to Kwik Kopy Box Hill.
We accept Visa, Mastercard and Amex payments and they will incur an additional 2% fee.
You can deposit directly into our bank account.
E & O.E. All claims and returned goods are to be accompanied by this invoice, and made within 7 days of receipt of goods.

Direct Deposit Details:
Acct: Suechess Pty. Ltd.
Bank: Westpac
BSB: 033-172
Acct No.: 33 4219

Please debit my (tick appropriate card) ☐ Visa ☐ Mastercard ☐ Amex
For the amount of $_____ Expiry Date ____ / ____
Card Number (please print numbers clearly) ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐
Name on card _____
Signature _____

Hoser 2012 - Australasian Journal of Herpetology 12:12-15.

Australasian Journal of Herpetology 12:16-17.
Published 30 April 2012.

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

The dissolution of the genus *Rhadinophis* Vogt, 1922 (Serpentes:Colubrinae).

RAYMOND T. HOSER

488 Park Road, Park Orchards, Victoria, 3134, Australia.
***Phone*: +61 3 9812 3322 *Fax*: 9812 3355 *E-mail*: viper007@live.com.au**
Received 14 March 2012, Accepted 10 April 2012, Published 30 April 2012.

ABSTRACT

The genus *Rhadinophis* Vogt, 1922 as currently recognized consists of two species, namely *R. frenatus* Gray, 1853 and *R. prasinus* Blyth, 1854.

As a result of recent molecular studies showing that the two species are not closely related, the genus is split two ways. The new genus for the species *prasinus* is the monotypic genus *Katrinahoserea* gen. nov. named and diagnosed according to the Zoological Code. The species *frenatus* is moved into the existing genus *Rhynchophis* Mocquard, 1897 for reasons explained within this paper.

Keywords: Taxonomic revision; new genus; *Rhadinophis*; genus; species; *Rhynchophis*; *Katrinahoserea;* snake; colubrid.

INTRODUCTION

The green colored snakes of the genus *Rhadinophis* Vogt, 1922 as currently recognized consists of two south-east Asian species, namely *R. frenatus* Gray, 1853 and *R. prasinus* Blyth, 1854.

Due to their bright color they are of interest to herpetologists. However their extremely thin build and delicate nature and apparent need for a humid cage environment has led to few being bred in captivity.

Added to this is the underlying fact that they occur in regions largely inaccessible to Westerners until recent years, so not many of them have filtered into the pet trade.

Morphologically, both species of *Rhadinophis* as defined to date are similar in size, shape and color and so it made sense that they were classified into the same genus.

The two species within *Rhadinophis* had been placed in other genera previously, but as phylogenetic studies have been done, these genera have been fragmented, leading to the current situation and the placement of the pair in Vogt's genus *Rhadinophis.*

A third species of similar color and build, but with a unicorn-like horn on the snout, *Rhynchophis boulengeri* Mocquard, 1897 was placed in its own monotypic genus when described, no doubt on account of its unique proboscis.

The undeniable physical similarities between this species and the species *Rhadinophis frenatus* was obviously overlooked at the time and until recently.

As part of a global study into the molecular phylogeny of the advanced snakes, Pyron et. al. (2011) compared mtDNA from most known genera of snake, including the three taxa relevant to this paper, which also happened to constitute the total species count for the two genera.

The results clearly showed all three species clustering as a broadly monophyletic group.

However the results showed *Rhadinophis frenatum* and *Rhynchophis boulengeri* together as a related pair, while *Rhadinophis prasinus* was sufficiently divergent to warrant being placed in a separate monotypic genus.

A revisiting of the morphology of the three snakes confirms the molecular position, most easily seen by comparing the heads and head scalation of the three.

The type species for the genus *Rhadinophis* was *Rhadinophis melli* Vogt, 1922, the species being the same taxon as *Herpetrodryas frenatus* Gray, 1853, giving the currently recognized position for the taxon.

Because the molecular studies by Pyron et. al. (2011) have confirmed that this species should be placed in the same genus as *Rhynchophis boulengeri* Mocquard, 1897, the genus name *Rhynchophis* having date priority over *Rhadinophis*, this means that *Rhadinophis* is subsumed into this genus as a junior synonym.

As a result, *R. prasinus* is in a new and separate monotypic genus for which there is no available name.

Therefore in this paper I formally name and define the new genus for this taxon according to the Zoological Code. The species *prasinus* is herein placed within the monotypic genus *Katrinahoserea* gen. nov..

The species *Rhynchophis boulengeri* Mocquard, 1897 is relatively unknown in terms of published studies and the like, but

some important publications on the taxon include, Brachtel (1998), Orlov et. al. (1999), Mocquard (1897) and Schultz and Schultz (2011) as well as several good accounts in major regional field guide books published.

Important publications on the two species formerly placed in the genus *Rhadinophis* include Boulenger (1894), Blyth (1855), Gray (1853), Grossmann (2002), Mao et. al. (2003), Pauwels et. al. (2006), Schulz (1996), Schulz and Grossman (2000), Schulz et. al. (2011) and Utiger, et. al. (2005).

GENUS *RHYNCHOPHIS* MOCQUARD, 1897

Type species: *Rhynchophis boulengeri* Mocquard, 1897

Diagnosis: The Rhinoceros Ratsnake (*Rhynchophis boulengeri*) formerly monotypic for the genus *Rhynchophis*, is also known as the Rhinoceros Snake, Rhino Rat Snake, Vietnamese Longnose Snake and Green Unicorn.

It is found from Northern Vietnam to Southern China, has a prominent, distinctive, scaled protrusion on the front of its snout which has led to its common naming after mythical unicorns and some species of rhinoceros which feature a single horn on the front of their snouts. This species of ratsnake is named for Belgian-British biologist George Boulenger.

Rhinoceros Ratsnakes inhabit subtropical rainforests at elevations between 300 and 1100 m, particularly valleys with streams. They are generally arboreal and mostly move at night, hunting small rodents, birds and other vertebrates.

Oviparous, the mating season is from April to May.

5 to 10 eggs in a clutch are recorded. Hatchlings usually measure 30-35 cm total length.

Their color is brownish grey with dark edges on several dorsal scales. As they mature Rhinoceros Ratsnakes change color to steel grey at about 12-14 months, then to a bluish green or green adult hue at about 24 months. However, some individuals maintain their steel grey subadult color and do not pass into the ordinary mature color phase.

The snout alone on the species *Rhynchophis boulengeri* was sufficient to define the previously monotypic genus until now.

However, the taxon *frenatum* has been shown to be closely related via molecular studies and so it is added to the diagnosis herein for the genus. As for *R. boulengeri* this taxon is extremely thin in build and has a head of similar shape, save for the horn-like protrusion on the snout which it lacks.

Separating this taxon (and *R. boulengeri*) from its former cogener *prasinus*, now placed in the genus *Katrinahoserea* gen. nov. is the coloration of the head and neck.

Both *boulengeri* and *frenatum* are characterized by a black line that starts just past the nostril, is thin as it runs into the eye, runs through the eye itself fairly thick and then behind the eye runs as a thick black line from half to a third of the width of the temporal scales as it runs along them and into the first two or three scales past the temporal scales before the line ends.

Beneath this line the color of the labials is far lighter than the color above the line and on top of the head.

By contrast in *Katrinahoserea* gen. nov. there are no black temporal stripes or other separation of the top part of the head from the bottom.

While the labials are lighter than the top of the head in *Katrinahoserea* gen. nov., there is no line separation and the contrast is nowhere near as great as in *Rhynchophis*.

The body of both species of *Rhynchophis* is characterized by prominent black flecks either on the scales or interstitial skin, a condition not seen or as prominent in *Katrinahoserea* gen. nov..

GENUS *KATRINAHOSEREA* GEN. NOV.

Type species: *Coluber prasinus* Blyth 1854

Diagnosis: This monotypic genus would normally be identified as similar to snakes within the former genus *Rhadinophis* or currently recognized genus *Rhynchophis*, either as diagnosed herein or earlier.

The genus *Katrinahoserea* gen. nov. is separated from the other closely related genera by a lack of a horn on the snout, and/or the lack of a dark stripe running down each side of the head from just past the nostril to the back of the head and onto the neck, including through the eye.

The genus *Katrinahoserea* gen. nov. is further separated from the genus *Rhynchophis* by the considerably shorter and more blunt snout region, easily seen by comparing the scalation between the nostrils and the eye.

In *Rhynchophis* these scales are huge and the scale between the nasal and the pre-ocular (the prefrontal) is massive and considerably wider (from the side) than the preocular and much bigger than it. By contrast in *Katrinahoserea* gen. nov. the same scale is the same width as the preocular, but considerably smaller than it.

Katrinahoserea lacks the dark pigment or intertstitial skin seen in *Rhynchophis* on most or all of its body or if present, it is nowhere near as intense or prominent as in the genus *Rhynchophis*.

Distribution: From eastern India and Bangladesh, eastward to southern China and countries between these points.

Common names: Green Trinket Snake, Green Bush Rat Snake and Green Ratsnake.

Etymology: Named in honor of my mother, Katrina Hoser, for services to herpetology over 50 years.

REFERENCES CITED

Blyth, E. 1855. Notices and descriptions of various reptiles, new or little known [part 2]. *J. Asiatic Soc. Bengal*, Calcutta, 23(3):287-302. [1854]

Boulenger, G. A. 1894. *Catalogue of the Snakes in the British Museum (Natural History). Volume II., Containing the Conclusion of the Colubridæ Aglyphæ.* Brit. Mus. (Nat. Hist.), Lond.:382 pp.

Brachtel, N. 1998. Das Portrait: *Rhynchophis boulengeri* Mocquard. *Sauria*, Berlin, 20(1):2.

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.

Grossmann, W. 2002. *Elaphe prasina* (Blyth). *Sauria* (Suppl.) 24(3):573-576.

Mao, J. J., Chu, H. P., Chen, U. C. and Yeh, K. C. 2003. The First Description of *Elaphe frenata* Gray, 1853 (Colubridae; Squamata) from Taiwan. *Coll. and Res*. 16:1-6.

Mocquard, F. 1897. Notes herpétologiques. *Bull. Mus. Hist. Nat., Paris*, [ser. 1], 3(6):211-217.

Orlov, N., Ryabov, S. and Schulz, K. D., 1999. Eine seltene Natter aus Nordvietnam, *Rhynchophis boulengeri* Mocquard, 1897 (Squamata: Serpentes: *Colubridae*). *Sauria*, Berlin, 1:3-8.

Pauwels, O. S. G., Dorz, B. and Vogel, G. 2006. *Elaphe prasina* (Blyth 1854) in Thailand. *Elaphe* 14(4):62.

Pyron, R. A., et al. 2011. The phylogeny of advanced snakes (Colubroidea), with discovery of a new subfamily and comparison of support methods for likelihood trees. *Mol. Phylogenet. Evol*. 58:349-342.

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").

Schulz, K. D. 1996. *Eine Monographie der Schlangengattung Elaphe Fitzinger.* Bushmaster, Berg (CH):460 pp.

Schulz, K. D. and Grossmann, W. 2000. Pflege und Zucht von *Elaphe prasina* (Blyth 1854). *Sauria* 22(2):31-36.

Schulz, B. and Schulz, K. D. 2011. Zur Kenntnis, Pflege und Zucht der Vietnamesischen Langnasennatter, *Rhynchophis boulengeri* Mocquard, 1897. *Reptilia* 87.

Schulz, K. D., Böhme, W. and Tillack, F. 2011. Hemipenis Morphology of *Coronella Bella* Stanley, 1917 with Comments on Taxonomic and Nomenclatural Issues of Ratsnakes (Squamata: Colubridae: Colubrinae: Elaphe Auct.). *Russian Journal of Herpetology* 18(4):273-283.

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.

Australasian Journal of Herpetology **12:18-22.**
Published 30 April 2012.

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

Three new species of *Stegonotus* from New Guinea (Serpentes: Colubridae).

RAYMOND T. HOSER

488 Park Road, Park Orchards, Victoria, 3134, Australia.
***Phone*: +61 3 9812 3322 *Fax*: 9812 3355 *E-mail*: viper007@live.com.au**
Received 12 March 2012, Accepted 10 April 2012, Published 30 April 2012.

ABSTRACT

The genus *Stegonotus* Duméril, Bibron and Duméril, 1854 is a genus consisting of ten currently described morphologically similar snakes.

Generally known as Ground Snakes, their greatest diversity is within the islands north of Australia, including New Guinea and islands to the west. They only occur in this general region, including Indonesia and northern Australia.

As a group, they have been taxonomically neglected, with obviously undescribed species on one or more islands including Timor.

Only one species within the genus has been formally named in over 80 years. That was *Stegonotus borneensis* Inger, 1967.

This paper revisits the data of McDowell (1972 and 1984) in the light of recent developments in taxonomy to conclude that he presented compelling evidence in favour of describing three regional populations of *Stegonotus* as new species.

The new taxa, all from New Guinea are herein described and named according to the Zoological Code as *Stegonotus adelynhoserae* sp. nov., *Stegonotus lenhoseri* sp. nov. and *Stegonotus sammacdowelli* sp. nov.

Keywords: Taxonomy; nomenclature; new species; ground snakes; Colubridae, *Stegonotus*; *lenhoseri*; *sammacdowelli*, *adelynhoserae.*

INTRODUCTION

The genus *Stegonotus* consists of small to medium-sized inornate colored snakes that are generally crepuscular to nocturnal in habits.

Known as “Ground Snakes”, or within Australia as “Slatey-Grey Snakes” in reflection of their local color, they do not attract the attention of lay people or herpetologists in the way that bigger, brighter or more dangerous snakes do.

Most species were described in the 1900’s at a time when the first major herpetological collecting expeditions went to the Moluccas, elsewhere in Indonesia and New Guinea.

Some species were described several times, as in there are synonyms available for the same species.

For many years there was a general confusion in terms of identifying given species due to their overall physical similarities and the use of highly variable diagnostic characters to try to identify them.

Other than two species described early in the 20th century, the only newly named taxa in the second half of the 20th century was a species from Borneo, described by Inger in 1967, namely *Stegonotus borneensis*.

McDowell (1972 and 1984), published two excellent papers resolving differences between the several taxa known to inhabit New Guinea, assigning them all to then described species forms.

However in defining locally occurring “variants” of given species he identified numerous characters that separated these forms from the nominate races.

Since his 1984 paper was published, there have been numerous more recent papers dividing New Guinea “species” up, usually in a north/south manner with those found north of the central cordillera being separated from those to the south.

In 1998, and relying solely on morphological data, Hoser divided New Guinea Death Adders (genus *Acanthophis*) four ways, most

notably naming as separate species forms found north and south of the central cordillera (the northern one named for the first time), the two others being a recent immigrant from the Australian side (around Merauke in Irian Jaya) and another east of the Sepik River Valley.

In 2000 Hoser again relied solely upon morphological data to subdivide the (then) species *Leiopython albertisi*, naming the southern species as *Leiopython hoserae* Hoser 2000.

Hoser (2000) deferred doing the same with the Amethystine Pythons (*Australiasis*) in favor of a paper planned to be published by Harvey et. al. that was to formally name these snakes.

Relying on mtDNA and morphology Harvey et. al. (2000) subdivided the Amethystine Pythons as Hoser (1998, and 2000) had done with the other taxa, again indicating that those from south of the central cordillera were a different species to those from the north and that any connections between the populations was in recent geological history.

Also of relevance here is that these authors separated populations of phenotypically similar snakes as different species (which they named) from islands west of New Guinea, naming for the first time three new species of python.

They identified the northern New Guinea species, the Bar-necked scrub Python as being different from those south of the central cordillera, but failed to formally name it. Hoser (2012) formally named this taxon as *Australiasis funki.*

Harvey et. al. (2000) were among the first in terms of herpetological papers to try to explain their results in geological terms with some detail (pages 170-171), addressing issues such as sea level changes and the formation of the various land barriers.

Also relevant in terms of this paper and earlier results published McDowell in 1972 and 1984 in terms of *Stegonotus*, Harvey et. al. (2000) found that the southern species were able to invade the north from the south-east sector of island New Guinea in recent geological times.

In 2003, 2004 and 2008, Leslie Rawlings and others published a series of papers detailing the phylogeny of the pythons, in particular those of New Guinea, again attempting to explain their results in terms of the geological history of the region.

Of note they found that the populations of the Green Pythons (*Chondropython*) from north of the central cordillera were a different species to those of the south.

In response to these findings Hoser (2009 and 2012) formally resurrected the species name *azureus* Meyer, 1874 for the northern taxon.

In 2008, Schleip provided corroboration, via results of DNA analysis for the separation by Hoser in 2000 of southern New Guinea *Leiopython* from those of the north, in terms of naming the former as a new and separate species.

For the record I should note that in the same paper, Schleip failed to provide a shred of DNA evidence to support his erection in the same paper of three new (alleged) *Leiopython* species within a very small geographical part of northern New Guinea, where no known barriers exist, all of which were effectively indistinguishable "Brown" *Leiopython albertisi* which he separated by using overlapping and variable scalation characteristics. As a result, none of his "species" have been recognized generally, except by way of the many aliases he posts under on internet forums and the like (see Hoser 2012 for details).

In 1972 and 1984, Samuel McDowell published two papers detailing New Guinea *Stegonotus.*

Within those papers he clearly showed differences between taxa within what was then identified as given single species.

The morphological differences between said snakes ran exactly as mirror images to the divisions as already noted in the relevant python papers above, clearly indicating that the barriers that separated the elapids and the pythons had also acted to separate populations and species of *Stegonotus*.

In the case of what McDowell identified as *Stegonotus modestus*, the two known and very distinctive populations corresponded with that of two species of *Australiasis* identified by Harvey et. al. (2000), one being on the New Guinea mainland (now known as *A. funki* Hoser 2012) and the other on Islands to the west (*A. clastolepis* Harvey et. al. 2000).

It should be noted that Harvey et. al. (2000), used the genus name *Morelia*, to describe their snakes, but the use of *Australiasis* Wells and Wellington, 1983 as the correct name for the group of snakes was effectively validated, as used by Hoser (2000) with the mtDNA data on the relevant pythons provided by Rawlings et. al. (2008).

In the case of what McDowell identified as the northern and southern forms of *Stegonotus diehli*, these two forms and populations mirrored the results identified for both *Leiopython* as identified by Hoser (2000), confirmed by Schleip (2008) as well as even more exactly those for the Amethystine Pythons as detailed by Harvey et. al. (2000).

In terms of the latter, the zone where southern *Australiasis* meets northern ones seemed to be east of the Sepik River (see p. 157 Harvey et. al. 2000), which is much the same as for the two species identified by McDowell as *S. diehli.*

Hence in the case of the two pairs of clearly identified taxa that display consistent morphological differences in known distributional regions as indicated by McDowell (1972 and 1984) and again in this paper, there can be no doubt that the species described are valid by any recent and reasonable interpretation of the term.

In the case of the third species described within this paper, it was described by McDowell (1972) as a species with affinities to *Stegonotus parvus* and on page 18 of his paper he did in effect publish a description of the taxon as a new species, minus the formalities, hence it remained an unnamed taxon.

The speciation of the *Stegonotus* in that case occurred in a relatively isolated island region known for endemism, including within the genera *Leiopython* and *Bothrochilus*. It is confirmed via the unique hemipenal morphology, noting here that hemipenal morphology is a conservative and useful character for differentiating snake taxa.

Of relevance here also is that in 2004, Hoser formally named several pythons that had been divided or separated by rising seas at some point in the geological past.

In terms of this third taxon, McDowell's important work is recognized and it is named in his honor.

That *Stegonotus* has been a neglected genus in terms of taxonomy is clearly obvious in that none of the three taxa named herein for the first time have been named prior.

This is said noting that all have been clearly identified in the literature for decades and left formally unnamed.

Another example of the general disinterest in the taxonomy of the genus at all levels is seen in the omission of specimens from the genus in the global survey of most snake genera around the world in the major study published by Pyron et. al. in 2011. The closest they came to assessing the phylogeny of this genus in terms of the higher taxonomy of snakes was to look at two species within the similar and closely related genus *Dinodon* Duméril, 1853.

Below I provide a brief diagnosis of the genus *Stegonotus*, followed by the formal descriptions of the three newly identified species.

GENUS *STEGONOTUS* DUMÉRIL, BIBRON AND DUMÉRIL, 1854

Diagnosis: These are a group of generally dark colored terrestrial snakes found in parts of Indo-Malaysia through to northern Australia and islands to the north. They are of moderate build, head distinct from the neck and the eye is small

to moderate and somewhat protruding and with a round pupil. They are non-venomous, solid-toothed, small to medium in size with smooth scales, usually about 15-17 dorsal mid-body rows, and a loreal scale is present.

As a rule these snakes are crepuscular to nocturnal.

A list of currently recognized species within the genus is provided after the descriptions of three new species. Other taxa have been described, but have been relegated to synonymy with those named (e.g. Bleeker, 1860). As mentioned earlier, there are one or more other undescribed species within the genus.

Important publications on the genus include, Boulenger (1893, 1895), Daan and Hillenius (1966), Das and Yaakob (2007), de Rooij (1917), Dubey et. al. (2008), Forcart (1953, 1954), Gaulke (2010), Günther (1865, 1872), How and Kitchner (1997), Inger (1967), Iskandar and Erdelen (2006), Lanza (1999), Lindholm (1905), Longman (1913), Macleay (1877, 1884), Malkmus (2005), Malkmus et. al. (2002), Manthey and Grossmann (1997), Mertens (1930), Meyer (1874), Peters (1861), Read (1998), Schlegel (1837), Trembath and Lloyd (2005) and Werner (1899).

***STEGONOTUS MACDOWELLI* SP. NOV.**

Holotype: A male specimen in the British Museum, specimen number: 98.3.3.23 from Gazelle Peninsula, northeastern New Britain, Papua New Guinea, at 4°36'S 152°00'E?.

The relevant Museum is a government owned public facility that allows researchers access to their collections and the holotype specimen is already lodged with and belongs to this facility.

Paratypes: A female specimen in the American Museum of Natural History (AMNH) specimen number: 82316 from Iambon (1,500 feet), Whiteman Range, New Britain, Papua New Guinea.

Second paratype is a female specimen in the British Museum, specimen number: 77.2.24.20 from the Duke of York Island, New Britain District, New Guinea.

The relevant Museums are government owned public facilities that allows researchers access to their collections and the paratypes are already lodged with and belong to these facilities.

Diagnosis: This taxon would formerly have been recognized as a variant of *Stegonotus parvus*, but would be separated from this by several means including hemipenal morphology.

The hemipenis is a longer hemipenis than in all other *Stegonotus* extending to subcaudal 18, and since the spinulose armature begins unusually proximally (at subcaudal 4), the spinulose region is particularly long.
This taxon can be separated from all other *Stegonotus* species by the following suite of characteristics: Medial (choanal) process of palatine strap-shaped, with broadly rounded or truncated tip extending straight mediad or even curved slightly backward, away from the vomer; scales without pits or a few scattered scales with tiny vestigial pits; head without blotches at any age; dark color of crown covering upper lip to reach edge of mouth; everted hemipenis extending to subcaudal 18; ventrals 209-218 (males), 184-196 (females).

Further details of *Stegonotus macdowelli* sp. nov. are as follows: Supralabials 8 (fourth and fifth entering eye); infra-labials 8-10; preoculars 2; postoculars 2 (1 in a specimen recorded by Werner, 1900: 87); anterior temporals 2, both reaching postoculars except in occasionally where lower excluded; scales 17-17-15; ventrals showing wide variation, males (N=3) 209-218, females 184-196; subcaudals for males 80-90, for a female from the western part of New Britain the count was 73, for female from Duke of York Island 87. Maxillary teeth 12 + 3 to 14 + 3; palatine teeth 14-16; pterygoid teeth 24-31; dentary teeth 17-19. Hemipenis of the holotype (BM 98.3.3.23) (inverted) to subcaudal 18, with smooth area at tip (presumably representing terminal concavity of everted organ), covered with small spines from subcaudal 4 distad, without indication of calyces. Color of snake is dark brown above, including whole of upper lip, the scales less pigmented marginally than basally, those of first and second row with whitish margins. In a specimen from western New Britain, all ventrals and subcaudals were brownish grey with pale posterior borders; in specimens from eastern New Britain, throat and ventrals of anterior and middle part of body were white (posterior ventrals and subcaudals as above); in a specimen from Duke of York Island, all ventrals and subcaudals were white (McDowell 1972).

Distribution: Known only from New Britain and Duke of York Islands.

Etymology: In recognition of the many years of excellent herpetological work by USA-based herpetologist Sam McDowell.

***STEGONOTUS LENHOSERI* SP. NOV.**

Holotype: A female specimen in the American Museum of Natural History (AMNH), specimen number 100037, from Milion (elevation 1,500 feet), West Sepik District, Papua New Guinea.

The relevant Museum is a government owned public facility that allows researchers access to their collections and the holotype is already lodged with and belongs to this institution.

Paratypes: First paratype is a male specimen in the American Museum of Natural History (AMNH), specimen number 75026, from Wewak, East Sepik District, Papua New Guinea.

Second paratype is a female specimen in the American Museum of Natural History (AMNH), specimen number 107190, from Alexishafen, Madang District, Papua New Guinea.

Third paratype is a female specimen in the American Museum of Natural History (AMNH), specimen number 107191, from Alexishafen, Madang District, Papua New Guinea.

The relevant Museum is a government owned public facility that allows researchers access to their collections and the paratypes are already lodged with and belong to this institution.

Diagnosis: Until now, this taxon would have been identified as *Stegonotus modestus* (Schlegel, 1837), which along with this species is separated from all other *Stegonotus* by the following suite of characters: Medial (choanal) process of palatine strap-shaped, with broadly rounded or truncated tip extending straight mediad or even curved slightly backward, away from the vomer; scales without pits or a few scattered scales with tiny vestigial pits; head without blotches at any age; fourth maxillary tooth from rear (immediately preceding the conspicuous diastema) similar to the teeth in front and triangular in cross-section, with a posterolateral and a posteromedial keel; an abrupt diminution of the teeth behind the enlarged teeth at the middle of the maxilla; distal half of hemipenis with numerous small spines that may suggest transverse flounces, but not calyces except at margin of terminal concavity; 13-14 maxillary teeth, the enlarged middle teeth equaling or exceeding the enlarged rear teeth, the small teeth following the enlarged middle teeth so reduced that dentition suggests *Dinodon;* maxillary teeth in the configuration 9 + 2 + 3, 8 + 3 + 3, 8 + 2 + 3, or 7 + 3 +3; palatine teeth 12-16; dentary teeth 14-19; hemipenis to subcaudal 11-14, similar in structure to that of *S. diehli;* adult with sagittal crest formed partly by parietal; subcaudals 85-91 (males), 86-88 (females), all divided; 208-216 ventrals in males, 195-214 ventrals in females, 17 or more dorsal mid-body rows, supralabials normally 7 (rarely 8), third and fourth entering eye or sometimes fourth and fifth entering eye; infralabials 8-10; preoculars 1 or (usually) 2; postoculars 2; rarely reaching 1 m in length; the color is brown above, almost black vertebrally, fading to pale tan on the first scale row and the ventrals above the angulation and on the upper lip (or upper lip may be nearly white); the edges of the lateral scales slightly paler than the centres; subcaudals tan with white angulation and posterior edge; ventrals white between angulations anteriorly, but showing tan anterior edges posteriorly in most specimens.

Stegonotus lenhoseri sp. nov. is separated from *S. modestus* by having 2 anterior temporals, both touching the postoculars, versus the lower being excluded from postoculars in *S. modestus*.

In *S. modestus* there are usually 15-17 dorsal mid body rows (rarely 18), versus 18-19 in *Stegonotus lenhoseri* sp. nov..

Stegonotus lenhoseri sp. nov. has 25-27 pterygoid teeth versus

21-25 in *S. modestus*.

Stegonotus modestus are further separated from *Stegonotus lenhoseri* sp. nov. by the fact that

in that taxon the white of the belly extends upward on the side of the neck behind the jaw articulation, suggesting an incomplete collar; in all specimens the first scale row and ventrals are pure white, at least on the anterior half of the body.

Distribution: *Stegonotus lenhoseri* sp. nov. is known from northern island New Guinea as far east as Astrolabe Bay; Manus Island, but not New Britain. *Stegonotus modestus* is now restricted to the Moluccan Islands including Ceram, and Misol, Buru and possibly the Aru Islands and Samao.

Etymology: Named in honor of my (deceased for some years) father, Len Hoser, in recognition of his valuable and largely unrecognized contributions to herpetology in Australia.

***STEGONOTUS ADELYNHOSERAE* SP. NOV.**

Holotype: A male specimen in the American Museum of Natural History (AMNH), specimen number 50087, from Kabuna, Central District, Papua New Guinea.

The relevant Museum is a government owned public facility that allows researchers access to their collection and the holotype is already lodged with and belongs to this institution.

Paratypes: First paratype is a male specimen in the American Museum of Natural History (AMNH), specimen number 82522, from Port Moresby, Central District, Papua New Guinea.

Second paratype is a female specimen in the British Museum (BM), specimen number 97.12.10.119, from Haveri, Central District, Papua New Guinea.

The relevant Museums are government owned public facilities that allow researchers access to their collections and the paratypes are already lodged with and belong to these institutions.

Diagnosis: This taxon would previously have been identified as *Stegonots diehli* Lindholm, 1905, both of which would be easily separated from all other *Stegonotus* by the following characters: the possession of a well developed pair of apical pits on every dorsal scale of the body and anterior tail; juveniles have black blotches on a pale head. In all other *Stegonotus* apical pits are absent, or if present, they are only vestigial and scattered; juveniles are patterned as adults.

Stegonotus adelynhoserae sp. nov. is most easily separated from *S. diehli* by having 17 dorsal mid-body rows, versus 15 in the *S. diehli*.

Stegonotus adelynhoserae sp. nov. have 21-29 pterygoid teeth and usually 181-208 (males) or 180-196 (females) ventrals, whereas *S. diehli* have 15-22 pterygoid teeth and 170-181 (males) or 166-176 (females) ventrals. These differences hold for when the two species are sympatric around the Huon Peninsula/Astrolabe Bay region. Furthermore in *Stegonotus adelynhoserae* sp. nov. the pigmentation of the subcaudals forms conspicuous spots, which is a trait not seen in *S. diehli*.

Distribution: *Stegonotus adelynhoserae* sp. nov. occurs in the Morobe District, the central range and southern New Guinea, including Irian Jaya, not occurring on the north side of New Guinea anywhere west of the Huon Peninsula/Astrolabe Bay region.

S. diehli is now restricted to the region north of the central watershed in the region west of the Huon Peninsula, including Irian Jaya.

Etymology: Named in honour of my daughter Adelyn Hoser in recognition of 13 years of educating thousands of people about reptiles.

***STEGONOTUS* SPECIES CURRENTLY RECOGNISED.**

Stegonotus adelynhoserae sp. nov.

Stegonotus batjanensis (Günther, 1865)

Stegonotus borneensis Inger, 1967

Stegonotus cucullatus (Duméril, Bibron and Duméril, 1854)

Stegonotus diehli Lindholm, 1905

Stegonotus florensis (De Rooij, 1917)

Stegonotus guentheri Boulenger, 1895

Stegonotus heterurus Boulenger, 1893

Stegonotus lenhoseri sp. nov.

Stegonotus macdowelli sp. nov.

Stegonotus modestus (Schlegel, 1837)

Stegonotus muelleri Duméril, Bibron and Duméril, 1854

Stegonotus parvus (Meyer, 1874)

REFERENCES CITED

Bleeker, P. 1860. Over de Reptiliën-Fauna van Amboina. *Natuurkundig Tijdschrift voor Nederlandsch Indië* 22:39-43.

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

Boulenger, G. A. 1895. On a collection of reptiles and batrachians from Ferguson Island, D'Entrecasteaux Group, British New Guinea. *Ann. Mag. Nat. Hist.* (6)16:28-32.

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. 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: L. S. L. Chua, L. G. Kirton and L. G. Saw (eds.), *Status of biological diversity in Malaysia and threat assessment of plant species in Malaysia.* Forest Research Institute Malaysia, Kepong:pp.31-81.

de Rooij, N. 1917. *The Reptiles of the Indo-Australian Archipelago. II. Ophidia*. Leiden (E. J. Brill), xiv + 334 S.

Dubey, S., Brown, G. P., Madsen, T. and Shine, R. 2008. Male-biased dispersal in a tropical Australian snake (*Stegonotus cucullatus*: Colubridae). *Molecular Ecology* 17:3506-3514.

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.

Forcart, L. 1953. Die Amphibien und Reptilien von Sumba, ihre zoogeographischen Beziehungen und Revision der Unterarten von Typhlops polygrammicus. *Verh. naturf. Ges.* Basel, 64:356-388.

Forcart, L. 1954. Die Taxonomie von *Lycodon florensis* Rooij und *Stegonotus sutteri* Forcart (Ophidia, Colubridae). *Verh Naturf Ges Basel* 65 (1):7-8.

Gaulke, M. 2010. Höhlenbewohner auf den Philippinen. *Reptilia* (Münster) 15(85):38-45.

Günther, A. 1865. Fourth account of new Species of Snakes in the Collection of the British Museum. *Ann. Mag. Nat. Hist.* (3)15:89-98.

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.

Harvey, M. B., Barker, D. G., Ammerman, L. K. and Chippendale, P. T. 2000. Systematics of pythons of the *Morelia amethistina* complex (Serpentes: Boidae) with the description of three new species, *Herpetological Monographs* (The Herpetologists League Incorporated), 14:139-185.

Hoser, R. T. 1998. Death adders (genus *Acanthophis*): an overview, including descriptions of five new species and one subspecies. *Monitor - Journal of the Victorian Herpetological Society* 9(2): Cover, 20-30, 33-41. (online via links from http://www.herp.net)

Hoser, R. T. 2000. A revision of the Australasian Pythons. *Ophidia Review* 1:7-27. (online via links from http://www.herp.net)

Hoser, R. T. 2004. A reclassification of the Pythoninae including the description of two new Genera, two new species and nine new subspecies. *Crocodilian - Journal of the Victorian*

Association of Amateur Herpetologists 4(3/4):21-40. (online via links from http://www.herp.net)

Hoser, R. T. 2009. Creationism and contrived science: A review of recent python systematics papers and the resolution of issues of taxonomy and nomenclature. *Australasian Journal of Herpetology* 2:1-34. (3 February).

Hoser, R. T. 2012. An updated review of the pythons including resolution of issues of taxonomy and nomenclature. *Australasian Journal of Herpetology* 10:2-32. (8 April).

How, R. A. and Kitchner, D. J. 1997. Biogeography of Indonesian snakes. *Journal of Biogeography* 24(725-735).

Inger, R. F. 1967. A new colubrid snake of the genus *Stegonotus* from Borneo. *Fieldiana: Zoology* 51:77-83.

Iskandar, D. T. and Erdelen, W. R. 2006. Conservation of amphibians and reptiles, in *Indonesia: issues and problems Amphibian and Reptile Conservation* 4(1):60-87.

Lanza, B. 1999. A new species of *Lycodon* from the Philippines, with a key to the genus (Reptilia: Serpentes: Colubridae). *Tropical Zoology* 12:89-104.

Lindholm, W. A. 1905. Ueber einige Eidechsen und Schlangen aus Deutsch-Neuguinea. *Jahrb. nassau.* Ver. lviii:227-240.

Longman, H. A. 1913. Herpetological Notes. Part I. Systematic. *Memoirs of the Queensland Museum Brisbane* 2:39-45.

Macleay, W. 1877. The ophidians of the Chevert Expedition. *Proceedings of the Linnean Society of New South Wales* 2:33-41.

Macleay, W. 1884. Notes on some reptiles from the Herbert River, Queensland. *Proceedings of the Linnean Society of New South Wales* 8:432-436.

Malkmus, R. 1985. Amphibien und Reptilien vom Mount Kinabalu (4101 m), Nordborneo. *Herpetofauna* (Germany)7(35):6-13.

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 & Reptilien Südostasiens.* Natur und Tier Verlag (Münster):512 pp.

McDowell, S. B. 1972. The species of *Stegonotus* (Serpentes, Colubridae) in Papua, New Guinea. *Zoologische Mededelingen* 47:6-26.

McDowell, S. B. 1984. Results of the Archbold Expeditions. No. 112. The snakes of the Huon Peninsula, Papua New Guinea. *American Museum novitates* 2775:28 pp.

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.

Meyer, A. B. 1874. [Eine Mittheilung von Hrn. Dr. Adolf Meyer] über die von ihm auf Neu-Guinea und den Inseln Jobi, Mysore und Mafoor im Jahre 1873 gesammelten Amphibien. *Monatsber. K. Preuss. Akad. Wiss.* Berlin 1874:128-140.

Peters, W. C. H. 1861. Eine zweite Übersicht (vergl. Monatsberichte 1859 p. 269) der von Hrn. F. Jagor auf Malacca, Java, Borneo und den Philippinen gesammelten und dem Kgl. zoologischen Museum übersandten Schlangen. *Monatsber. königl. Akad. Wiss*. Berlin. 1861 (Juli):683-691 [1862 on title page]

Pyron, R. A., et al. 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.

Rawlings, L. H., Barker, D. G. and Donnellan, S. C. 2004. Phylogenetic relationships of the Australo-Papuan *Liasis* pythons (Reptilia:Macrostomata), based on mitochondrial DNA. *Australian Journal of Zoology* 52 (2):215-227.

Rawlings, L. H. and Donnellan, S. C. 2003. Phylogeographic Analysis of the Green Python (*Morelia viridis*) reveals cryptic diversity. *Molecular Phylogenetics and Evolution* 27(2003):36-44.

Rawlings, L. H., Rabosky, D. L., Donnellan, S. C. and Hutchinson, M. N. 2008. Python phylogenetics: inference from morphology and mitochondrial DNA. *Biological Journal of the Linnean Society* 93, 603-619.

Read, J. L. 1998. Reptiles and amphibians of the Kau Wildlife Area near Madang: a valuable conservation resource. *Science in New Guinea* 23(3):145-152.

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").

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)

Schleip, W. 2008. Revision of the Genus *Leiopython* Hubrecht 1879 (Serpentes: Pythonidae) with the Redescription of Taxa Recently Described by Hoser (2000) and the Description of New Species. *Journal of Herpetology* 42(4):645-667.

Trembath, D. and Lloyd, R. 2005. Geographic Distribution: *Stegonotus cucullatus* (Slatey Grey Snake). *Herpetological Review* 36(2):204.

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.

Australasian Journal of Herpetology

Publishes original research in printed form in relation to reptiles, other fauna and related matters.

It is a peer reviewed printed journal for permenant public scientific record, with a sizeable print run and has a global audience.

Full details at: 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 **12:23-25.**
Published 30 April 2012.

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

A new genus and new subgenus of snakes from the South African region (Serpentes: Colubridae).

Raymond T. Hoser

488 Park Road, Park Orchards, Victoria, 3114, Australia.
Phone: +61 3 9812 3322 Fax: 9812 3355 E-mail: viper007@live.com.au
Received 19 February 2012, Accepted 4 April 2012, Published 30 April 2012.

ABSTRACT

A review of the taxonomy of the Colubroidea from Southern Africa and Madagascar has found inconsistencies in classification at the genus level in various genera including *Buhoma*, and *Leioheterodon*.

Relying on recent studies of the relevant species level taxa including phylogenys based on mtDNA it's clear that some of the snakes are placed within genera even though at that level, their placement would make the relevant genera paraphyletic.

To rectify the anomaly, a new genus and subgenus are designated, named and diagnosed to accommodate relevant species according to the Zoological Code.

These are as follows: *Swileserpens* gen. nov. for a species level taxon formerly placed in the genus *Buhoma*, namely *depressiceps* and *Michaelnicholsus* subgen. nov. for a species level taxon formerly placed in the genus *Leioheterodon*, namely *geayi*.

Keywords: Taxonomic revision; new genus; new subgenus; *Swileserpens*; *Michaelnicholsus*; *Colineipperus*; *Leioheterodon*; *Buhoma*; *geayi*; *depressiceps*; snakes.

INTRODUCTION

The colubrid snakes of southern Africa and Madagascar have been subject to numerous studies in recent years, the result of which has included the resurrection of old generic names and when needed the creation of new genera to accommodate species that don't readily place within larger, obviously paraphyletic groups.

Several genera from the South African region have been highlighted in a study by Pyron et. al. 2011 as being potentially paraphyletic.

This paper deals with two of them, namely *Buhoma* and *Leioheterodon*, both of which have been found to be paraphyletic as currently recognized by some authors.

The most relevant study on the genus *Buhoma* as currently recognized was the paper of Ziegler, et. al. (1997), which formally named and separated the genus from inclusion within the Malagasy-centered genus *Geodipsas*.

Earlier publications of note about species in that genus include those of Broadley and Howell (1991), Chifundera (1990), Chirio and Lebreton (2007), Menegon et. al. (2008), Rasmussen et. al. (1995), Schmidt (1923), Tornier (1902), Werner (1897) and Werner (1899).

Key publications in terms of the genus *Leioheterodon* as currently understood include, Anonymous (1994), Boulenger (1893), Desguez (1884), Duméril, Bibron and Duméril (1854), Günther (1863), Labanowski and Lowin (2011) and Mocquard (1905).

Notable and relevant published studies involving the taxonomy and nomenclature of another important regional genus *Psammophis* include those by Boulenger (1902), Broadley (1977), Broadley (2002), Kelly et. al. (2008).

Other relevant studies involving the subject genera in other manner, such as wild habits, captivity and the like, all of which have a bearing on classification issues include: Anonymous (1994), Branch (1992), Broadley (1959), Cadle (1996), Glaw and Vences (1994), Hilgartner and Raoilison (2005), Marias (2004), Shine et. al. (2006), Spawls, et. al. 2001 and Wright (1995).

As a result of these studies, it is clear that in each of the two genera and *Psammophis* there are species that are widely divergent of one another.

In the case of the genus *Psammophis*, there are numerous pre-existing names for the several recently identified genus groupings. However in the case of one major group, no names exist, so a new genus name is assigned in another paper published in this same journal.

In the case of each of the genera *Buhoma* and *Leioheterodon*, one species is clearly divergent from the others within the genus and these are herein assigned to new genus and subgenus.

GENUS *BUHOMA SENSO LATO*

The so-called "Forest Snakes" within the genus *Geodipsas* Boulenger, 1896 have been problematic for taxonomists for some years.

Ziegler et. al. (1997) showed from examination of hemipenal morpology that African snakes assigned to the genus *Geodipsas* should be removed from that genus, due to their different hemipenal morphology, with *Geodipsas* being restricted to taxa from Madagascar. This view was confirmed by another paper's findings at about the same time (just prior), namely Cadle (1996).

As a result, Ziegler at. al. erected the genus *Buhoma* to accommodate the three African species, namely; *vauerocegae* (Tornier, 1902), *procterae* (Loveridge, 1922) and *depressiceps* (Werner, 1897).

More recently Pyron et. al. (2011) published the results of mtDNA analysis of the relevant snakes as part of a global review of snake systematics. This review showed the taxon *depressiceps* to be widely divergent of the others within the genus *Buhoma* as created by Ziegler at. al. in 1997.

Morphologically and biologically the species *depressiceps* is quite divergent from the rest.

These morphological and biological differences between the taxa was also noted by Ziegler et. al. (1997).

As a result, a new genus is erected for this taxon.

GENUS *SWILESERPENS* GEN. NOV.

Type species: *Tropidonotus depressiceps* Werner, 1897

(Known in most contemporary texts as either *Geodipsas depressiceps* or *Buhoma depressiceps*)

Diagnosis: The forest snakes of the genera *Buhoma* and *Swileserpens* gen. nov. are small robust species, diagnosed by having two grooved maxillary teeth on each side, slightly larger than others, divided subcaudals, single anal and a round pupil. The tail is relatively short, being less than 20 per cent of the total length.

Above the body is usually a dark velvety brown colour with darker longitudinal lines or striations; below the colour is white; broadly porcelain white beneath the tail. Below the head is yellowish, brighter along the lower labials to the ninth ventral. The head above is a deep brown, with a yellowish nuchal collar of 4-5 scale rows.

According to Laurent (1960), the snake is not aggressive when handled and makes no attempt to bite. They may make an unpleasant cloacal discharge.

The species taxon *depressiceps* is herein treated as being monotypic for the genus. However the subspecies taxon *marlieri* Laurent 1956, may in fact be a separate species. In spite of this, the diagnosis that separates *Swileserpens* gen. nov. from *Buhoma*, applies to both these taxa.

Swileserpens gen. nov. is separated from *Buhoma* by the following suite of characters: 19 dorsal mid-body scale rows versus 17 in *Buhoma*; *Swileserpens* has 1+3 temporals versus 1+2 in *Buhoma*; *Swileserpens* gen. nov. has strongly keeled scales whereas *Buhoma* does not.

Ziegler et. al. (1997), found substantial differences in hemipenal morphology between *Swileserpens* gen. nov. and the other taxa within their genus *Buhoma*, the details of which are in the paper.

Buhoma species (*vauerocegae* and *procterae*) are restricted to mountain ranges in Tanzania (Rasmussen et. al. 1995), whereas *Swileserpens* gen. nov. inhabits forest regions of western central Africa (Guibe 1958).

Both *Buhoma* and *Swileserpens* are separated from *Geodipsas* by having 7 or 8 supralabials, with the third, fourth and fifth entering the eye. In all Malagasy *Geodipsas*, there are 7 supralabials in which only the third and fourth enter the eye.

Both *Buhoma* and *Swileserpens* are further separated from *Geodipsas* by having different sublingual scales. In the African taxa, there are three regular pairs of longish sublingual scales, behind which the ventrals start. By contrast in the Malagasy taxa only have two pairs of large sublinguals before the commencement of the regular ventrals.

Common Name: Pale-headed forest snake.

Etymology: Named in honour the Swile family of Mitchell's Plain and Athlone in South Africa for their amazing hospitality when my family visited South Africa in 2009. This includes, Ernie, Verona, Benjamin, Keegan, Jade, Robert (now deceased), Felicia, Gareth and Marlene.

Species in genus *Swileserpens* gen. nov.

Swileserpens depressiceps (type species)

Species remaining in the genus *Buhoma.*

Buhoma vauerocegae

Buhoma procterae

GENUS *LEIOHETERODON* SENSO LATO

The three species of Madagascar Hognose snakes currently placed in the genus *Leioheterodon* have been in herpetoculture in the USA and Europe for some years and are now commonly captive bred (see Anonymous 1994 and Wright 1995).

While superficially similar, the various idiosyncrasies between the species have become apparent. Of particular note has been the differences between the Speckled Hognose Snake (species *geayi*) and the other two species, *modestus* and *madagascariensis*, which appear to be very similar to one another.

Molecular studies, including that of Pyron et. al. (2011) have confirmed this relative position, indicating that the taxon *geayi* should be classified apart from the others.

As a result of this situation and the fact that there is no currently available name, a new subgenus is defined and named below to accommodate the species *geayi*.

SUBGENUS *MICHAELNICHOLSUS* GEN. NOV.

Type species: *Lioheterodon geayi* Mocquard, 1905

Diagnosis: In common with the other Madagascan Hognosed snakes, *Michaelnicholsus* subgen. nov. is immediately recognizable by it's upturned snout, a feature no other Malagascay snake has.

This subgenus *Michaelnicholsus* subgen. nov. is monotypic for the species *geayi*.

These snakes are similar in appearance to the North American hognosed snakes.

They are native to the island minicontinent of Madagascar and are medium sized to large heavy bodied colubrids.

They feed on vertebrates.

Though rear-fanged, they are not regarded as dangerous to humans.

Michaelnicholsus subgen. nov. can be readily separated from the other two species remaining within the genus *Lioheterodon* most readily by colouration. It is the only species of the trio to have a colouration whereby each dorsal and lateral scale is heavily bordered in black, giving the snake the overall dark and heavily speckled or mottled appearance over a tan, yellowish to reddish brown ground colour, therefore giving it an often "braided" appearance. Colouration often becomes a deeper red to reddish brown at about half to two thirds of the way down the snake's body.

By contrast, the Blond Hognose Snake (*Lioheterodon modestus*) is of uniform light colour, usually tan, light brown or pale yellowish. The lateral and labial scales in this species are usually lighter whitish to cream than the dorsal scales.

The Giant Hognose Snake (*Lioheterodon madagascariensis*) is the largest in the genus *Lioheterodon* and is known to reach about 1.5 metres in length. The colour is yellowish to brownish on top, with large darker brown to black dorsal and lateral blotches. The neck and front third of the body are typically darker than the rest.

Etymology: Named in honor of Michael Nichols for services to

herpetology, having done considerable work assisting Snakebusters, Australia's best reptiles shows, in a "behind the scenes" capacity. Of course Snakebusters and our strong educational messages to the public has been singularly successful in making our home state of Victoria go from being one of the highest "death from snakebite" states in Australia to become the lowest.

REFERENCES CITED

Anonymous, 1994. The Madagascan Hognose Snake (*Leioheterodon madagascariensis*). *Reptilian* 2(3):35-36.

Bocage, J. V. B. 1872. Diagnoses de quelques espéces nouvelles de Reptiles d'Afrique occidentale. *Jorn. Sci.* Lisbon 4:72-82.

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

Boulenger, G. A. 1902. Description of a new snake of the genus *Psammophis*, from Cape Colony. *Proc. Zool. Soc.* London 1902:126.

Branch, W. R. 1992. Life History Notes:*Psammophis notostictus. Jour. Herp. Ass. Afr.* (41):43-43.

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

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. 1977. A review of the genus *Psammophis* in southern Africa (Serpentes: Colubridae). *Arnoldia* 8(12):1-29.

Broadley, D. G. 2002. A review of the species of *Psammophis* Boie found south of Latitude 12° S (Serpentes: Psammophiinae). *Afr. J. Herpetol.* 51(2):83-119.

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

Cadle, J. E. 1996. Systematics of snakes of the genus *Geodipsas* (Colubridae) from Madagascar, with descriptions of new species and observations on Natural History. *Bulletin of the Museum of Comparative Zoology* 155(2):33-87.

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

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

Daudin, 1802. *Histoire Naturelle, Générale et Particulière des Reptiles.* vol. 7. Paris: Dufart:436 pp.

Desguez, M. 1884. Note sur l'alimentation de l' *Heterodon madagascariensis. Bull. Soc. Philom.* Paris (7)8(3):182-184.

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.

Glaw, F. and Vences, M. 1994. *A Fieldguide to the Amphibians and Reptiles of Madagascar.* Vences and Glaw Verlag, Köln.

Guibe, J. 1958. Les serpents de Madagascar. *Memoires de l'Institut Scientifique de Madagascar* 12:189-260.

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.

Hilgartner, R. and Raoilison, M. 2005. Freilandbeobachtungen am Madagaskar-Leguan *Oplurus cuvieri* Gray, 1831. *Reptilia* (Münster)10 (3):64-69.

Hoser, R. T. 1995. *The Hoser Files: The fight against entrenched official corruption.* Kotabi, Melbourne, Australia:322 pp.

Hughes, B. 1999. Critical review of a revision of *Psammophis* (Linnaeus 1758) (Serpentes, Reptilia) by Frank Brandstätter. *Afr. J. Herpetol.* 48(1-2):63-70.

Kelly, C. M. R., Barker, N. M., Villet, M. H., Broadley, D. G. and Branch, W. R. 2008. The snake family Psammophiidae (Reptilia: Serpentes): Phylogenetics and species delimitation in the African Sand Snakes (*Psammophis* Boie, 1825) and allied genera. *Mol Phylogenet Evol.*, 21 March.

Jansen, M. 2008. Die Lanzenottern der Gattung Bothrops in Bolivien. *Draco* 8 (33):50-56.

Marais, J. 2004. *A Complete Guide to the Snakes of Southern Africa* (2nd ed). Struik Publishers:312 pp.

Labanowski, R. J. and Lowin, A. J. 2011. A reptile survey in a dry deciduous forest fragment in northern Madagascar showing new records for the little-known snake *Pararhadinaea melanogaster* and a range extension for the skink *Amphiglossus tanysoma. Herpetology Notes* 4:113-121.

Laurent, R. F. 1956. Contribution a l'herpetologie de la region des Grands Lacs. *Annales du Musee Royal du Congo Belge* (Sciences Zoologiques) 48:1-390.

Menegon, M., Doggart, N. and Owen, N. 2008. The Nguru mountains of Tanzania, an outstanding hotspot of herpetofaunal diversity. *Acta Herpetologica* 3(2):107-127.

Mocquard, M. F. 1905. Description de deux nouvelles especes de Reptiles. *Bull. Mus. Hist. Nat.,* Paris 11:288-290.

Peters, W. C. H. 1869. Über neue Gattungen und neue oder weniger bekannte Arten von Amphibien (*Eremias*, *Dicrodon*, *Euprepes*, *Lygosoma*, *Typhlops*, *Eryx*, *Rhynchonyx*, *Elapomorphus*, *Achalinus*, *Coronella*, *Dromicus*, *Xenopholis*, *Anoplodipsas*, *Spilotes*, *Tropidonotus*). *Monatsber. k. preuss. Akad. Wiss. Berlin*, 1869:432-447.

Peracca, M. G. 1896. Retili et Anfibi raccolti a Kazungula e sulla strada da Kazungula a Buluwaio dal Rev. Luigi Jalla, Missionario Valdese nell' alto Zambese. *Boll. Mus. Zool. Comp. Anat. Univ. Torino* 11(255):1-4.

Pyron, R. A., et al. 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.

Rasmussen, J. B., Howell, K. M. and Andersen, M. 1995. A review of the Usambara forest snake *Geodipsas vauerocegae* and the Uluguru forest snake *G. procterae. Amphibia-Reptilia*, Leiden 16 (2):123-136.

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.

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.

Shine, R., Branch, W. R., Webb, J. K., Harlow, P. S. and Shine, T. 2006. Sexual Dimorphism, Reproductive Biology, and Dietary Habits of Psammophiine Snakes (Colubridae) from Southern Africa. *Copeia* 2006(4):650-664.

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

Tornier, G. 1902. Herpetologisch Neues aus Ostafrika. *Zool. Anz.* 25:700-704.

Wallach, V. 1986. *Lioheterodon madagascariensis*: an addition to the snake fauna of the Comoro Islands. *J. Herp. Assoc. Afr.* 32:24-25.

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.

Wright, A. 1995. The Malagasy hognose snakes genus *Lioheterodon. Reptilian* 3(3):7-8.

Ziegler, T. Venves, M., Glaw, F. and Bohme, W. 1997. Genital morphology and systematics of *Geodipsas* Boulenger, 1896 (Reptilia: Serpentes: Colubridae), with description of a new genus. *Revue Suisse de Zoologie* 104 (1):95-114.

Australasian Journal of Herpetology **12:26-31.**
Published 30 April 2012.

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

A division of the African Genus *Psammophis* Boie, 1825 into 4 genera and four further subgenera (Serpentes: Psammophiinae).

Raymond T. Hoser

488 Park Road, Park Orchards, Victoria, 3114, Australia.
***Phone*: +61 3 9812 3322 *Fax*: 9812 3355 *E-mail*: viper007@live.com.au**
Received 17 March 2012, Accepted 6 April 2012, Published 30 April 2012.

ABSTRACT

The Colubrid snakes of the subfamily Psammophiinae have been the subject of several phylogenetic studies, including that of Broadley (2002), Kelly et. al. (2008), and most recently as part of a wider study by Pyron et. al. (2011).

All showed the genus *Psammophis* as recognized in 2011 to be paraphyletic at the genus level.

Relying on these results and obvious morphological differences between the relevant species, the genus as now known is split into four genera, including the available *Psammophis* Boie, 1825, *Dromophis* Peters, 1869 and *Phayrea* Theobold, 1868 as well as the newly erected genus *Eipperus* gen. nov., defined and named according to the Zoological Code to accommodate species that fit within none of the other genera.

Furthermore, divergent taxa are assigned to three newly named subgenera and one other for which a name is already available, including two within *Psammophis*, namely, *Elliottus* subgen. nov. and *Slatteryus* subgen. nov., one within *Dromophis* namely *Amphiophis* Bocage, 1872 and another within *Phayrea* namely, *Rayhammondus* subgen. nov.

Keywords: new genus; subgenus; taxonomy; nomenclature; systematics; Colubridae; *Psammophis; Dromophis; Phayrea; Eipperus; Psammophiinae; Elliottus; Slatteryus; Phayrea; Rayhammondus.*

INTRODUCTION

The morphologically similar, but phenotypically diverse group of about 50 recognized species of snakes known as the Psammophiinae has been the subject of taxonomists attention for many years and in spite of several detailed phylogenetic studies, there has not been stability in the nomenclature of the group.

The approximately 50 species within Psammophiinae were as at end 2011 placed within the following genera, *Dipsina* Jan, 1863 (one species), *Hemiharerrhis* Boettger, 1893 (4 species), *Malpolon* Fitzinger, 1826 (2 species), *Mimophis* Günther, 1868 (1 species), *Rhageris* Peters, 1862 (1 species), *Rhamphiophis* Peters, 1854 (4 species), *Psammophylax* Fitzinger, 1843 (4 species) and *Psammophis* Boie, 1825 (33 species).

At the genus level, the use of the given names and the component species within each genus has been relatively stable in recent times save for those species within the largest genus (by species number), that being *Psammophis*, which is the subject of this paper.

This Afro/Asian (mainly African) group of snakes has been inspected morphologically by herpetologists for more than a century, including by way of a major monograph by Loveridge in 1940. In recent years, studies by Broadley (2002), Kelly et. al. (2008), and to a lesser degree Pyron et. al. 2011, have looked at sizeable numbers of Psammophiine snake species nuclear and mitochondrial DNA including all genera identified above.

All the molecular studies have had similar results.

The most recent of these studies, that by Pyron et. al. (2011)

looked at various Psammophiine species and these tended to group within the various genera within popular usage in herpetology.

Consistent with an earlier study by Kelly et. al. (2008), in Pyron et. al.'s study, the two species formerly placed within the genus *Dromophis* Peters, 1869 both showed up within the clades for *Psammophis* species and not particularly close to one another.

This result led Kelly et. al. in 2008 to relegate *Dromophis* to synonymy with the genus *Psammophis*, a position unchanged by Pyron et. al. (2011), although the latter authors noted that their primary concern was the higher taxonomy of the relevant genera, rather than classification of species at the genus level.

The wide-ranging results of Pyron et. al. (2011) have been calibrated by myself against other similar molecular phylogenetic studies specific to the Snail-eating Snakes (Guo et. al. 2011), True Vipers (Wüster et. al. 2008), Pitvipers (Castoe et. al. 2003, 2005, and 2006), Coral Snakes (da Silva and Sites 2001), various colubrids (Lawson et. al. 2005, Queiroz et. al. 2002) and been shown to be accurate and consistent.

As a result, those results are accepted for the genus *Psammophis* as accurate, especially when calibrated with the virtually identical results published by Kelly et. al. (2008) and others.

Any taxa missed in Pyron et. al's analysis can also be readily assigned to the various species groups tested, meaning the results were in effect more-or-less comprehensive for the genus.

While the molecular studies have shown all snakes currently placed within *Psammophis* to cluster as a group, there are nomenclatural issues that arise from the results.

One group of species, identified herein as the *condanarus* group, is only marginally closer to other *Psammophis* than it is to the four species placed within the genus *Psammophylax*.

Because no one in recent times has proposed merging the two genera, there becomes a strong argument to erect a new genus to accommodate this intermediate group.

The argument for this new genus has increased merit when the criteria for defining a genus (as in depth of divisions between clades) is assessed consistently across all snake genera and species.

Looking at the molecular results in terms of this potential genus group, I find the argument in favor of placing them in a new genus compelling.

Following the erection of a new genus to accommodate the *condanarus* group, for which the long forgotten name *Phayrea* Theobold, 1868 is available, the same argument appears in terms of the next clade, identified herein as the *notostictus* group, again it fitting within the consistent criteria of being sufficiently divergent to be placed in a new genus, for which in this case there is no pre-existing name available.

Beyond the erection of this next genus, the same argument appears in terms of splitting a third group of snakes, known herein in the *praeornatus* group into a third genus.

The genus name *Dromophis* Peters, 1869, is already available for the group.

The largest group, while clearly consisting different species groups and clearly paraphyletic at a level deep enough to yield at least four species groups, is not in my view sufficiently differentiated or diverse to warrant being split any further at the genus level.

However two lineages with more ancient divergence do warrant recognition as subgenera.

Likewise for the species *angolensis* in terms of the available genus group *Dromophis*, as well as the species crucifer within the *condanarus* group.

Following on from the above result, I hereby subdivide the four obvious groups into four genera and four relevant subgenera.

These are *Psammophis* Boie, 1825, *Dromophis* Peters, 1869, as well as the newly erected genus *Eipperus* gen. nov. for the *notostictus* group and *Phayrea* Theobold, 1868 for the *condanarus* group, the new genus being defined and named according to the Zoological Code (Ride 1999) to accommodate species that fit within.

Furthermore, divergent taxa are assigned to three newly named subgenera, including two within *Psammophis*, namely, *Elliottus* subgen. nov. and *Slatteryus* subgen. nov., another within *Amphiophis* namely, *Rayhammondus* subgen. nov. and resurrection of the name *Amphiophis* Bocage, 1872 for one within *Dromophis.*

The body of literature detailing with and summarizing what's known about *Psammophis* and related genera is vast and includes the following key publications: Böhme and De Pury (2011), Boulenger (1902), Branch (1983), Broadley (1975, 2002), Broadley and Cotterill (2004), Broadley and Howell (1991), Broadley and Hughes (2000), Broadley et. al. 2003, Chiro and Ineich (1992), Egan (2007), Esterbauer (1985), Fitzsimons (1966), Geniez et. al. (2004), Hartmann (1998), Hedges (1983), Hughes (2002), Hulbert and Lutzmann (2004), Kramer and Schnurrenberger (1963), Largen and Spawls (2010), Loveridge (1940), Marx (1958, 1988), Parker (1949), Rato et. al. (2007), Schlegel (1837), Schlüter (2006), Shine et. al. (2006) and Spawls et. al. (2001).

GENUS *PSAMMOPHIS* BOIE 1825, *SENSO LATO*

Snakes in the subfamily Psammophine are sometimes classed as being within the family Colubridae, or alternatively within the Lamprophiidae, with Colubroidea being a superfamily.

Regardless of the higher level classification, these snakes are recognizable by several features, perhaps most notably the vestigial, tube-like hemipenis. They vary from small to large in size (but not giant), are mainly diurnal, generally fast-moving active terrestrial snakes. Some are partly arboreal, while others burrow in loose dirt and sand.

Preferred habitats include savannah, grassland and semi-desert and includes habitats modified by human activities. All but one species lays eggs.

While defined as back-fanged venomous, they are not generally regarded as dangerous to humans, unless of course the victim displays a rare allergic reaction to venom or saliva.

The most serious symptoms are reported for Mediterranean *Malpolon*.

The subfamily occurs throughout Africa, southern Europe and the nearest parts of south-west Asia.

The genus *Psammophis* as generally recognized in early 2011 consists of an assemblage of small to large snakes with a head distinct from the neck, moderate to large eyes and a round pupil.

There are 10-15 maxillary teeth, the largest in front of the eye, and the large grooved "back" fangs are posterior to the eye.

The anterior mandibular teeth are noticeably enlarged.

Usually four infralabials touch the anterior chin shields.

The body is more-or-less cylindrical with usually smooth scales in 11-19 dorsal mid-body rows. The anal may or may not be divided and the subcaudals are always paired.

Some species including *sibilans* and *schokari* polish their bodies with nasal secretions that appear to reduce skin water loss.

Most species are found in low-lying areas, including swamps and other similar places sometimes subject to water inundation.

GENUS *PSAMMOPHIS BOIE 1825*

Type species: *Coluber sibilans* Linnaeus, 1758
Diagosis: Separated from the other three genera formerly within *Psammophis*, namely *Dromophis*, *Eipperus* gen. nov. and *Amphiophis* by the following suite of characters: 150-198 ventrals, 90-120 divided subcaudals, (versus 140-170 in genus *Dromophis*), highly variable dorsal colouration, usually with distinct body stripes in shades of brown or olive and yellow running along the body. Sometimes the markings are indistinct or flecked. Grows to nearly 2 metres in length, head is usually broad, except in the subgenus *Elliottus* gen. nov., the widely

separated occipital shields usually separates these snakes from the other three genera *Dromophis*, *Eipperus* gen. nov. and *Amphiophis.*

Found throughout Africa and nearby.

Content of Genus *Psammophis*

Psammophis sibilans (Linnaeus, 1758) (Type Species)

Psammophis brevirostris Peters, 1881

Psammophis mossambicus Peters, 1882

Psammophis phillipsi (Hallowell, 1844)

Psammophis leopardinus Bocage, 1887

Psammophis rukwae Broadley, 1966

Psammophis sudanensis Werner, 1919

Psammophis orientalis Broadley, 1977

Psammophis subtaeniatus Peters, 1882

Psammophis trinasalis Werner, 1902

Psammophis zambiensis Hughes, 2002

Subgenus *Elliottus* subgen. nov. (see below)

Psammophis (*Elliottus*) *lineatus* (Duméril, Bibron and Duméril, 1854)

Subgenus *Slatteryus* subgen. nov. (see below)

Psammophis (*Slatteryus*) *biseriatus* Peters, 1881 (Type species)

Psammophis (*Slatteryus*) *tanganicus* Loveridge, 1940

SUBGENUS *ELLIOTTUS* SUBGEN. NOV.

Type species: *Dryophylax lineatus* Duméril, Bibron and Duméril, 1854

Diagnosis: Separated from all other *Psammophis* (*senso lato*) including genera *Dromophis*, *Eipperus* gen. nov. and *Amphiophis* by the following suite of characters: 17 dorsal mid-body scale rows, 138-167 ventrals, 82-105 subcaudals, light olive or brown and grey longitudinal stripes, greenish-yellow vertebral line, black transverse dashes on the outer edges of the ventrals is diagnostic for the subgenus, the center of the belly being creamy white to grayish yellow or pale green, the build is fairly slender, maximum total length of 1.2 metres, there is a single large anterior temporal which separates this taxon from all others in *Psammophis* which was diagnostic for *Dromorphis*, but is not any longer useful on its own in terms of generic diagnosis as this species and just one in *Dromorphis* (*D. praeornatus*) as defined herein have this character.

The subgenus is monotypic for the species *Psammophis* (*Elliottus*) *lineatus.* It's known as the Striped Swamp Snake, being called this in reflection of the sort of habitats it is often found in and its typical colouration. It's found in most parts of Africa except for the far north and far south.

Etymology: Named in honour of Adam Elliott of Hoppers Crossing, in recognition of his contributions to Australian herpetology.

SUBGENUS *SLATTERYUS* SUBGEN. NOV.

Type species: *Psammophis biseriatus* Peters, 1881

Diagnosis: Separated from all other *Psammophis* (*senso stricto*), by having 15 instead of 17 dorsal mid-body rows. These snakes have 142-189 ventrals, 93-135 divided subcaudals, dorsal colour is grey or light brown, the top of the head is often lighter, including sometimes a bright green, maximum total length is 1.4 metres, pre-ocular 1 (rarely 2), 2 postoculars, the loreal is much longer than deep, temporals are variable 2+2 or 2+3, rarely 1+2 or 1+3; 8,9 or 10 upper labials with 3-5th or 4th-6th entering the orbit; 10 infralabials contact the anterior chin shields, which are shorter than posterior, narrow head, pair of occipital shields are widely separated. These are very slender snakes often arboreal in low vegetation.

They are found in the drier eastern sector of Africa, from the central regions, northwards to Sudan and Libya where they are not as common as further south.

Etymology: Named in honor of Paul Slattery, of Park Orchards, Victoria, Australia, for services to local governance, including through the publication and distribution of his independent local newspapers.

Content of Subgenus *Slatteryus* subgen. nov.

Psammophis (*Slatteryus*) *biseriatus* Peters, 1881 (Type species)

Psammophis (*Slatteryus*) *tanganicus* Loveridge, 1940

GENUS *DROMOPHIS* PETERS, 1869

Type species: *Dendrophis praeornatus* Schlegel, 1837

Diagnosis: Separated from the other three genera formerly within *Psammophis*, namely *Psammophis*, *Eipperus* gen. nov. and *Amphiophis* by the following suite of characters: 170-197 ventrals, 140-170 divided subcaudals, versus 90-120 in genus *Psammophis*, usually 17 mid-body rows, 9 supralabials, rarely 8 or 10, numbers 5-6 enter the orbit, rarely numbers 4-5 or 4-6, very rarely 6 and 7 enter the eye, pre-oculars are usually in contact, rarely separated from the frontal, 2 postoculars, loreal much longer than deep, temporal 2+2 or 2+3, or rarely 1+2, these are sometimes obscured and appear 2+1+3 or 2+2+3, 10 or 11 infralabials (4-6 usually largest) 4-5 contact chin shields long as or shorter than posterior.

The genus is usually recognizable by the very gaudy colour, which consists of 3 well-defined black stripes running down a yellow or creamish-white body although sometimes with a speckled pattern. Large bulging eye and a pair of large occipital shields. Of moderate build, but never bulky.

Grows to nearly 2 metres in length.

Found throughout Africa and nearby.

Content of genus *Dromophis*:

Dromophis praeornatus (Schlegel, 1837) (Type species)

Dromophis aegyptius (Marx, 1958)

Dromophis elegans (Shaw, 1802)

Dromophis pulcher (Boulenger, 1895)

Dromophis punctulatus (Duméril, Bibron and Duméril, 1854)

Dromophis schokari (Forskal, 1775)

Subgenus *Amphiophis* Bocage, 1872

Dromophis (*Amphiophis*) *angolensis* (Bocage, 1872)

SUBGENUS *AMPHIOPHIS* BOCAGE, 1872

Type species: *Amphiophis angolensis* Bocage, 1872

Diagnosis: Separated from all other *Psammophis* (senso lato) including genera *Psammophis*, *Dromophis*, *Eipperus* gen. nov. and *Amphiophis* by the following suite of characters: nostril pierced between 2 nasals; preocular 1, usually widely separated from frontal; postoculars 2; temporals usually1+2; supralabials 8 (rarely 6, 7 or 9), the fourth and fifth (rarely third and fourth, fourth only or fifth and sixth) entering orbit; infralabials 8 (rarely 7 or 9), the first 4 (rarely 3 or 5) in contact with anterior sublinguals; dorsal scales in 11-11-11 rows (rarely 9 rows); ventrals 133-157; cloacal shield divided; subcaudals 58-80. Head dark brown, three narrow yellow transverse bands posteriorly, supralabials white; neck dark brown with one or two grey crossbands which broaden laterally, a dark brown black-edged dorsal band three scales wide, greyish or yellowish laterally, sometimes with black hairlines through the outer two scale rows. Ventrum and lower half of outer scale row white or yellow, uniform or with an ill defined lateral series of dark flecks, sometimes a mid-ventral pale orange band present.

Found in the drier parts of sub-Saharan Africa. The subgenus is monotypic for *Dromophis* (*Amphiophis*) *angolensis.*

GENUS *EIPPERUS* GEN. NOV.

Type species: *Psammophis moniliger var. notostictus* Peters, 1867

Diagnosis: Separated from all other *Psammophis* (*senso lato*) including genera *Psammophis*, *Dromophis*, and *Amphiophis* by the following suite of characters. The nostril is pierced between 3 nasals, the upper posterior with a posterior prolongation; preoculars 2 (rarely 1), usually in contact with frontal; postoculars 2 (very rarely 3); temporals basically 2+2+3, but with frequent fusions; supralabials 8 (very rarely 7 or 9), the fourth

and fifth (rarely third and fourth) entering orbit; infralabials 9-12 (usually 10), the first 4 (rarely 3 or 5) in contact with anterior sublinguals; dorsal scales in 17-17-13 (or 17-17-15) rows; ventrals 155-183; cloacal shield entire or divided; subcaudals divided 76-107. Light grey to dark brown above, often paler laterally, uniform or with a pale stripe or series of spots on the vertebral scale row and a pale stripe on row 4, these stripes may be bordered by black flecks. The head shields may have pale margins, with a pair of pale blotches on the parietals. A white ventrolateral stripe covers the lower half of the outer scale row and ends of the ventrals, extending forward onto the labials, pre- and post-oculars. Chin and throat white with grey or black spots and streaks. Venter yellowish, more or less infuscated with grey and with a grey line bordering the white ventrolateral stripe. There are sometimes grey flushes on the venter.

These are long-thin and fast-moving diurnal snakes that actively chase their prey. Diagnostic of the genus is the long tail and high subcaudal count (76 to 107).

The genus is restricted to southern Africa, mainly in the countries to the immediate north of South Africa.

Etymology: Named in honor of Scott Eipper, a herpetologist from Queensland, Australia.

Content of *Eipperus* gen. nov.

Eipperus notostictus (Peters, 1867) (Type species)

Eipperus leightoni (Boulenger, 1902)

Eipperus namibensis (Broadley, 1975)

Eipperus jallae (Peracca, 1896)

Eipperus ansorgii (Boulenger, 1905)

Eipperus trigrammus Günther, 1865)

GENUS *PHAYREA* THEOBOLD, 1868

Type species: *Coluber condanarus* Merrem, 1820

Diagnosis: This genus is herein defined in two parts, firstly the five south-west and south Asian species, namely, *Phayrea condanarus* (type species), *P. lineolatus*, *P. indochinensis, P. leithii* and *P. longifrons*, then the remaining taxon, *P. crucifer*, placed in its own subgenus, *Rayhammondus* gen. nov.

The Asiatic species are separated from all other snakes within the genera *Phayrea*, *Psammophis*, *Eipperus* and *Dromophis* by the following suite of characters: The rostral is as deep as broad and easily visible from above; nasal divided or semidivided; internasals rather more than half the length of the prefrontals; frontal very narrow, as long as or longer than its distance from the end of the snout, as long as the parietals; loreal about twice as long as deep; preocular single, not extending to the frontal; two postoculars; temporals 1+2 or 1+3, rarely 2+3; upper labials 8, fourth and fifth entering the orbit; 4 lower labials in contact with the anterior chin-shields, which are as long as the posterior. 17 dorsal mid-body rows, 156-182 ventrals, anal divided, subcaudals 75-90. Dorsally the coloration varies, but is usually a pale olive-brown, with two pairs of more or less distinct dark bands each two scales wide, the lower of these bands, which passes through the eye, often black-edged; upper labials and lower parts uniform yellowish, with a dark line along each side of the ventrals and subcaudals. Total body length of about a metre.

The African taxon within this genus is separated from all other snakes within the genera *Phayrea*, *Psammophis*, *Eipperus* and *Dromophis* by the following suite of characters: Nostril pierced between 2 nasals; preocular 1, widely separated from frontal; postoculars 2 (very rarely 3); temporals basically 2+2+3, but with frequent fusions; supralabials 8 (rarely 7 or 9), the fourth and fifth (rarely third and fourth or fifth and sixth) entering orbit; infralabials 9 (rarely 10), the first 4 (rarely 5) in contact with anterior sublinguals; dorsal scales in 15-15-13 rows; ventrals 134-165; anal plate divided; subcaudals 68-91, though there is an isolated record of a specimen with a substantially lower ventral and subcaudal count, being an aberrant female from the Nyanga highlands, Zimbabwe, which had only 117 ventrals and 47 subcaudals (Broadley 2002). Head grey, with a dark red-brown black-edged stripe extending from the snout, dividing on the frontal and again on the parietals, in each case enclosing a grey centre, continuing on the body as a black-bordered three scale wide dorsal stripe, this is separated by a thin white line from a grey dorso-lateral stripe on scale rows 4, 5 and 6. A dark grey-brown lateral stripe covers scale rows 2 and 3 and the upper half of the outer row, the lower half being white. Pre- and post-oculars white, supralabials, chin and throat white, blotched or speckled with black. Ventrum orange with a broken black lateral line. South African specimens usually have one or two dark crossbars intersecting the vertebral stripe on the nape to form the “cross” from which the species derives its name, these crossbars are missing in specimens from Zimbabwe and KwaZulu-Natal. Some South African specimens are uniform grey above and pinkish white below.

The first described species from Asia are found in drier parts of south-west Asia, (two species), entering wetter parts in the south, with the single species from *Rayhammondus* subgen. nov. being confined to drier parts of east Africa south of the Sahara latitudes.

Content of *Phayrea* Theobold, 1868

Phayrea condanarus (Merrem, 1820) (Type species)

Phayrea lineolatus (Brandt, 1836)

Phayrea indochinensis (Smith, 1943)

Phayrea leithii (Günther, 1869)

Phayrea longifrons (Boulenger, 1896)

Subgenus *Rayhammondus* subgen. nov. (see below)

Phayrea (*Rayhammondus*) *crucifer* (Daudin, 1803)

SUBGENUS *RAYHAMMONDUS* SUBGEN. NOV.

Type species: *Coluber crucifer* Daudin, 1803

Diagnosis: This subgenus is monotypic for the species *Phayrea crucifer*, known under the common name of Mountain or Cross-marked Grass Snake.

It is separated from all other snakes in the genera *Psammophis*, *Dromophis*, *Eipperus* gen. nov. and *Amphiophis* by the following suite of characters: Nostril pierced between 2 nasals; preocular 1 widely separated from frontal; postoculars 2 (very rarely 3); temporals basically 2+2+3, but with frequent fusions; supralabials 8 (rarely 7 or 9), the fourth and fifth (rarely third and fourth or fifth and sixth) entering orbit; infralabials 9 (rarely 10), the first 4 (rarely 5) in contact with anterior sublinguals; dorsal scales in 15-15-13 rows; ventrals 134-165; anal plate divided; subcaudals 68-91, though there is an isolated record of a specimen with a substantially lower ventral and subcaudal count, being an aberrant female from the Nyanga highlands, Zimbabwe, which had only 117 ventrals and 47 subcaudals (Broadley 2002). Head grey, with a dark red-brown black-edged stripe extending from the snout, dividing on the frontal and again on the parietals, in each case enclosing a grey centre, continuing on the body as a black-bordered three scale wide dorsal stripe, this is separated by a thin white line from a grey dorso-lateral stripe on scale rows 4, 5 and 6. A dark grey-brown lateral stripe covers scale rows 2 and 3 and the upper half of the outer row, the lower half being white. Pre- and post-oculars white, supralabials, chin and throat white, blotched or speckled with black. Ventrum orange with a broken black lateral line. South African specimens usually have one or two dark crossbars intersecting the vertebral stripe on the nape to form the “cross” from which the species derives its name, these crossbars are missing in specimens from Zimbabwe and KwaZulu-Natal. Some South African specimens are uniform grey above and pinkish white below.

Found in drier parts of eastern southern Africa.

Etymology: Named in honor of Raymond (Ray) Hammond of Hamilton, Victoria, for services to governance in Australia, including his assistances to those who blew the whistle on corruption in the Victoria Police and also the Victorian Department of Sustainability and Environment.

REFERENCES CITED

Böhme, W. and De Pury, S. 2011. A note on the generic allocation of *Coluber moilensis* Reuss 1834 (Serpentes: Psammophiidae). *Salamandra* 47(2):120-123.

Boulenger, G. A. 1902. Description of a new snake of the genus *Psammophis*, from Cape Colony. *Proc. Zool. Soc. London* 1902:126.

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

Broadley, D. G. 1975. A review of *Psammophis leightoni* and *Psammophis notosticus* in southem Africa (Serpentes: Colubridae). *Arnoldia* 7(13):1-17.

Broadley, D. G. 2002. A review of the species of *Psammophis* Boie found south of Latitude 12° S (Serpentes: Psammophiinae). *Afr. J. Herpetol.* 51(2):83-119.

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

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. 2000. A revision of the African genus *Hemirhagerrhis* Boettger 1893 (Serpentes: Colubridae). *Syntarsus* 6:1-17.

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

Castoe, T. A., Chippindale, P. T., Campbell, J. A., Ammerman, L. L. and Pa, C. L. 2003. Molecular systematics of the Middle American jumping vipers (genus *Atropoides*) and phylogeography of the *Atropoides nummifer* complex. *Herpetologica* 59(3):420-431.

Castoe, T. A., Mahmood, M. S. and Parkinson, C. L. 2005. Modeling nucleotide evolution at the mesoscale: The phylogeny of the Neotropical pitvipers of the *Porthidium* group (Viperidae: Crotalinae). *Molecular Phylogenetics and Evolution* 37(3):881-898.

Castoe, T. A. and Parkinson, C. L. 2006. Bayesian mixed models and the phylogeny of pitvipers (Viperidae: Serpentes). *Molecular Phylogenetics and Evolution* 39(1):91-110.

Chirio, L. and Ineich, I. 1992. Les genres *Rhamphiophis* Peters 1854 et *Dipsina* Jan 1863 (Serpentes, Colubridae): revue des taxons reconnus et description d'une espèce nouvelle. *Bull. Mus. natl. Hist. nat.,* Paris, 4è ser. 13A (1-2):217-235.

da Silva, N. G. and Sites, J. W. 2001. Phylogeny of South American Triad Coral Snakes (Elapidae: *Micrurus*) Based on Molecular Characters. *Herpetologica* 57(1):1-22.

Egan, D. 2007. *Snakes of Arabia*. Motivate Publishing, Dubai:208 pp.

Esterbauer, H. 1985. Die Eidechsennatter, *Malpolon monspessulanus*, in Syrien. *Die Aquarien und Terrarienzeitschrift*, 38(12):562-565.

Fitzsimons, V. 1966. A check-list, with syntopic keys, to the snakes of southern Africa. *Annals of the Transvaal Museum* 25(3):35-79.

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.

Guo, Y., Yunke, W., Shunping, H., Haito, S. and Zhao, E. 2011. Systematics and molecular phylogenetics of Asian snail-eating snakes (Pareatidae). *Zootaxa* 3001:57-64.

Hartmann, Jörg 1998. Der Gestreifte Shaapsteker (*Psammophylax tritaeniatus*) - Porträt einer Rarität in der Terraristik. *Elaphe* 6(1):17-22.

Hedges, N. G. 1983. *Reptiles and amphibians of East Africa*. Kenya Literature Bureau, Nairobi:139 pp.

Hughes, B. 2002. On the African leopard whip snake, *Psammophis leopardinus* Bocage, 1887 (Serpentes, Colubridae), with the description of a new species from Zambia. *Bull. Nat. Hist. Mus. Lond* (Zool.), 68(2):75-81.

Hulbert, F. and Lutzmann, N. 2004. *Mimophis mahfalensis* (Grandidier). *Sauria*, Berlin 26(2):1-2. [erratum in 26(4):46]

Kelly, C. M. R., Nigel, P., Barker, M., Villet, H., Broadley, D. G. and Branch, W. R. 2008. The snake family Psammophiidae (Reptilia: Serpentes): Phylogenetics and species delimitation in the African Sand Snakes (*Psammophis* Boie, 1825) and allied genera. *Molecular Phylogenetics and Evolution* 47(3):1045-1060.

Kramer, E. and Schnurrenberger, H. 1963. Systematik, Verbreitung und Ökologie der Libyschen Schlangen. *Rev. Sui. Zool.* 70(3):453-568.

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

Lawson, R., Slowinski, J. B., Crowther, B. I. and Burbink, F. T. 2005. Phylogeny of the colubroidea (Serpentes): New evidence from the mitochondrial and nuclear genes. *Molecular phylogenetics and evolution* 37:581-601.

Loveridge, A. 1940. Revision of the African snakes of the genera *Dromophis* and *Psammophis. Bull. Mus. comp. Zool.* Harvard 87:1-69.

Marx, H. 1958. Egyptian snakes of the genus *Psammophis*. *Fieldiana:Zoology* 39:191-200.

Marx, H. 1988. The colubrid snake, *Psammophis schokari*, from the Arabian Peninsula. *Fieldiana: Zoology. New Ser.* 40(1383):1-16.

Parker, H. W. 1949. The snakes of Somaliland and the Sokotra islands. *Zoologische Verhandelingen* 6:1-115.

Pyron, R. A., et al. 2011. The phylogeny of advanced snakes (Colubroidea), with discovery of a new subfamily and comparison of support methods for likelihood trees. *Mol. Phylogenet. Evol.* 58:349-342.

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").

Queiroz, A., Lawson, R. and Lemos-Espinal, J. A. 2002. Phylogenetic Relationships of North American Garter Snakes (*Thamnophis*) Based on Four Mitochondrial Genes: How Much DNA Sequence Is Enough? *Molecular Phylogenetics and Evolution* 22:315-329.

Rato, C., Brito, J. C., Carretero, M. A., Larbes, S., Shacham, B. and Harris, D. J. 2007. Phylogeography and genetic diversity of *Psammophis schokari* (Serpentes) in North Africa based on mitochondrial DNA sequences. *African Zoology* 42(1):112-117.

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).

Schlüter, U. 2006. Sandliebhaber - die psammophilen Nattern Nordafrikas. *Reptilia* (Münster)11(4):72-80.

Shine, R., Branch, W. R., Webb, J. K., Harlow, P. S., and Shine, T. 2006. Sexual Dimorphism, Reproductive Biology, and Dietary Habits of Psammophiine Snakes (Colubridae) from Southern Africa. *Copeia* 2006(4):650-664.

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

Wüster, W., Peppin, L., Pook, C. E. and Walker, D. E. 2008. A nesting of vipers: Phylogeny and historical biogeography of the Viperidae (Squamata: Serpentes). *Molecular Phylogenetics and Evolution* 49(2):445-459.

NEW ARRANGEMENT OF GENERA AND SPECIES FORMERLY PLACED WITHIN *PSAMMOPHIS*

Genus: *Psammophis* Fitzinger, 1843
Psammophis sibilans (Linnaeus, 1758) (Type species)
Psammophis brevirostris Peters, 1881
Psammophis mossambicus Peters, 1882
Psammophis phillipsi (Hallowell, 1844)
Psammophis leopardinus Bocage, 1887
Psammophis rukwae Broadley, 1966
Psammophis sudanensis Werner, 1919
Psammophis orientalis Broadley, 1977
Psammophis subtaeniatus Peters, 1882
Psammophis trinasalis Werner, 1902
Psammophis zambiensis Hughes, 2002
Subgenus *Elliottus* subgen. nov.
Psammophis (*Elliottus*) *lineatus* (Duméril, Bibron and Duméril, 1854)
Subgenus *Slatteryus* subgen. nov.
Psammophis (*Slatteryus*) *biseriatus* Peters, 1881 (Type species)
Psammophis (*Slatteryus*) *tanganicus* Loveridge, 1940

Genus: *Dromophis* Peters, 1869
Dromophis praeornatus (Schlegel, 1837) (Type species)
Dromophis aegyptius (Marx, 1958)
Dromophis elegans (Shaw, 1802)
Dromophis pulcher (Boulenger, 1895)
Dromophis punctulatus (Duméril, Bibron and Duméril, 1854)
Dromophis schokari (Forskal, 1775)
Subgenus *Amphiophis* Bocage, 1872
Dromophis (*Amphiophis*) *angolensis* (Bocage, 1872)
Genus: *Eipperus* gen. nov.
Eipperus notostictus (Peters, 1867) (Type species)
Eipperus leightoni (Boulenger, 1902)
Eipperus namibensis (Broadley, 1975)
Eipperus jallae (Peracca, 1896)
Eipperus ansorgii (Boulenger, 1905)
Eipperus trigrammus Günther, 1865)
Genus: *Phayrea* Theobold, 1868
Phayrea condanarus (Merrem, 1820) (Type species)
Phayrea lineolatus (Brandt, 1836)
Phayrea indochinensis (Smith, 1943)
Phayrea leithii (Günther, 1869)
Phayrea longifrons (Boulenger, 1896)
Subgenus *Rayhammondus* subgen. nov.
Phayrea (*Rayhammondus*) *crucifer* (Daudin, 1803)

Hoser 2012 - Australasian Journal of Herpetology 12:26-31.

Australasian Journal of Herpetology **12:32-35.**
Published 30 April 2012.

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

A division of the African Tree Viper genus *Atheris* Cope, 1860 into four subgenera (Serpentes:Viperidae).

Raymond T. Hoser

488 Park Road, Park Orchards, Victoria, 3114, Australia.
***Phone*: +61 3 9812 3322 *Fax*: 9812 3355 *E-mail*: viper007@live.com.au**
Received 15 February 2012, Accepted 2 April 2012, Published 30 April 2012.

ABSTRACT

The African Tree Viper genus *Atheris* has been of interest to taxonomists in recent years.

Significant was the removal of the species *superciliaris* to the newly created monotypic genus *Proatheris* and the species *hindii* to the monotypic genus *Montatheris* both by Broadley in 1996 gaining widespread acceptance.

Marx and Rabb (1965), erected a monotypic genus *Adenorhinos* for the species *barbouri*, but this designation has not gained widespread support from other herpetologists, with a number of recent classifications continuing to place the taxon within *Atheris* (e.g. Menegon et. al. 2011).

Phylogenetic studies of the genus *Atheris senso lato* using molecular methods (e.g. Pyron et. al. 2011) have upheld the validity of the creation of the monotypic genera *Proatheris* and *Montatheris* by Broadley.

These studies have also shown there to be at least four well-defined groups of species within the genus *Atheris* as recognized in early 2012, though not as divergent as seen for the snakes placed within *Proatheris* and *Montatheris*.

As a result, the genus is now subdivided into subgenera using available names for three, with the fourth one being named *Woolfvipera* subgen. nov.

Keywords: new genus; Viper; Africa; *Atheris; Poecilostolus; Adenorhinos; Woolfviper; Proatheris; Montatheris.*

INTRODUCTION

African Tree Vipers represent a significant case of convergent evolution when compared with Asian Pitvipers (*Trimeresurus* and related genera) and South American Pitvipers (*Bothrops* and related genera).

The majority of species have a derived body form superbly suited to an arboreal existence as a predator of other vertebrates.

African Tree Vipers as a group are fairly small snakes ranging in adult size from *Montatheris hindii* (20-36 cm total length) to *Atheris nitschei* and *A. squamigera* (some specimens may exceed 76 cm). They are characterized by having broad heads, relatively large eyes, vertical pupils and narrow necks. Their bodies are usually slender and have strongly keeled and overlapping scales. These snakes come in a range of colours and patterns, sometimes within a single species. *Atheris ceratophora* and *A. squamigera* are particularly variable species. Most *Atheris* species are primarily arboreal, but may be frequently found on or near the ground. Snakes placed in the genera *Proatheris* and *Montatheris* are by notable contrast primarily terrestrial.

All *Atheris* (*senso lato*) are characterized by normal slow and deliberate movements, relying on their cryptic coloration to avoid detection.

All these snakes are easily separated from the stout, heavily bodied terrestrial species of viper within the genus *Bitis senso lato*.

African Tree Vipers are endemic to Africa. Many species have very limited ranges and it seems only exist in isolated populations, making them particularly vulnerable to human induced habitat modification. They range across equatorial Africa as far west as the rainforests of Guinea (*Atheris chlorechis*) and as far southeast as coastal Mozambique (*Proatheris superciliaris*). They occur at a wide range of elevations from lowland swamps (*P. superciliaris*) to high altitude montane moorland (*Montatheris hindii*). Rainforest, evergreen forest, montane forest, upland swamp, and lowland swamp bordering grassland are among the habitats utilized by African Tree Vipers.

There have been numerous studies into these snakes, both in terms of ecology and systematics. These have resulted in the publications of, Barbour and Loveridge (1928), Bartlett (1988), Bogert (1940), Boulenger (1906), Branch (2000), Broadley (1960, 1998), Broadley and Howell (1991), Broadley, et. al. (2003), Dobiey and Vogel (2007), Edwards (2000), Emmrich (1997), Ernst and Rödel (2002), Freed (1986), Günther (1863), Hallowell (1856), Ionides and Pitman (1965), Kramer (1961), Laurent (1955, 1956, 1960), Lawson (1993), Lawson (1999), Love (1988), Loveridge (1930, 1933, 1936, 1942, 1953 and 1957), Mallow et. al. (2003), McMahon (1990), Meidinger (1998, 2000), Menegon et. al. (2011), Morgan (1988), Pareti (1994), Pearson (1997), Pel (1851), Peters (1864), Phelps (2010), Pitman (1974), Pook (1990), Rasmussen and Howell (1982, 1998), Spawls (1990), Spawls and Branch (1995), Spawls et. al. (2001), Stevens (1973), Tornier (1902), Vesey-Fitzgerald (1958), Werner (1895) and Witte (1953).

Publications of relevance to the taxonomic placements within this paper include those of Ashe (1968), Boulenger (1910), Broadley (1989), Broadley (1996), Broadley (1998), Cope (1859), Fischer (1888), ICZN (1991), Lawson (1999), Lawson and Ustach (2000), Lawson et. al. (2001), Loveridge (1930), Marx and Rabb (1965), Pyron et. al. (2011) and Werner (1895).

As mentioned in the abstract, recent studies of the phylogeny of these and related snakes have shown clearly that the monotypic genera *Proatheris* and *Montatheris* are more than sufficiently divergent to be valid.

The results of a molecular study published by Pyron et. al. (2011) were somewhat ambiguous in terms of any further divisions within *Atheris* as currently known.

The species placed in the monotypic genus *Adenorhinus* by Marx and Rabb in 1965, namely *A. barbouri*, was found by Pyron et. al. to be closest to *Atheris ceratophora*. In fact both species were found to be closer to one another than any other of the remaining four *Atheris* species tested by Pyron et. al.

Because these two species formed a well defined group separate from other *Atheris* tested and by a significant amount, there is a strong argument that could be mounted for not only retaining the genus *Adenorhinus,* but furthermore it's expansion to include those species closely related to the type species *A. barbouri,* namely *Atheris ceratophora* and *A. katangensis*, as well as *A. mabuensis*, and the recently described species *A. matildae.*

Rather than recognize *Adenorhinus* as a genus, I have taken the conservative position and recognized it within *Atheris* as a subgenus.

Based on the molecular results of Pyron et. al. (2011) and the obvious morphological affinities of the rest of *Atheris*, it is clear that the remainder of *Atheris* also forms three other well-defined species group clades. As a matter of consistency with *Adenorhinus,* these too should be assigned to subgenera.

This is fairly straight forward with those species associated with *Atheris squamigera* being placed in the genus *Poecilostolus* Günther, 1863.

These other species are, *A. hispida*, *A. acuminata*, *A. subocularis*, *A. broadleyi* and *A. hirsuta*.

A. chlorechis remains within *Atheris*, noting that the ICZN has ruled this the type species for the genus. This is a monotypic group.

The remaining species, namely *A. desauxi*, *A. nitschei* and *A. rungweensis*, are herein placed in a new subgenus, namely *Woolfvipera* gen. nov. as defined below.

GENUS *ATHERIS SENSO LATO* (DIAGNOSIS)

These snakes are characterized by the characters already mentioned. In addition they have a broadly triangular head, distinct from the neck, thickly covered with small keeled imbricate scales, with small scales separating the labials from the eye. The mouth appears grotesquely wide, the eye is large and the pupil vertically elliptical. The nostrils are laterally oriented, the body is somewhat vertically compressed and the body scales are keeled (not serrated) with apical pits. The laterals are more-or-less oblique, smaller than dorsals and last lateral row is larger, ventrals are rounded, the tail is moderately short but prehensile (the degree of which varies between subgenera), subcaudals are single. Most adults are less than 700 mm in total length and most species appear to move about mostly at night.

They are live-bearing.

SUBGENUS *WOOLFVIPERA* SUBGEN. NOV.

Type species: *Atheris nitschei* Tornier, 1902

Diagnosis: Separated from other species within the genus *Atheris* by the following suite of characters: Their head is broad, flat and angular, conspicuously distinct from the neck, covered above with strongly keeled imbricate scales; the last four upper labials are slightly keeled, the scales below the head to the end of the gape are not keeled.

By contrast snakes in the subgenera *Adenorhinus* and *Poecilostolus* have heads that have a shaggy spiked appearance or if not, then with more strongly keeled scales than seen in *Woolfvipera* subgen. nov. forming three or four distinct rows of ridges on each side of the head running from behind the eyes to the beginning of the neck, with the ridges running down the centre of each scale. In *Woolfvipera* subgen. nov. such ridges are either absent, or if present, barely discernable.

Atheris is separated from this subgenus by the considerably longer and more prehensile tail, noting that *Atheris* (subgenus) tends to have smaller and more imbricate head shields than seen in *Adenorhinus* and *Poecilostolus*.

Ventrally *Woolfvipera* subgen. nov. are immaculate yellow or creamish in colour, versus mottled, patterned or otherwise dark in the other three subgenera *Atheris*, *Adenorhinus* and *Poecilostolus.*

Woolfvipera subgen. nov. are characterized by a somewhat more stout build than the snakes in the other subgenera and due to their attaining a length in line with those of the other subgenera, these snakes are in fact considerably heavier. Their tails are also generally shorter than seen in the other subgenera, except for *Adenorhinus.*

Scale counts for ventrals, subcaudals, mid-body rows, labials and the like are variable and overlap with species in the other subgenera.

The subgenus *Adenorhinus* are separated from other *Atheris* by their smaller adult size (average maximum total length of 45 cm) and non-prehensile tails.

The Green Bush Viper, *Atheris chlorechis*, monotypic for the subgenus *Atheris* is diagnosed by the following suite of characters: Adults large, often 45-60 cm (18-24 inches) in total length. Some specimens occasionally reach 70 cm (28 inches). The keeled body scales are smaller than other members of the genus giving it a smoother appearance. Its tail is long and strongly prehensile with a yellow tip. Not nearly as variable as other *Atheris* species with most adult specimens overwhelmingly

green. Western bush vipers are light green with a pale green or bluish venter and pale yellowish paired dorsal spots. The 15-19 cm (6-7 1/2 inch) babies may be tan or light brown and change to yellowish green with dark green markings within 24 hours (Freed, 1986, Spawls and Branch, 1995).

The snakes in the subgenus *Poecilostolus* are separated from other *Atheris* by the following suite of characters: prehensile tail, shaggy or spinose head, alternatively not such, but with heavily ridged neck and body scales dark, mottled or patterned venter.

Montatheris is separated from all other *Atheris* and *Proatheris* by the following suite of characters: It is a very small viper only 20-36 cm (8-14 inches) in total length. Greyish or brown with pairs of black triangles with light edges on the dorsum. Head is brownish with a dark brown 'V' or arrow mark. Venter is greyish with darker speckling.

Proatheris is separated from all other *Atheris* and *Montatheris* by a pair of large supraocular shields, that none of the others have. It is a heavy bodied viper with a greyish brown dorsum with three rows of dark spots separated by yellowish bars that form a broken lateral line on either side of the body. The unusually elongated head has three blackish chevrons. Venter is whitish with dark blotches, underside of tail is orange or yellow. Adult size is usually 42-60 cm (16-24 inches).

Distribution: *Woolfvipera* gen. nov. is found in Central Africa.

Etymology: *Woolfvipera* subgen. nov. is named in honour Australian herpetologist, Paul Woolf, in recognition of his many decades valuable contribution to Australian herpetology, including as founder president of the Herpetological Society of Queensland.

Content of Subgenus *Woolfvipera* subgen. nov.

Atheris (*Woolfvipera*) *nitschei* Tornier, 1902 (Type species)

Atheris (*Woolfvipera*) *desauxi* Ashe, 1968

Atheris (*Woolfvipera*) *rungweensis* Bogert, 1940

Content of Subgenus *Atheris* Cope, 1860

Atheris (*Atheris*) *chloroechis* (designated type species)

Content of Subgenus *Adenorhinus* Marx and Rabb, 1965

Atheris (*Adenorhinus*) *barbouri* Loveridge, 1930 (Type species)

Atheris (*Adenorhinus*) *ceratophora* Werner, 1895

Atheris (*Adenorhinus*) *katangensis* Witte, 1953

Atheris (*Adenorhinus*) *mabuensis* Branch and Bayliss, 2009

Atheris (*Adenorhinus*) *matildae* Menegon et. al., 2011

Content of Subgenus *Poecilostolus* Günther, 1863

Atheris (*Poecilostolus*) *squamigera* (Hallowell, 1854) (Type species)

Atheris (*Poecilostolus*) *acuminata* Broadley, 1998

Atheris (*Poecilostolus*) *broadleyi* Lawson, 1999

Atheris (*Poecilostolus*) *hirsuta* Ernst and Rödel, 2002

Atheris (*Poecilostolus*) *hispida* Laurent, 1955

Atheris (*Poecilostolus*) *subocularis* Fischer, 1888

The genus *Montatheris* Broadley (1996) is monotypic for the species *M. hindii*

(Boulenger, 1910). The genus *Proatheris* Broadley (1996) is monotypic for the species *Proatheris superciliaris* (Peters, 1854).

REFERENCES CITED

Ashe, J. 1968. A new bush viper. *Ned. Tijdschr. jagtkunde*. 1:149-173.

Barbour, T. and Loveridge, A. 1928. A comparative study of the herpetological faunae of the Uluguru and Usambara Mountains, Tanganyika Territory, with descriptions of new species. *Mem. Mus. comp. Zool. Harv.* 50:87-265.

Bartlett, R. D. 1998. Random thoughts on the variable bush viper, *Atheris squamiger*. *Reptile Hobbyist*. 3(8):52-58.

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.

Boulenger, G. A. 1906. Description of a new tree-viper from Mount Ruwenzori. *Ann. Mag. nat. Hist.* (7)18:37-38.

Boulenger, G. A. 1910. Description of four new African snakes in the British Museum. *Ann. Mag. nat. Hist.* (8)5:512-513.

Branch, B. 2000. Mountains, moorlands and moving houses: The search for *Montatheris*. *Reptiles* 8(6):48-57.

Broadley, D. G. 1960. *Vipera superciliaris*, a rare viper added to the Nyasaland list. *J. Herp. Ass. Rhod.* 12:3-4.

Broadley, D.G. 1989. Case 2691. Atheris Cope, 1862 (Reptilia, Serpentes): proposed conservation, and proposed confirmation of *Vipera chlorechis* Pel, 1851 as the valid name of the type species. *Bull. zool. Nomencl.* 46:264-266.

Broadley, D. G. 1996. A review of the tribe Atherini (Serpentes: Viperidae), with the descriptions of two new genera. *Afr. J. Herpetol.* 45(2):40-48.

Broadley, D. G. 1998. A review of the genus *Atheris* Cope (Serpentes: Viperidae), with the description of a new species from Uganda. *Herpetological Journal* 8:117-135.

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

Cope, E. D. 1859. Catalogue of the venomous serpents in the Museum of the Academy of Natural Sciences of Philadelphia, with notes on the families, genera, and species. *Proc. Acad. nat. Sci. Philad.* 1859:332-347.

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

Edwards, E. 2000. The Ivorian Tree Viper. *Ophidia Review* 1:4-5.

Emmrich, D. 1997. New data for the rare horned bush-viper, *Atheris ceratophora*, Werner, 1895. *Mitt. Zool. Mus. Berl.* 73(1):131-151.

Ernst, R. and Rödel, M. O. 2002. A new *Atheris* species (Serpentes: Viperidae), from Taï National Park, Ivory Coast. *Herpetological Journal* 12:55-61.

Fischer, J. G. 1888. Über zwei neue Schlangen und eine neuen Laubrosch von Kamerun. *Jb. hamb. wiss. Anst.* 5:1-10.

Freed, P. 1986. *Atheris chlorechis* (West African bush viper): Reproduction. *Herp. Review.* 17(2):47-48.

Günther, A. 1863. On *Atheris burtonii*, a new snake from West Africa. *Proc. zool. Soc. Lond.* 16-17.

Hallowell, E. 1856. Descriptions of new reptiles from Guinea. *Proc. Acad. nat. Sci. Phila.* 1854:193-194.

ICZN (International Commission on Zoological Nomenclature). 1991. Opinion 1634: *Atheris* Cope, 1862 (Reptilia, Serpentes): conserved. *Bull. zool. Nomencl.* 48:84.

Ionides, C. J. P. and C. R. S. Pitman. 1965. Notes on two East African venomous snake populations - *Echis carinatus pyramidum* (Geoffroy), Egyptian saw-scaled viper and *Vipera hindii* (Boulenger), montane viper. *J. E. Afr. nat. Hist. Soc.* 25(III):116-121.

Kramer, E. 1961. Über zwei afrikanische Zwergpuffottern, *Bitis hindii* (Boulenger, 1910) und *Bitis superciliaris* (Peters, 1854). *Viert. naturf. Ges. Zürich.* 106:419-423.

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

Laurent, R. F. 1956. Contribution à l'Herpétologie de la Région des Grands Lacs de l'Afrique centrale. *Ann. Mus. roy. Congo belge, sér. in 8vo, Sci. Zool.* 48:1-390.

Laurent, R. F. 1960. Notes complementaires sur les Chéloniens et les Ophidiens du Congo oriental. *Ann. Mus. roy. Congo belge, sér. in 8vo, Sci. Zool.* 84:1-86.

Lawson, D. P. 1993. The reptiles and amphibians of the Korup National Park Project, Cameroon. Herpetological Natural History.

1(2):27-90.
Lawson, D. P. 1999. A new species of arboreal viper (Serpentes: Viperidae: *Atheris*) from Cameroon, Africa. Proc. Biol. Soc. Washington. 112(4):793-803.
Lawson, D. P. and P. C. Ustach. 2000. A redescription of *Atheris squamigera* (Serpentes: Viperidae) with comments on the validity of *Atheris anisolepis*. *J. Herpetol.* 34(3):386-389.
Lawson, D. P., Noonan, B. P. and Ustach, P. C. 2001. *Atheris subocularis* (Serpentes: Viperidae) Revisited: Molecular and Morphological Evidence for the Resurrection of an Enigmatic Taxon. *Copeia*. 2001(3):737-744.
Love, W. 1988. Bush vipers (*Atheris*): Experiences in breeding and maintenance. *Vivarium*. 1(3): 22-25.
Loveridge, A. 1930. Preliminary description of a new tree viper of the genus *Atheris* from Tanganyika Territory. *Proc. New England Zool. Club*. 11:107-108.
Loveridge, A. 1933. Reports on the scientific results of an expedition to the southwestern highlands of Tanganyika Territory. VII. Herpetology. *Bull. Mus. comp. Zool. Harv*. 74:197-416.
Loveridge, A. 1936. Scientific results of an expedition to rain forest regions in eastern Africa. V. Reptiles. *Bull. Mus. comp. Zool. Harv*. 79:209-337.
Loveridge, A. 1942. Scientific results of a fourth expedition to forested areas in east and central Africa. IV. Reptiles. *Bull. Mus. comp. Zool. Harv.* 91:237-373.
Loveridge, A. 1953. Zoological results of a fifth expedition to East Africa. III. Reptiles from Nyasaland and Tete. *Bull. Mus. comp. Zool. Harv*. 110:141-322.
Loveridge, A. 1957. Check list of the reptiles and amphibians of East Africa (Uganda, Kenya, Tanganyika, Zanzibar). *Bull. Mus. comp. Zool. Harv*. 117:153-362.
Mallow, D., Ludwig, D. and Nilson, G. 2003. *True Vipers: Natural History and Toxinology of Old World Vipers.* Krieger, Malabar, Florida, 410 pp.
Marx, H. and Rabb, G. B. 1965. Relationships and zoogeography of the viperine snakes (Family Viperidae). *Fieldiana. Zool.* 44:161-206.
McMahan, B. 1990. *Atheris nitschei nitschei* (Sedge Viper) reproduction. *Herp. Review.* 21(4):93.
Meidinger, R. 1998. Erstnachzucht von *Atheris desaixi* Ashe, 1968, Mount-Kenya-Buschviper. *Elaphe*. 6(3):15-17.
Meidinger, R. 2000. Erfolgreiche Haltung und Erstnachzucht von *Atheris hispida*, die Rauhschuppigen Buschviper. *Elaphe*. 8(4):5-10.
Menegon, M., Davenport, T. B. and Howell, K. M. 2011. Description of a new and critically endangered species of *Atheris* (Serpentes: Viperidae) from the Southern Highlands of Tanzania, with an overview of the country's tree viper fauna. *Zootaxa* 3120:43-54.
Morgan, D. R. 1988. The lowland viper (*Atheris superciliaris*) in captivity: A preliminary perspective. *J. Herp. Ass. Afr.* 34:38-40.
Pareti, K. S. 1994. Cannibalism in a captive West African Bush Viper (*Atheris chlorechis*). *Herp. Review* 25(1):17.
Pearson, S. 1997. The bush vipers: Gorgeous problem snakes. *Reptile Hobbyist*. 2(11):36-38, 40, 42, 43.
Pel, H. S. 1851. Over de jagt aan de Goudkust, volgens eene tienjarige eigene ondervinding. *Ned. Tijdschr. jagtkunde*. 1:149-173.
Peters, W. C. H. 1864. Eine neue Art der Baumvipern, *Atheris polylepis* aus Liberia. *Mber. Königl. Akad. Wiss. Berl.* 184:642-645.
Phelps, T. 2010. *Old World Vipers*. Edition Chimaira, Frankfurt, 558 pp.
Pitman, C. R. S. 1974. *A guide to the snakes of Uganda.* Revised Edition. Codicote: Wheldon and Wesley.
Pook, C. E. 1990. Notes on the genus *Atheris* (family Viperidae). *Br. herpetol. Soc. Bull.* 32:31-36.
Pyron, R. A., et al. 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.
Rasmussen, J. B. and Howell, K. M. 1982. The current status of the rare Usambara mountain forest-viper, *Atheris ceratophorus* Werner, 1895, including a probable new record of *Atheris nitschei rungweensis* Bogert, 1940, and a discussion of its validity (Reptilia, Serpentes, Viperidae). *Amphibia-Reptilia* 3:269-277.
Rasmussen, J. B. and Howell, K. M. 1998. A review of Barbour's short-headed viper, *Adenorhinos barbouri* (Serpentes: Viperidae). *Afr. J. Herpetol.* 47(2):69-75.
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").
Spawls, S. 1990. Further comments on *Atheris*. *Br. herpetol. Soc. Bull.* 34: 44-45.
Spawls, S. and Branch, B. 1995. *The Dangerous Snakes of Africa*. Blandford, London.
Spawls, S., Howell, K., Drewes, R. C. and Ashe, J. 2001. *A field guide to the reptiles of East Africa*. Academic Press, 543 pp.
Stevens, R. A. 1973. A report on the lowland viper, *Atheris superciliaris* (Peters), from the Lake Chilwa floodplain of Malawi. *Arnoldia Rhodesia.* 6(22):1-22.
Tornier, G. 1902. Herpetologische Neues aus Deutsch-Ost-Afrika. *Zool. Jahrb.* 16:578-590.
Vesey-Fitzgerald, D. F. 1958. The snakes of Northern Rhodesia and the Tanganyika Borderlands. *Proc. Trans. Rhod. Sci. Assoc.* 46:17-102.
Werner, F. 1895. Ueber einige Reptilien aus Usambara (Deutsch-Ostafrika). *Verh. zool.-bot. Ges Wien.* 45:194.
Witte, G.-F. de. 1953. Reptiles. *Explor. Parc natn. Upemba Miss. G.-F. de Witte*. 6:1-322.

Hoser 2012 - Australasian Journal of Herpetology 12:32-35.

Australasian Journal of Herpetology

Publishes original research in printed form in relation to reptiles, other fauna and related matters.

It is a peer reviewed printed journal for permenant public scientific record, with a sizeable print run and has a global audience.

Full details at: 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.

Available online at www.herp.net

Australasian Journal of Herpetology **12:36-39.**
Published 30 April 2012.

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

A new Subgenus of Giant Snakes (Anaconda) from South America (Serpentes: Boidae).

Raymond T. Hoser

488 Park Road, Park Orchards, Victoria, 3114, Australia.
Phone: +61 3 9812 3322 Fax: 9812 3355 E-mail: viper007@live.com.au
Received 12 February 2012, Accepted 4 April 2012, Published 30 April 2012.

ABSTRACT

A review of the taxonomy of the New World boids finds several genera as currently recognized to be paraphyletic.

There are available genus names for those species within genera that have been found to be composite, should they be split to ensure monophyletic genera.

The only potential exception to this is within the genus *Eunectes* Wagler, 1830 as currently recognized.

There is a strong argument in favor of splitting the so-called Yellow Anacondas away from the so-called Green Anacondas, at the genus level as a result of clear and consistent differences between the relevant taxa.

This paper formalizes this division by taking a conservative position and naming and defining a new subgenus, *Maxhoserboa* subgen. nov. for the Yellow Anaconda and related species.

Keywords: Taxonomic revision; new subgenus; *Eunectes*; *Maxhoserboa*; *murinus*; *deschauenseei; notaeus*; *beniensis*; snakes.

INTRODUCTION

The large and giant South American Boa species known as "Anaconda" have fascinated people ever since they first became known to Europeans and no doubt prior.

Allegedly reaching lengths up to 10 metres (33 feet), although none accurately recorded have ever come close to this, the Green Anaconda, averaging about five metres in length is still by far (on average) the heaviest living snake on the planet, even if not the longest.

The longest recorded living snake to date is the far thinner Asiatic Reticulated Python (*Broghammerus reticulatus*).

Almost every kid's book about "dangerous" animals features the Green Anaconda (*Eunectes murinus*) as part of the script.

In 1997 a so-called adventure film titled **"**Anaconda" was made to highlight the size and ferocity of these particularly large snakes. It was complete with all the embellishment and hype that a blockbuster film would be expected to have.

Native to most of the northern half of South America east of the Andes, these snakes are reasonably common where they occur and therefore well-known to science.

The larger and better-known Green Anaconda (*Eunectes murinus*) has been a staple of major public zoos for decades, while the somewhat smaller and more even tempered Yellow Anaconda (*E. notaeus*) has been popular with herpetoculturists since at least the late 1970's when numbers of live specimens were imported to Europe and the USA to satisfy the burgeoning reptile pet trade (see Fig 9.4 Reed and Rodda 2009).

As a result of their abundance both in the wild and more recently in captivity, there are numerous excellent publications dealing with all aspects of these snakes, including, Albuquerque et. al. (2010), Barone (2003), Bellosa (2003), Bellosa and Mössle (2009), Calle et. al. (1994), Calle et. al. (2001), Cope (1869), Gay (1993), Gilmore and Murphy (1993), Infante-Rivero et. al. (2008), Lamonica et. al. (2007), Müller (1970), Petzold (1983) Rivas (1998, 2000, 2001, 2007), Rivas and Corey (2008), Rivas and Burghardt (2001), Rivas and Owens (2000), Rivas et. al. (1995, 1999, 2001, 2007a, 2007b, 2008), Schreitmüller (1924), Starace (1998), Strimple (1993, 1997), Strimple et. al. (1997), Trutnau (1982) and Vaz-Silva (2007).

The taxonomy at the genus level has been fairly stable since Wagler first created the genus *Eunectes* in 1830.

At the species level, the two most widespread and common

forms have been consistently recognized, namely Green (*Eunectes murinus*) and Yellow (*E. notaeus*), with most authors not recognizing other described variants until the period post-dating year 2000 (see McDiarmid et. al. 1999).

In recent years a number of described variants have been given full species status, mainly as a result of five studies published by Dirksen and Böhme, namely Dirksen (2001), Dirksen (2002), Dirksen and Böhme (1998a), Dirksen and Böhme (1998b) and Dirksen and Böhme (2005) and others similar publications by Dirksen in particular.

Dirksen has also promoted the "new" species that he described in 2002 via his own personal website (http://www.anakondas.de) that is dedicated to Anacondas.

Broadly speaking there are two main clades within the genus as currently recognized.

First is the larger Green Anacondas (*Eunectes murinus*), the type species described by Linnaeus in 1758. The clade apparently includes the lesser-known and smaller species *E. beniensis,* a taxon first described by Dirksen in 2002.

Secondly are the distributionally disjunct and considerably smaller, Yellow Anacondas, (*E. notaeus*), described by Cope in 1862, and the lesser-known species *E. deschauenseei,* described by Dunn and Conant in 1936, a taxon regarded by many for some years as merely a variant of *notaeus.*

Phylogenies of these two main lineages relying on morphological and molecular evidence have been done and show that each lineage is effectively monophyletic.

Furthermore, fossil evidence from the region shows *Eunectes* to have ancient origins dating as far back as the middle Miocene (16-11.6 MYA) of Columbia for the now extinct taxon *E. stirtoni* (Hsiou and Albino 2009) or perhaps even earlier (same authors).

On that basis it seems obvious that the snakes should be split into two genera or at least subgenera, as has been proposed for other South American and Carribean boa genera as indicated by Noonan and Chippindale (2006), see in particular for the genera *Epicrates* and *Eryx* as currently recognized.

However until the post 2000 period, *Eunectes* as recognized only contained two recognized and superficially similar species, so there was a strong and compelling argument by taxonomists against the creation of two monotypic genera for these snakes even though differences were obvious.

However, noting that there are now currently four recognized species within *Eunectes senso lato* (Dirksen and Böhme 2005) and they fall into two distinct and mutually exclusive groups, the argument against the creation of two monotypic genera has been effectively removed.

This argument in favor of division becomes more compelling in the knowledge that other regionally isolated forms of *E. notaeus* in particular have been assessed as being highly distinct and are likely to be formally described and named as full species in the near future (Mendez, et. al. 2007, Reed and Rodda 2009).

Reed and Rodda (2009) also note that matings between *E. murinus* and *E. notaeus* have failed to produce viable offspring, which accords with the sympatry of the two species in the wild through wide areas.

This is significant as results of cross-generic matings between pythons have been widely posted on the internet (see for example www.kingsnake.com hybrid forum and Hoser 1989) with these offspring apparently being viable.

There are other significant facts that point to *Eunectes* as currently recognized, long consisting of two distinct lineages and this includes an overlay of present distributions of the "Yellow" Anacondas versus that of the "Green" when reconciled with the known climatic history of the South American continent over the past 20 million or more years (see Noonan and Chippindale 2006).

This evidence that the two lineages of "Green" and "Yellow" Anacondas is ancient is in fact confirmed by the current distributions of the two forms.

The Green Anaconda (*murinus*) is distributed throughout most of the Amazon basin and nearby areas. By contrast the Yellow Anacondas (*E. notaeus* and *E. deschauenseei*) are in effect split into two widely separated areas, generally north and south of the centre of distribution, indicating that the population has been split by the more wide-ranging species, which as noted don't cross-breed, further noting that reproductively at least, most boids and pythons are conservative and maintain an ability to breed with cogeners both in captivity and in the wild even when phenotypically very different.

As a result of the above facts, the genus *Eunectes* Wagler, 1830 is herein divided into two, with a new subgenus, *Maxhoserboa subgen. nov.* being formally named and described according to the Zoological Code (Ride 1999) herein.

The genus *Eunectes* is herein defined herein as a nominate subgenus to only include the so-called Green Anacondas.

If one seeks to get a definition of the genus *Eunectes* in total, including both listed subgenera below, then one only needs to combine the diagnoses for both.

SUBGENUS *EUNECTES* WAGLER, 1830

Type species: *Boa marina* Linnaeus, 1758.

Diagnosis: Large to extremely large boid snakes from central and South America.
In this genus as defined herein, the ground color is typically olive green upon which are scattered dark (black to blackish brown) usually ovoid blotches of varying size; these blotches can be single, paired, joined or alternating down the midline, depending on the individual. There are typically no saddles or other types of dorsal patterns, making for a very clean appearance of black blotches on a solid background. A second lateral series of irregular dark markings is typically present, sometimes presenting as small circles with centers that are lighter, usually yellow, than the ground color. Southern specimens have more and smaller darker blotches.

Notable of the Green Anacondas (*E. murinus* and *E. beniensis*) is their massive thick build, with large individuals having midbody diameters in excess of 0.3 metre (Coburn, 1991).

In comparison to all other pythons and boas, the eyes and nostrils of *Eunectes* (*senso lato*) are positioned more dorsally, as is typical of many semi-aquatic vertebrates.

Dirksen and Böhme (2005) defined the Green Anaconda (*E. murinus*) as having 239-269 ventrals, 53-81 dorsal mid body rows, 4 black head stripes, suborbitals between the oculars and supralabials, black dorsal blotches usually half as long as the dorsal width when one looks at the whole animal, and black lateral spots with yellowish centres that are lighter than the ground color.

In contrast all other species of Anaconda have five head stripes, no scales between the oculars and labials and lower dorsal mid body scale row counts.

The Beni Anaconda is similar in appearance to the Green Anaconda, although the blotches are not as ovoid. It's blotches are darker and more numerous and the size attained is only about 2/3 the length of the species *E. murinus.*

The genus (and subgenus) is found in suitable wetter and swampy habitats throughout most parts of Northern South America, except for the west coast and colder high-altitude areas.

SUBGENUS *MAXHOSERBOA* GEN. NOV.

Type species: *Eunectes notaeus* Cope, 1862

Diagnosis: Snakes in this subgenus are easily separated from those species remaining within the genus *Eunectes* (the nominate subgenus) by the following suite of characters (see entire diagnosis): the coloration is strongly "yellow" as opposed to "green" seen in the subgenus *Eunectes.* In DeSchauensee's Anaconda (*E. deschauenseei*), the yellowish ground color is somewhat muted to a yellowish green or light brown and tends

to be most prominent in the lateral surfaces. These snakes are separated from similar looking pythons by the absence of the prominent labial pits seen in the pythons.

After noticing the yellowish ground cover, an obvious identifying feature of this genus is the many black dorsal blotches and smaller lateral blotches present. The number and size of blotches is generally sufficient to differentiate the Yellow Anacondas from the Green (*Eunectes*).

DeSchauensee's Anaconda has fewer (87-126) and larger dorsal oval blotches (usually solid) separated by two or three scales, as well as small lateral irregular blotches. The yellow Anaconda has 101-175 dorsal blotches, separated by only one or two scales, the dorsal blotches tend to have lighter centres.

The Yellow Anaconda also has numerous irregular lateral blotches which tend to form complete or incomplete ocelli on the upper flanks below the dorsal blotches, below which are numerous black flecks.

The two Yellow Anaconda species exhibit very similar scale counts, including 43-54 dorsal mid body rows, 213-237 ventrals (Dirksen, 2002).

The two species of Yellow Anaconda can be easily separated by distribution.

The DeSchauensee's Anaconda is found only in the region of the Brazilian island of Marajo, nearby areas of the mouth of the Amazon and several drainages in French Guiana. The area between the two known distributional centres for this species may also have specimens, but has not been properly searched for the taxon to date.

The Yellow Anaconda is widespread in the region it occurs in. This includes the Pantanal in Bolivia and Brazil, from 15 Deg South Latitude, through aquatic habitats of the Paraguay and Parana River basins below 250 metres elevation in Paraguay and Argentina reaching 32 deg south latitude in the Parana basin. While the Yellow Anaconda has a species range in excess of 400,000 square kilometres, the snakes are only found where suitable aquatic habitats exist (see Dirksen 2002, and Dirksen and Henderson 2002).

Where Yellow Anacondas (*Maxhoserboa* subgen. nov.) and Green Anacondas (subgenus *Eunectes*) are sympatric, the former can be easily distinguished by any of the following: 1/ The presence of fewer than 50 dorsal mid body rows (Green Anacondas have more than 50 rows), 2/ No scales present between the supralabials and the oculars (present in the Green Anaconda) and 3/ The presence of five dark head stripes (the Green Anaconda only has four, see Fig. 8.1 Starace 1998, Dirksen 2002).

Etymology: Named in honour of my Sydney-based cousin, Max Hoser in honour of his many public services.

Species within *Maxhoserboa* subgen. nov.

Eunectes (*Maxhoserboa*) *notaeus* (type species)

Eunectes (*Maxhoserboa*) *deschauenseei*

Species remaining within the subgenus *Eunectes*

Eunectes (*Eunectes*) *murinus* (type species)

Eunectes (*Eunectes*) *beniensis*

REFERENCES CITED

Albuquerque, N. R., Wellinton, S., Arruda, A. S. C., Regiane C. V., Galharte, L. and Var, G. H. 2010. A dicephalic yellow anaconda snake, *Eunectes notaeus* (Serpentes: Boidae), from Southern Pantanal, Brazil. *Journal of Natural History* 44:1989-1994.

Barone, S. 2003. *Eunectes notaeus* - Yellow Anaconda. *Reptilia* (GB) (29):51-54.

Bellosa, H. 2003. Record Snake Fascination. *Reptilia* (GB) (27):28-30.

Bellosa, H. and Mössle, R. 2009. Freilandforschung und Terrarienbeobachtung als sich ergänzende Methoden am Beispiel der Großen Anakonda (*Eunectes murinus*). *Ophidia* 3(1).

Calle, P., Rivas, J., Muñoz M., Thorbjarnarson, J., Dierenfeld, E. Holmstrom, W. Braselton, E. and Karesh, W. B. 1994. Health assessment of free-ranging anacondas (*Eunectes murinus*) in Venezuela. *Jour. Zoo. Wildl. Med.* 25:53-62.

Calle, P. P., Rivas J. A., Muñoz, M. C., Thorbjarnarson, J. B., Holmstrom, W. and Karesh, W. B. 2001. Infectious Disease serologic survey in free-ranging Venezuelan anacondas (*Eunectes murinus*). *Journal of Zoo and Wildlife Medicine* 32(3):320-323.

Cope, E. D. 1862. Synopsis of the species of *Holcosus* and *Ameiva*, with diagnoses of new West Indian and South American Colubridae. *Proc. Acad. Nat. Sci. Philadelphia* 14:60-82.

Cope, E. D. 1899. Contributions to the herpetology of New Granada and Argentina, with descriptions of new forms. *Philadelphia Mus. Sci. Bull.* (1):1-19.

Coburn, J. 1991. *The atlas of snakes of the World*. TFH Books, Neptune, New Jersey.

Dirksen, L. 2001. Zur Kenntnis der Anakonda-Arten (Serpentes: Boidae: *Eunectes*). *Herpetofauna* (Germany) 23(130):22-34

Dirksen, L. 2002. Anakondas. *Natur und Tier Verlag* (Münster):190 pp.

Dirksen, L. and Böhme, W. 1998a. Studien an Anakondas 1: Indizien für natürliche Bastardierung zwischen der Großen Anakonda (*Eunectes murinus*) und der Paraguay-Anakonda (*Eunectes notaeus*) in Bolivien, mit Anmerkungen zur Taxonomie der Gattung Eunectes (Reptilia: Squamata: Serpentes). *Zool. Abh. Mus. Tierkd.* Dresden, 50(4):45-58.

Dirksen, L. and Böhme, W. 1998b. Studien an Anakondas 2: Zum taxonomischen Status von *Eunectes murinus gigas* (Latreillem 1801) (Serpentes: Boidae), mit neuen Ergebnissen zur Gattung *Eunectes* Wagler, 1830. *Salamandra* 34(4):359-374.

Dirksen, L. and Böhme, W. 2005. Studies on anacondas III. A reappraisal of *Eunectes beniensis* Dirksen, 2002, from Bolivia, and a key to the species of the genus *Eunectes* Wagler, 1830 (Serpentes: Boidae). *Russian Journal of Herpetology* 12(3):223-229.

Dirksen, L. and Henderson, R. W. 2002. *Eunectes deschauenseei* Dunn and Conant de Schauensee's Anaconda. *Catalogue of American Amphibians and Reptiles*, V 755:1-3.

Dunn, E. R. and Conant, R. 1936. Notes on anacondas, with descriptions of two new species. *Proc. Acad. Nat. Sci. Philadelphia* 88:503-506.

Gay, M. 1993. The green anaconda (*Eunectes murinus*). *Reptilian* 2(1):14-17.

Gilmore, R. M. and Murphy, J. C. 1993. On large anacondas, *Eunectes murinus* (Serpentes: Boidae), with special reference to the Dunn-Lamon record. *Bulletin of the Chicago Herpetological Society* 28(9):185-188.

Hoser, R. T. 1989. *Australian Reptiles and Frogs*. Pierson and Co., Sydney, Australia:238 pp.

Hsiou, A. S. and Albino, A. M. 2009. Presence of the genus *Eunectes* (Serpentes: Boidae) in the Neogene of the southwestern Amazonia, Brazil. *Journal of Herpetology* 33(4):612-619.

Infante-Rivero, E., Natera-Mumaw, M., and Marcano, A. 2008. Extension of the distribution of *Eunectes murinus* (Linnaeus, 1758) and *Helicops angulatus* (Linnaeus, 1758) in Venezuela, with notes on ophiophagia. *Herpetotropicos* 4(1):39.

Lamonica, R. C., Abrahao-Charles, H., Loguercio, M. F. C. and Rocha-Barbosa, O. 2007. Growth, Shedding and Food Intake in Captive *Eunectes murinus* (Linnaeus, 1758) (Serpentes: Boidae). *Int. J. Morphol.* 25(1):103-108.

Linnaeus, C. 1758. *Systema naturæ per regna tria naturæ, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis*. Tomus I. Editio decima, reformata. Laurentii Salvii, Holmiæ. 10th Edition:824 pp.

McDiarmid, R. W., Campbell, J. A. and Touré, T. A. 1999. *Snake*

species of the world. Vol. 1. Herpetologists' League:511 pp.

Müller, P. 1970. Über die Eunectes-Arten von Marajó. *Salamandra* 6 (3/4):140-141.

Noonan, B. P. and Chippindale, P. T. 2006. Dispersal and vicariance: The complex evolutionary history of boid snakes. *Molecular Phylogenetics and Evolution* 40:347-358.

O'Shea, M. T. 1994. *Eunectes murinus* (northern green anaconda). Cannibalism. *Herpetological Review* 25(3):124.

Petzold, H. G. 1983. Die Anakondas: Gattung *Eunectes*. A. Ziemsen, Wittenberg Lutherstadt, Die Neue Brehm-Bucherei Heft 554:142 pp.

Reed, R. N. and Rodda, G. H. 2009. *Giant constrictors: Biological and Management Profiles and an establishment risk assessment for nine large species of pythons, anacondas and the boa constrictor*. US Geological Service:323 pp.

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").

Rivas, J. A. 1998. Predatory attack of a green anaconda (*Eunectes murinus*) on an adult human. *Herpetological Natural History* 6(2):157-159.

Rivas, J. A. 2000. Life history of the green anacondas with emphasis on its conservation Biology. Unpublished Ph.D. dissertation at the University of Tennessee, Knoxville, USA.

Rivas, J. A. 2001. Feasibility and efficiency of transmitter force-feeding in studying the reproductive biology of large snakes. *Herpetological Natural History* 8(1):93-95.

Rivas, J. A. 2007. Conservation of Anacondas: How Tylenol conservation and macroeconomics threaten the Survival of the world's largest snake. *Iguana* 10-21.

Rivas, J. A. and Burghardt G. M. 2001. Sexual size dimorphism in snakes: wearing the snakes shoes. *Animal Behaviour* 62(3):F1-F6.

Rivas, J. A. and Corey, S. J. 2008. *Eunectes murinus* (green anaconda). Longevity. *Herpetological Review.*

Rivas, J. A., Muñoz, M. D. C., Thorbjarnarson, J. B., Holmstrom, W. and Calle P. P. 1995. A safe method for handling large snakes in the field. *Herpetological Review* 26:138-139.

Rivas, J. A., Thorbjarnarson, J. B., Owens, R. Y and M. C, Muñoz, 1999. *Eunectes murinus*: caiman predation. *Herpetological Review* 30(2):101.

Rivas, J. A. and Owens, R. Y. 2000. *Eunectes murinus* (green anaconda): cannibalism. *Herpetological Review* 31(1):44-45.

Rivas, J. A., Owens, R. Y. and Calle, P. P. 2001. *Eunectes murinus*: Juvenile predation. *Herpetological Review* 32(2):107-108.

Rivas, J. A., Muñoz, M. D. C., Thorbjarnarson, J. B., Burghardt, G. M., Holmstrom, W. and Calle, P. P. 2007a. Natural History of the green anacondas (*Eunectes murinus*) in the Venezuelan llanos. pp: 128-138-415. In: R. W. Henderson, and R. Powell, (eds.), *Biology of Boas, Pythons, and Related Taxa*. Eagle Mountain Publishing Company, Eagle Mountain.

Rivas, J. M., Burghardt, G. and Thorbjarnarson, J. 2007b. Sexual size dimorphism and mating system of the Green Anaconda (*Eunectes murinus*). pp: 312-325 In: R. W. Henderson, R. and Powell, G. W. (eds.), *Biology of Boas, Pythons, and Related Taxa*. Eagle Mountain Publishing Company, Eagle Mountain.

Rivas, J. A., Ascanio, R. and Muñoz, M. D. 2008. What is the length of a snake? *Contemporary Herpetology* 2008 (2):1-3.

Schreitmüller, W. 1924. Ueber *Eunectes murinus* L. (Nördliche Anakonda). *Archiv für Naturgeschichte* 90A (8):125-130.

Starace, F. 1998. *Guide des Serpents et Amphisbènes de Guyane*. Ibis Rouge Editions, Guyane.

Strimple, P. D. 1993. Overview of the natural history of the green anaconda (*Eunectes murinus*). *Herpetological Natural History* 1(1):25-35.

Strimple, P. D. 1997. Anacondas: High drama at the water's edge. *Reptiles* 5(11):48-67.

Strimple, P. et al. 1997. On the status of the anaconda *Eunectes barbouri* Dunn and Conant. *Journal of Herpetology* 33(4):607-608.

Trutnau, L. 1982. Einige Bemerkungen über die neuweltlichen Riesenschlangen der Gattung *Eunectes* Wagler, 1830. *Herpetofauna* (Germany) 4(17):14-21.

Vaz-Silva, W. et al. 2007. Herpetofauna, Espora Hydroelectric Power Plant, state of Goiaìs, Brazil. *Check List* 3(4):338-345.

Australasian Journal of Herpetology

Publishes original research in printed form in relation to reptiles, other fauna and related matters.

It is a peer reviewed printed journal for permenant public scientific record, with a sizeable print run and has a global audience.

Full details at: 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 **12:40-47.**
Published 30 April 2012.

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

A review of the South American snake genera *Leptodeira* and *Imantodes* including three new genera and two new subgenera (Serpentes: Dipsadidae: Imantodini).

Raymond T. Hoser

488 Park Road, Park Orchards, Victoria, 3114, Australia.
Phone: +61 3 9812 3322 Fax: 9812 3355 E-mail: viper007@live.com.au
Received 2 February 2012, Accepted 4 April 2012, Published 30 April 2012.

ABSTRACT

A review of the phylogeny and taxonomy of the snake genera *Leptodeira* and *Imantodes* finds both genera as currently recognized to be paraphyletic.

There are no available genus names for those species substantially different to the type species groups.

This paper formalizes the obvious intra-generic divisions.

Leptodeira is subdivided into three genera, with two new genera, *Lukefabaserpens* gen. nov. and *Ginafabaserpenae* gen. nov. being formally named and diagnosed according to the Zoological Code. Similarly, a subgenus *Crossmanus* subgen. nov. is erected, diagnosed and named to accommodate divergent taxa from within the remainder of *Leptodeira.*

Imantodes is divided into two genera, with a new genus *Maclachlanus* gen. nov. and a subgenus from the remainder of *Imantodes* identified as *Neilsimpsonus* subgen. nov., both being formally named and diagnosed according to the Zoological Code.

Keywords: Taxonomic revision; new genus; *Leptodeira*; *Lukefabaserpens; Ginafabaserpenae*; *Crossmanus; Imantodes*; *Maclachlanus*; *Neilsimpsonus*; snakes.

INTRODUCTION

The closely related genera *Leptodeira* (the Cat-eyed Snakes) and *Imantodes* (Vine snakes) have been the subject of numerous studies in terms of their phylogeny. Included are those of Cadle and Greene (1993), Daza et. al. (2009), Duellman (1958a), Mulcahy (2007), Mulcahy et. al. (2011), Myers (1982), Pyron et. al. (2011), Reyes-Velasco and Mulcahy (2010), Taub (1967), Taylor (1938), Zaher (1999) and Zaher, et. al. (2009).

Studies of other aspects of these snakes include: Aveiro-Lins et. al. (2006), Ávila and Kawashita-Ribeiro (2011), Barrio-Amorós and Brewer-Carias (2008), Calderon et. al. (2003), Cisneros-Heredia (2006), Claessen (2003), Cope (1867), Cope (1870), Cope (1894), Cope (1899), Duellman (1958b), Duellman (1978), Duellman and Salas (1991), Duméril (1853), Duméril et. al. (1854), Dundee et. al. (1986), Golder (1983), Greer (1965), Griffin (1917), Günther (1860), Günther (1868), Hartweg and Oliver (1940), Hidalgo (1980), Jansen and Köhler (2003), Lee (2000), Liner (2007), McCranie (2007), Oliver (1942), Peters et. al. (1970), Peterson et. al. (1995), Pizzatto et. al. (2008), Porras (2006), Porras and Solórzano (2006), Rivas et. al. (2012), Savage (2002), Savage and Norman (1987), Schmidt and Andrews (1936), Smith (1942), Smith and Tanner (1944), Smith et. al. (1995), Taylor (1936), Taylor (1951), Vences et. al. (1998), Whithworth and Beirne (2011), Wilson and Meyer (1985), Wilson

et. al. (1979), Zug, et. al. (1979), Zweifel (1959a) and Zweifel (1959b).

This has led a number of authors to surmise the relationships of snakes within the two genera, including what were assumed to be the most basal and the most derived members of the genera.

The more recent studies involving nuclear and mitochondrial DNA have broadly upheld the general conclusions to the effect that the two genera are monophyletic to one another and also closely related to one another, with *Imantodes* as currently recognized being basal to *Leptodeira*.

However the divisions within each genus in terms of the component species are so deep that a number of studies have found the genera to be in effect paraphyletic when assessed in a manner consistent with other colubrid snakes and where generic distinctions are drawn.

The results of Pyron et. al. (2011) mirrors that of Mulcahy, et. al. (2011) and Myers (2011), which in turn (in the main) mirrors the results of the very comprehensive morphology-based analysis of Duellman (1958a).

In conjunction with other more recent studies relating to the morphology and biology of the component species, the totality is a compelling argument in favor of dividing both genera as indicated in the abstract.

One species in particular, that currently known as *Leptodeira nigrofasciata* consistently sits between the two genera *Leptodeira* and *Imantodes* as currently recognized and was recognized as far back as 1958 as being widely divergent from the rest (Duellman 1958a). As no one has recently proposed the merger of these two genera (a view not supported by the molecular data) the only tenable option is the removal of *Leptodeira nigrofasciata* from *Leptodeira* and the placement within its own (new genus).

This is done below where the taxon is placed in the genus *Lukefabaserpens* gen. nov.

A similar situation exists for the species currently known as *Leptodeira frenata*, which although not as basal as *L. nigrofasciata* also warrants being placed in its own monotypic genus and so is assigned to *Ginafabaserpenae* gen. nov..

A similar situation to that just described also exists for the species taxon currently known as *Imantodes inornatus*, which sits basal to both *Imantodes* and *Leptodeira* according to the phylogeny presented by Pyron et. al. (2011) and due to its strong divergence, cannot possibly be placed in either genus and so is also placed in a new genus below (*Maclachlanus* gen. nov.).

As already inferred, *Leptodeira* is subdivided into three genera, broadly in line with the species groups defined by Duellman (1958a), page 14, and elsewhere in his monograph, with the final division in line with that seen in the results of Pyron et. al. (2011), in turn calibrated as accurate from other similar studies (see for example the results of earlier molecular studies for Coral Snakes and Rattlesnakes cited in Hoser 2012).

This means herein there are two new genera, *Lukefabaserpens* gen. nov. and *Ginafabaserpenae* gen. nov. formally named and diagnosed according to the Zoological Code (Ride 1999). A subgenus within what remains of *Leptodeira* to accommodate divergent members is also formally named and diagnosed according to the Zoological Code, called *Crossmanus* subgen. nov..

Imantodes is divided two ways, with a new genus *Maclachlanus* gen. nov. being formally named and diagnosed according to the zoological code, as well as a subgenus to accommodate two divergent taxa within what remains of *Imantodes.*

THE GENUS *LEPTODEIRA* FITZINGER, 1843

The Genus *Leptodeira* was diagnosed by Duellman (1958a).

The key elements are adapted and republished here with some additions and modifications arising from other sources cited above:

The genus is placed within the Colubridae, because the hemipenes has an unforked or only slightly forked sulcus spermaticus and hypapophyses are absent from the body vertebrae.

The genus *Leptodeira* is characterized by maxillary teeth that increase in size posteriorly followed by a diastema and two enlarged, grooved fangs. The loreal scale is wider than high, there are immaculate ventral scales and sublateral scale row reduction. There are two apical pits, elliptical pupil, divided anal, smooth dorsal scales, normal complement of colubrid head shields and a capitate hemipenis with many large spines.

In the genus (*senso lato*) as recognized by Duellman (1958a), there are 8-18 maxillary teeth which increase in length posteriorly, are followed by a diastema and two enlarged grooved fangs.

The palatine teeth vary from seven to twelve in number, pterygoid 16-32, dentary 14-28, the large temporal venom glands sit on either side of the head in the temporal region.

The head shields are of an unmodified colubrid type, with a short rostral, paired internasals and prefrontals, divided nasals, and a single loreal. The snout is blunt and not protruding. The proculars are one to four; postoculars one to four; upper labials 7-9, usually eight; lower labials eight to twelve, usually ten; temporals usually 1+2+3; chinshields normally subequal in length; 150-208 rounded and overlapping ventrals; divided anal; 54-107 divided imbricate subcaudals; dorsal scalation is smooth with 17-25 mid body rows; there are two apical pits and keels occasionally present in the anal region only; scale reduction normally involving the paravertebral row; tail length is more than 20 per cent of the body length, neck narrow, head distinct; maximum length usually slightly exceeds a metre.

What were described by Duellman (1958a) as the species groups, were separated on the nature of the hemipenes, the dentition and certain skull elements, particularly the quadrates, vomers, and maxillaries.

Analysis of the characters shows that the most useful in a systematic study of the snakes are the numbers of ventrals, subcaudals, and dorsal scale rows, the numbers of upper labials and preocular scales, the number, shape, and size of the body blotches, and the nature of the dorsal head pattern and hemipene morphology. Analysis of numerous character clines shows that parallel clines may exist in two or more species in certain characters, but that in others the clines may diverge. Discontinuous clines are common. In some cases these are correlated with striking morphological changes between populations and become incorporated in the characteristics of subspecies, which are ignored in this paper.

Studies of the skull of *Leptodeira* (*senso lato*) indicate that the skull is a normal colubrid type without striking specializations. Certain skeletal elements readily identify it from related genera. The poison glands (modified posterior portions of parotid glands) are large and produce a venom of sufficient strength to kill small frogs and lizards. The distribution of the genus is essentially throughout the American tropics to elevations of about 2000 meters. Some forms are restricted to semi-arid habitats; others live in tropical rain forest. Two species range from semi-arid to wet forest environments; each has a subspecies adapted to arboreal life in the forest by having a reduced number of dorsal scale rows, enlarged vertebral and paravertebral scale rows, and a laterally compressed body. Snakes of this genus feed primarily on frogs and toads; some lizards are included in the diet. The snakes are nocturnal and appear to reach their greatest abundance at times of congregations of breeding frogs and toads, which appear to be their main diet.

These snakes are also known to feed on lizards.

So far as is known, all species are oviparous and may lay as many as 13 eggs.

As inferred already colours and patterns are variable and dorsally may consist of any of dark spots, blotches or bands on a lighter ground colour, or sometimes relatively plain in colour,

while the ventral surfaces are usually immaculate cream, white or with only scattered darker flecks.

The genus *Leptodeira* (*senso lato*) is found from the far south of the United States, through central America and into the northern half of South America, generally including the region north of the tropic of Capricorn, excluding the Andes and west and the far east of the continent.

For the record, the similar and monotypic False Cat Eyed Snake *Pseudoleptodeira latifasciata*, is separated from this genus by the fact that the loreal scale is not wider than high, it does not have immaculate ventral scales and does not have sublateral scale row reduction.

The species *uribei*, sometimes in the past placed within the genera *Pseudoleptodeira* and more recently within *Leptodeira* is herein placed in the genus *Ginafabaserpenae* gen. nov. with the species *frenata*, the species *frenata* being the type for the genus.

The genus *Imantodes* is separated from *Leptodeira*, *Lukefabaserpens* gen. nov. and *Ginafabaserpenae* gen. nov. by the loss of bifurcation of the sulcus spermaticus versus a reduction to a small terminal fork or expanded flat area in the genus *Leptodeira.*

The entire monograph of Duellman (1958a) is available for download from the internet as a giant pdf file for free as of early 2012 and therefore it is not my intention to repeat its contents here.

Instead this paper's focus is to complete the formalities of the divisions of the relevant genera in light of the most recent molecular findings.

The separation of the taxa within the newly described subgenus and two separate genera of *Leptodeira* is done within the diagnoses of each below.

In contrast to Duellman (1958a), the monotypic False Cat Eyed Snake *Pseudoleptodeira latifasciata* is not treated as being within *Leptodeira* and is ignored for the purposes of diagnoses and the like, having been separated from the relevant taxa above.

In terms of the two new genera *Lukefabaserpens* gen. nov. and *Ginafabaserpenae* gen. nov. both can be separated from *Leptodeira* by dentition. *Leptodeira* has 13 or more maxillary teeth anterior to the diastema whereas for the other genera, the number is 12 or less (see Duellman (1958a) table 1, p. 17).

Lukefabaserpens gen. nov. and *Ginafabaserpenae* gen. nov. both can be separated from *Leptodeira* by the lower number of dentary teeth, 17 or less, versus 19 or more in *Leptodeira.*

The relevant three species within the new monotypic genus *Lukefabaserpens* gen. nov. and *Ginafabaserpenae* gen. nov. both can be separated from one another by the number of pterygoid teeth. *Lukefabaserpens* gen. nov. usually has 18 or less, versus usually 20 or more in *Ginafabaserpenae* gen. nov..

For the species *nigrofasciata* (*Lukefabaserpens* gen. nov.) there are 10-12 maxillary teeth anterior to the diastema and for the species *frenata* (*Ginaserpenae* gen. nov.) there are 8-10 maxillary teeth anterior to the diastema.

Lukefabaserpens gen. nov. is easily separated from *Ginaserpenae* gen. nov. on the basis of mid-body scale row count. For *Lukefabaserpens* gen. nov. there are 17-19 dorsal mid body scale rows, versus more than 19 in *Ginaserpenae* gen. nov.

The two genera *Lukefabaserpens* gen. nov. and *Ginafabaserpenae* gen. nov. both can be further separated from one another by the characters outlined in the Key in Duellman (1958a) pages 14-16.

SUBGENUS *CROSSMANUS* SUBGEN. NOV.

Type species: *Crotaphopeltis punctata* Peters, 1866

(Known in most contemporary texts as *Leptodeira punctata*)

Diagnosis: *Crossmanus* subgen. nov. is separated from all snakes within the rest of the genus *Leptodeira*, and the snakes within the genera *Lukefabaserpens* gen. nov. *Ginafabaserpinae* gen. nov. and *Pseudoleptodeira* by the following suite of characters:

In terms of the two new genera *Lukefabaserpens* gen. nov. and *Ginafabaserpenae* gen. nov. (containing the species taxa formerly known as *Leptodeira nigrofasciata, L. uribei* and *L. frenata*) both can be separated from *Leptodeira* by dentition. *Leptodeira* has 13 or more maxillary teeth anterior to the diastema where as for the other genera, the number is 12 or less (see Duellman (1958a) table 1, p. 17).

Pseudoleptodeira is separated from all other snakes in the genera *Lukefabaserpens* gen. nov. *Ginafabaserpinae* gen. nov. and *Leptodeira* by having more than 19 mid body rows, seven to ten long dark bands on the body and a light occipital region.

The other snakes within what's left of *Leptodeira* are separated from *Crossmanus* subgen. nov. by having a hemipenis that usually has a cup-shaped depression in the capitulum which is set off from the rest of the organ by a fold, maxillary teeth normal or reduced in number and a dorsal body colour pattern consisting of dark blotches on a light ground colour.

Leptodeira is found from Mexico running south and into South America.

Two members of *Crossmanus* subgen. nov., namely *splendida* and *septentrionalis* are characterized and separated from all other *Leptodeira* by a hemipenis with many spines and without a deep fold around the base of the capitulum and a high number of maxillary teeth.

The species *punctata* (type for the subgenus) is unusual among all other *Leptodeira* in having a different general body pattern and appearance, but also in the reduced number of ventrals, subcaudals, labials and teeth, giving it appearance similar to snakes of the genus *Hypsiglena*.

Crossmanus punctata is characterised by 150-167 ventrals, 54-69 subcaudals, 19 dorsal mid body rows (15 posteriorly); the hemipenis *in situ* extends for six caudals; there is a median row of three large spines, the distal spine being the largest; on each side there are two rows of smaller spines; four or five spines in each row, which converge distally; the distal spine is common to both rows; the sulcus is opposite the primary row of spines and extends to the middle of the capitulum, the capitulum is disc-shaped, finely crenulated, and set off from the rest of the organ by a deep fold.

The coloration of *Crossmanus punctata* is a ground color of yellowish brown to light tan dorsally. There are five or six longitudinal rows of black or dark spots on the dorsum. The largest spots are on rows 7 and 8, in some individuals these are fused across the vertebral scale row to form a series of transverse bars. The second row of spots is on scale rows 3 and 4; these spots are smaller than the dorsal ones and are often indistinct. The lowermost row of spots is on scale rows 1 and 2. These are often reduced to a dark area on the edges of the scales. There is a black nuchal blotch, four or six scales in length and extending laterally to the third scale row. This blotch may be divided along the midline. The tail is marked dorsally with three to five rows of small dark spots. The belly is an immaculate cream color.

The top of the head is cream-yellow to tan and may have an ornate head pattern consisting of an 8-shaped mark on the frontal and parietals with an anterior Y-shaped projection on the frontal and prefrontals and a nape stripe extending posteriorly from the parietals from the length of three or four dorsal scales. This pattern is often fragmented.

Crossmanus punctata is the only species within all of *Leptodeira*, *Lukefabaserpens* and *Ginafabaserpinae* that does not have a longitudinal series of dorsal body blotches of varying size and colour.

Crossmanus subgen. nov. ranges from Mexico into South America.

Etymology: Named in honor of Bradley Crossman, born and

raised in Sydney Australia and since having spent time at various locations including Airlie Beach, Queensland, where for many years he conducted wildlife and reptile rescues and the like and essential public education about reptiles.

In a story repeated across Australia many times, his successful business enterprise at Airlie Beach was closed down by corrupt government wildlife officers who wanted to monopolize the "wildlife space" and used their position as both regulator and competitor to close down a business rival that they couldn't match on the basis of standards.

Species within *Crossmanus* subgen. nov.

Leptodeira (*Crossmanus*) *punctata* (Peters, 1866) (Western Cat-eyed Snake)

Leptodeira (*Crossmanus*) *splendida* (Günther, 1895) (Splendid Cat-eyed Snake)

Leptodeira (*Crossmanus*) *septentrionalis* (Kennicott, 1859) (Northern Cat-eyed-Snake)

Other species remaining within Genus *Leptodeira* as defined within this paper.

Leptodeira (*Leptodeira*) *annulata* (Linnaeus, 1758) (Type species for the genus) (Banded Cat-eyed Snake)

Leptodeira (*Leptodeira*) *bakeri* Ruthven, 1936 (Baker's Cat-eyed Snake)

Leptodeira (*Leptodeira*) *maculata* (Hallowell, 1861) (Southwestern Cat-eyed Snake)

Leptodeira (*Leptodeira*) *rubricata* (Cope, 1893) (Boca Mala Cat-eyed Snake)

Total of seven species within this genus.

GENUS *LUKEFABASERPENS* GEN. NOV.

Type species: *Leptodeira nigrofasciata* Günther, 1868

Diagnosis: Separated from all (other) *Leptodeira* by the following suite of characters:

In terms of the two new genera *Lukefabaserpens* gen. nov. and *Ginafabaserpenae* gen. nov. both can be separated from *Leptodeira* by dentition. *Leptodeira* has 13 or more maxillary teeth anterior to the diastema whereas for the other genera, the number is 12 or less (see Duellman (1958a) table 1, p. 17).

Lukefabaserpens gen. nov. and *Ginafabaserpenae* gen. nov. both can be separated from *Leptodeira* by the lower number of dentary teeth, 17 or less, versus 19 or more in *Leptodeira.*

The relevant three species within the new monotypic genus *Lukefabaserpens* gen. nov. and *Ginafabaserpenae* gen. nov. can be separated from one another by the number of pterygoid teeth. *Lukefabaserpens* gen. nov. usually has 18 or less, versus usually 20 or more in *Ginafabaserpenae* gen. nov..

For the species *nigrofasciata* (*Lukefabaserpens* gen. nov.) there are 10-12 maxillary teeth anterior to the diastema and for the species *frenata* and *uribei* (*Ginaserpenae* gen. nov.) there are 8-10 maxillary teeth anterior to the diastema.

Lukefabaserpens gen. nov. is easily separated from *Ginaserpenae* gen. nov. on the basis of mid-body scale row count. For *Lukefabaserpens* gen. nov. there are 17-19 dorsal mid body scale rows, versus more than 19 in *Ginaserpenae* gen. nov.

Lukefabaserpens gen. nov. is further recognizable by having 10-21 large dorsal body blotches, extending to, or nearly the ventrals, forming long body bands with straight edges with no lateral intercalary spots, no ornate head pattern on the frontals or parietals, two preoculars and usually 17 mid-body scale rows.

Pseudoleptodeira is separated from all other snakes in the genera *Lukefabaserpens* gen. nov. *Ginafabaserpinae* gen. nov. and *Leptodeira* by having more than 19 mid body rows, seven to ten long dark bands on the body and a light occipital region.

Lukefabaserpens gen. nov. ranges from Central America, Costa Rica, Honduras, Nicaragua northward through arid and semi-arid habitats to Mexico.

They are a smaller taxon than species of *Ginaserpenae* gen. nov. and *Leptodeira.*

In common with the genus *Pseudoleptodeira*, this genus is separated from *Ginaserpenae* gen. nov. and *Leptodeira* by long dark bands on the body, hemipenis with spinus capitulum, somewhat elongated and flattened head and reduced numbers of teeth on all dentigerous bones.

The Mexican snakes assigned to the genus *Lukefabaserpens* gen. nov. have been referred to the species *mystacina* (Cope 1869), but Duellman (1848a) found it to be merely a regional variant of *nigrofasciata*, for which the key diagnostic characters varied clinally across the distributional range of the species *nigrofasciata.*

As already mentioned, in the species *nigrofasciata*, there is distinct clinal variation from southern Mexico through to Costa Rica. As one moves south there is an increase in body bands and a decrease in the number of ventrals and subcaudals.

The subgenus *Lukefabaserpens* gen. nov. is monotypic for the type species *nigrofasciata*.

Etymology: Named in honour of Melbourne Australia based lawyer, Luke Faba, who in 2011-2012 worked extremely hard in a series of legal battles against corrupt government wildlife officials working for the Victorian Government Wildlife Department (known as DSE) to fight for the rights of ordinary Victorians to be safely and properly educated about reptiles by Snakebusters reptile shows and displays.

The corrupt wildlife officers, Ron Waters, Glen Sharp, Emily Gibson and others (see definitions of terms in Hoser 1999) were working on behalf of rival business operators with whom they had an improper relationship and protected from prosecution when they committed wildlife and safety offences on a regular basis.

Furthermore they fabricated charges and false allegations against company Snakebusters, whom none of the other newly licenced enterprises could match by standard, in order to remove Snakebusters from a "market" they could not otherwise compete in on the basis of standard.

The DSE officers also breached competitive neutrality laws in that they were part of the same government umbrella organization in control of the dysfunctional government-owned Melbourne Zoo, the main business competitor of Snakebusters for "in school" educational incursions and excursions and breached their statutory role.

As they were simultaneously in the role of regulator of their main commercial competitor, namely Snakebusters, they should not have illegally used their power to shut down a business competitor who had never breached any written rules.

The Zoo and DSE officials illegally abused this position to corruptly fabricate criminal charges against Snakebusters and then ram through criminal convictions with a combination of legal firepower that only the taxpayer funded government department could afford (at a total cost of several million dollars!) and by "judge shopping" to ensure that they got friendly judgments in their favor in a manner by which it simply wasn't financially viable or possible for Snakebusters to pursue the matter through the higher courts.

There were countless false claims and allegations made by these people against Snakebusters, many of which put public safety at risk.

Such false claims included that the Snakebusters venomoid snakes (see Hoser 2004a and Hoser 2004b), had all regenerated venom and were dangerous (they weren't) and that the venomoid bites shown on video of myself and others in the period 2006 to 2011, including my daughter taking venomoid bites, and all showing no ill effects, were routine for dangerous snakes as they falsely claimed that so-called dry bites are extremely common from species such as Taipans, Death Adders and the like.

As a result of this false advice from DSE people and other business competitors, at least two people who heeded this

Hoser 2012 - Australasian Journal of Herpetology 12:40-47.

wrong advice died from Snakebite in the period from 2009-2011.

These DSE officials are also the very same people responsible for bushfire prevention and management.

These are the same officials responsible in part for the 172 Victorians needlessly killed in the Black Saturday bushfires of 7 Feb 2009.

Instead of dealing with the impending bushfire disaster in the period leading up to the fires at end 2008 and early 2009, DSE officers were raiding Snakebusters shows at Shopping Malls and elsewhere, creating public alarm at these events and pumping money into legal teams to bog Snakebusters down at extended VCAT (tribunal) hearings and the like in late 2008, where they repeatedly claimed I, Raymond Hoser was delusional to believe that dozens of people could die in a bushfire event in Victoria.

As a result of the vast amount of money, manpower and resources the DSE devoted to unlawfully attacking Snakebusters in January 2009 and earlier in the period 2006 to 2008, the DSE were totally unprepared for the bushfires that happened on 7 February 2009, leading to the totally preventable deaths of 172 people and huge (avoidable) property losses.

Lawyers such as Luke Faba, who worked for the unfairly matched underdog (Snakebusters) against hateful cowards hiding behind the shield of an over-powerful government and totally corrupt bureaucracy deserve to be honored by having a genus of snake named after them.

Species within *Lukefabaserpens* gen. nov.

Lukefabaserpens nigrofasciata (Günther, 1868) (The genus is monotypic for the species)

Common name: Black-banded Cat-eyed Snake

GENUS *GINAFABASERPENAE* GEN. NOV.

Type species: *Sibon frenatum* Cope, 1886

(Known in most contemporary texts as *Leptodeira frenata*)

Diagnosis: Separated from all (other) *Leptodeira* and *Lukefabaserpens* gen. nov. by the following suite of characters:

The snakes of this genus have a dark post-orbital stripe, usually in contact with the first body blotch, whereas those of the genera *Leptodeira* and *Lukefabaserpens* gen. nov. do not.

In terms of the two new genera *Ginafabaserpenae* gen. nov. and *Lukefabaserpens* gen. nov. both can be separated from *Leptodeira* by dentition. *Leptodeira* has 13 or more maxillary teeth anterior to the diastema whereas for the other genera, the number is 12 or less (see Duellman (1958a) table 1, p. 17).

Ginafabaserpenae gen. nov. and *Lukefabaserpens* gen. nov. both can be separated from *Leptodeira* by the lower number of dentary teeth, 17 or less, versus 19 or more in *Leptodeira*.

The relevant three species within the new genera *Ginafabaserpenae* gen. nov. and *Lukefabaserpens* gen. nov. both can be separated from one another by the number of pterygoid teeth. *Lukefabaserpens* gen. nov. usually has 18 or less, versus usually 20 or more in *Ginafabaserpenae* gen. nov..

For the species *nigrofasciata* (*Lukefabaserpens* gen. nov.) there are 10-12 maxillary teeth anterior to the diastema and for the species *frenata* and *uribei* (*Ginaserpenae* gen. nov.) there are 8-10 maxillary teeth anterior to the diastema.

Lukefabaserpens gen. nov. is easily separated from *Ginaserpenae* gen. nov. on the basis of mid-body scale row count. For *Lukefabaserpens* gen. nov. there are 17-19 dorsal mid body scale rows, versus more than 19 in *Ginaserpenae* gen. nov.

Ginafabaserpenae gen. nov. is separated from all *Leptodeira*, *Lukefabaserpens* gen. nov. and *Pseudoleptodeira* by hemipenal morphology.

In all species except *Ginafabaserpenae* gen. nov. there is a small to large cup in the capitulum, whereas this is absent in *Ginafabaserpenae* gen. nov..

Furthermore in *Ginafabaserpenae* gen. nov. the capitulum is set off by a deep fold and the distal spines are larger than the proximal ones.

Pseudoleptodeira is separated from all other snakes in the genera *Lukefabaserpens* gen. nov. *Ginafabaserpinae* gen. nov. and *Leptodeira* by having more than 19 mid body rows, seven to ten long dark bands on the body and a light occipital region.

The genus *Ginafabaserpenae* gen. nov. occurs from central Veracruz southwards and eastards through southern Mexico in the states of Tabasco and Chiapas, throughout the Yucatan Peninsula in El Peten in Guatemala and British Honduras and offshore islands as well as the Pacific Coast of Mexico.

Etymology: Named in honour of Melbourne Australia based lawyer, Gina Faba, who in 2011-2012 worked extremely hard in a series of legal battles against corrupt government wildlife officials working for the Victorian Government Wildlife Department (known as DSE) to fight for the rights of ordinary Victorians to be safely and properly educated about reptiles by Snakebusters reptile shows and displays.

See also for etymology of *Lukefabaserpens* gen. nov. (Luke Faba) above.

Species within *Ginafabaserpenae* gen. nov.

Ginafabaserpenae frenata (Cope, 1886) (Rainforest Cat-eyed Snake)

Ginafabaserpenae uribei (Bautista and Smith, 1992) (Uribe's False Cat-eyed Snake)

THE GENUS *IMANTODES* DUMÉRIL, 1853

Known as the Vine Snakes, Tree Snakes or Chunk-headed snakes, these are smallish (rarely more than a metre long), very thin and delicate snakes with a relatively large head and bulging eyes with elliptical pupils.

These snakes are so light that they can often crawl over leaves at night, without moving them and disturbing the sleeping prey lizards that they sometimes eat.

They occur in Middle America from Mexico southwards to the north of South America.

Myers (1982) summed up his view of the phylogeny and taxonomy of the group in the abstract of his paper. In it he wrote:

"The widespread Neotropical genus *Imantodes* (Colubridae) is partially revised in order to determine the relationships of a distinctive new snake discovered on an isolated ridge in eastern Panama. The six species of blunt-headed vine snakes now recognized are equally divided between two monophyletic assemblages - the *cenchoa* and *lentiferus* groups - based on hemipenial characters, maxillary dentition, relative tongue (fork) length, and coloration (reduction of pigmentation in the primitive blotched markings) ... From examination of type specimens of old names currently in the synonymy of *Imantodes cenchoa*, it is concluded that (1) the placement of *Himantodes anisolepis* and *H. platycephalus* is correct, (2) *Himantodes hemigenius* is a junior synonym of *I. gemmistratus*, and (3) the name *Himantodes semifasciatus* is a composite of *I. cenchoa* and *I. gemmistratus*. A lectotype is designated to keep *semifasciatus* with *cenchoa*, but the nominal subspecies *Imantodes cenchoa semifasciatus* is nonetheless considered invalid. A lectotype also is designated for *Imantodes lentiferus*."

As of then and as recently as early 2012, the six recognized species within the genus *Imantodes* are as follows:

Imantodes cenchoa (Linnaeus, 1758) (the type species for the genus) (Blunt-headed Treesnake)

Imantodes gemmistratus (Cope, 1861) (Central American Treesnake)

Imantodes inornatus (Boulenger, 1896) (Speckled Blunt-headed Treesnake)

Imantodes lentiferus (Cope, 1894) (Amazon basin Treesnake)

Imantodes phantasma Myers, 1982 (Phantasma Tree Snake)

Imantodes tenuissimus Cope, 1867 (Yucatán Bluntheaded Snake)

The division of the genus as done by Myers is in broad

accordance with the DNA results published by Pyron et. al. 2011, where Myers also identified two monophyletic assemblages.

One of those assemblages, the so-called *lentiferus* group, is in fact itself composite and according to the evidence of Pyron et. al. 2011, sits relatively closely phylogentically to the main *cenchoa* group.

While Myers (1982) placed the taxon *inornatus* as basal to the other two in the *lentiferus* group, Pyron et. al. found this taxon to be basal to all others in the genus *Imantodes* as defined by Myers (1982) and perhaps the closely related genus *Leptodeira*.

In fact the taxon *inornatus* is so widely divergent of the others in the *lentiferus* group and all other *Imantodes*, that it clearly forms a third taxonomic group.

Hence, on the basis of a revisiting of the morphological evidence published by Myers (1982) and the more recent evidence of Pyron et. al. (2011), there's now no question whatsoever that the taxon *inornatus* should be placed in it's own genus, and separated apart from all other snakes placed in *Imantodes* by Myers (1982).

However on the basis of the evidence of Myers (1982) and in particular Pyron et. al. (2011), it was however a difficult question as to whether or not to erect a new genus for the two species *lentiferus* and *phantasma.*

As a result, I have taken a conservative position and erected a subgenus for these two taxa.

THE GENUS *IMANTODES* DUMÉRIL, 1853 (*SENSO LATO*)

Few snakes can be confused with the snakes in the genus *Imantodes*. This due to their highly attenuated, vertically compressed bodies and conspicuous head with bulbous eyes, stuck on a ridiculously long and thin neck.

Genus *Imantodes* is separated from other similar snakes by the loss of bifurcation of the sulcus spermaticus versus a reduction to a small terminal fork or expanded flat area in the genera *Leptodeira, Lukefabaserpens* gen. nov. and *Ginafabaserpenae* gen. nov..

The preferred food of *Imantodes* is frogs, toads and to a lesser extent small lizards, that are usually hunted for at night.

SUBGENUS *NEILSIMPSONUS* SUBGEN. NOV.

Type species: *Himantodes lentiferus* Cope, 1894

(Known in most contemporary texts as *Imantodes lentiferus*)

Diagnosis: Within the genus *Imantodes senso lato*, the *cenchoa* group, including the species *cenchoa*, *gemmistratus* and *tenuissimus* are separated from the others (including the two species within this subgenus) by the relatively small hemipenis that only extends 4-5 subcaudals when everted, versus 6-8 in the others (*lentiferus*, *phantasma* from this subgenus and *Maconchieus* gen. nov. being monotypic for the species *inornatus*), making the latter group's hemipenes of more typical colubrid size.

The genus *Maconchieus* gen. nov. is separated from all other *Imantodes* species by the fact that the hemipenis has a free overhanging edge of the capitulum which is a common condition in colubrids having unicapitate hemipenes. In contrast to the condition in *Maconchieus* gen. nov. the asulcate edge of the capitulum is variously scalloped or emarginated in the taxa *lentiferus* and *phantasma* (which includes the total of this subgenus). Despite minor variation in this part of the hemipenis, the taxa *lentiferus* and *phantasma* share an unusual tendency for the overhanging edge of the capitulum to be proximally connected by a slightly oblique, elongated cluster of small spines. In those two species, the hemipenes are asymmetrical in that this small cluster of spines extends to the capitulum in a slightly dextral direction (when the hemipenes are appressed posteriad with the sulci spermatici against the tail), on both the right and left organs.

Snakes in *Neilsimpsonus* subgen. nov. have only shallow grooving on the rear fangs versus deep grooving on other snakes remaining in what's left of *Imantodes.*

Snakes in *Neilsimpsonus* subgen. nov. are not vividly banded or blotched as seen in other snakes remaining in what's left of *Imantodes.*

Species within *Neilsimpsonus* subgen. nov.

Imantodes (*Neilsimpsonus*) *lentiferus* (type species)

Imantodes (*Neilsimpsonus*) *phantasma*

Other species remaining within Genus *Imantodes* as defined within this paper.

Imantodes (*Imantodes*) *cenchoa* (the type species for the subgenus)

Imantodes (*Imantodes*) *gemmistratus*

Imantodes (*Imantodes*) *tenuissimus*

Total of five species within this genus.

GENUS *MACONCHIEUS* GEN. NOV.

Type species: *Himantodes inornatus* Boulenger, 1896

(Known in most contemporary texts as *Imantodes inornata*)

Diagnosis: The genus *Maconchieus* gen. nov. is separated from all *Imantodes* species by the following suite of characters: Pattern of vague dark lines or of relatively light blotches, appearing as a pattern of short blackish dorsal crosslines and similar, alternating lateral lines on golden or light-brown body, with the upper surfaces that are only somewhat darkened or dusted by black speckling; less than 220 ventrals and less than 140 subcaudals; about 17-21+2 maxillary teeth, the fangs with only shallow, basal grooves; hemipenis of moderate size, spinose or not at asulcate edge of capitulum, but this region with a deep overhang or naked pocket.

Within the genus *Imantodes senso lato*, the *cenchoa* group, including the species *cenchoa*, *gemmistratus* and *tenuissimus* are separated from the others (including this genus) by the relatively small hemipenis that only extends 4-5 subcaudals when everted, versus 6-8 in the others (*lentiferus*, *phantasma* and *Maconchieus* gen. nov.), making the latter group's hemipenes of more typical colubrid size.

The genus *Maconchieus* gen. nov. is separated from all other *Imantodes* species by the fact that the hemipenis has a free overhanging edge of the capitulum which is a common condition in colubrids having unicapitate hemipenes. In contrast to the condition in *Maconchieus* gen. nov. the asulcate edge of the capitulum is variously scalloped or emarginated in the taxa *lentiferus* and *phantasma.* Despite minor variation in this part of the hemipenis, the taxa *lentiferus* and *phantasma* share an unusual tendency for the overhanging edge of the capitulum to be proximally connected by a slightly oblique, elongated cluster of small spines. In those two species, the hemipenes are asymmetrical in that this small cluster of spines extends to the capitulum in a slightly dextral direction (when the hemipenes are appressed posteriad with the sulci spermatici against the tail), on both the right and left organs.

Etymology: Named in honor of Melbourne Australia based barrister and lawyer, Lachlan McConchie, who in 2011-2012 worked extremely hard in a series of legal battles against corrupt government wildlife officials working for the Victorian Government Wildlife Department (known as DSE) to fight for the rights of ordinary Victorians to be safely and properly educated about reptiles by Snakebusters reptile shows and displays.

See also for etymology of *Lukefabaserpens* gen. nov. (Luke Faba) above.

Species within *Maconchieus* gen. nov.

Maconchieus inornata (the genus is monotypic for this species)

Important first reviser notes:

Due to the fact that a number of phylogenies have been produced that robustly test the conclusions and outcomes of this paper, I'd anticipate the various generic placements to come into general usage fairly quickly.

However, there may be inertia by some herpetologists to place

the species *Lukefabaserpens nigrofasciata* in a monotypic genus apart from the taxa *Ginafabaserpenae frenata* and *Ginafabaserpenae uribei.*
If any subsequent worker chooses to merge these genera for any reason, then the name *Lukefabaserpens* should take precedence over *Ginafabaserpenae.*

REFERENCES CITED

Aveiro-Lins, G., Rocha-Barbosa, O., Salomao, M. G., Puorto, G. and Loguercio, M. F. C. 2006. Topographical anatomy of the blunthead treesnake, *Imantodes cenchoa* (Linnaeus, 1758) (Colubridae: Xenodontinae). *International Journal of Morphology* 24(1):43-48.

Ávila, R. W. and Kawashita-Ribeiro, R. A. 2011. Herpetofauna of São João da Barra Hydroelectric Plant, state of Mato Grosso, Brazil. *Check List.* 7(6):750-755.

Barrio-Amorós, C. L. and Brewer-Carias, C. 2008. Herpetological results of the 2002 expedition to Sarisari-ama, a tepui in Venezuelan Guayana, with the description of five new species. *Zootaxa* 1942:1-68.

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

Cadle, J. E., and Greene, H. W. 1993. Phylogenetic patterns, biogeography, and the ecological structure of neotropical snake assemblages, p. 281-293. In: *Species Diversity in Ecological Communities: Historical Perspectives.* R. E. Ricklefs and D. Schleter (eds.). University of Chicago Press, Chicago.

Calderon, R., Cedeño-Vázquez, J. R. and Pozo, C. 2003. New distributional records for amphibians and reptiles from Campeche, Mexico. *Herpetological Review* 34(3):269-272.

Claessen, H. 2003. De slangen van de Guyanas Deel VI. *Lacerta* 61(5):177-187.

Cisneros-Heredia, D. F. 2006. Notes on the distribution and natural history of the Bluntheaded vine snake, *Imantodes cenchoa*, in Ecuador. *Herpetological Bulletin* 97:4-7.

Cope, E. D. 1867. Fifth contribution lo the herpetology of tropical America. *Proc. Acad. nat. Sci. Philadelphia* 18[1866]:317-323.

Cope, E. D. 1870. Seventh contribution to the herpetology of tropical America. *Proc. Amer. Philos. Soc.* 11[1869]:147-169.

Cope, E. D. 1894. On the species of *Himantodes* Dumeril and Bibron. *American Naturalist* 28:612-614.

Cope, E. D. 1899. Contributions to the herpetology of New Granada and Argentina, with descriptions of new forms. *Philadelphia Mus. Sci. Bull.* (1):1-19.

Daza, J. M., Smith, E. N., Páez, V. P. and Parkinson, C. L. 2009. Complex evolution in the Neotropics: the origin and diversification of the widespread genus *Leptodeira* (Serpentes: Colubridae). *Molecular Phylogenetics and Evolution* 53:653-667.

Duellman, W. E. 1958a. A monographic study of the colubrid snake genus *Leptodeira. Bull. Amer. Mus. Nat. Hist.* 114(1):1-152.

Duellman, W. E. 1958b. Systematic status of the colubrid snake, *Leptodeira discolor* Günther. *University of Kansas Publications Museum of Natural History* 2011:1-9.

Duellman, W. E. 1978. The biology of an equatorial herpetofauna in Amazonian Ecuador. *Misc. Publ. Univ. Kans. Mus. Nat. Hist.* 65:1-352.

Duellman, W. E. and Salas, A. W. 1991. Annotated checklist of the amphibians and reptiles of Cuzco Amazonico, Peru. *Occas. Papers Mus. of Natur. Hist.,* Univ. of Kansas, Lawrence (143):13 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.

Duméril, A. M. C. 1853. Prodrome de la classifcation des reptiles ophidiens. *Mém. Acad. Sci.*, Paris, 23:399-536.

Dundee, H. A., White, D. A. and Rico Gray, V. 1986. Observations on the distribution and biology of some Yucatán Peninsula amphibians and reptiles. *Bull. Maryland Herp. Soc.* 22:37-150.

Golder, F. 1983. Haltung und Zucht von *Leptodeira nigrofasciata* Günther 1868 (Serpentes, Colubridae). *Salamandra* 20(1):3-10.

Greer, A. E. 1965. Distribution notes for *Leptodeira punctata*, *Tropidodipsas philippi* and *Tropidodipsas malacodryas* in northwestern Mexico. *Herpetologica* 21(3):237.

Griffin, L. E. 1917. *Leptodeira albofusca* (Lacépéde) a synonym of *Leptodeira annulata* (Linnaeus). *Annals of the Carnegie Museum* 11(1-2):321-326.

Günther, A. 1860. On new reptiles and fishes from Mexico. *Proceedings of the Zoological Society of London* 1860:316-319.

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.

Hartweg, N., and Oliver, J. A. 1940. A contribution to the herpetology of the isthmus of Tehuantepec. IV. *Misc. Publ. Mus. Zool. Univ. Michigan* No. 47:1-31.

Hoser, R. T. 1999. *Victoria Police Corruption* (1 and 2), Kotabi Publishing, Australia.1536 pp.

Hoser, R. T. 2004a. Surgical Removal of Venom Glands in Australian Elapid Snakes: The creation of venomoids. *Herptile* 29(1):37-52. (online via links from http://www.herp.net)

Hoser, R. T. 2004b. Silcone snakes cause sensation in Australia and elsewhere. *Hard Evidence* (November 2004) 4(6):25-29. (online via links from http://www.herp.net)

Hoser, R. T. 2012. A reclassification of the Rattlesnakes; species formerly exclusively referred to the genera *Crotalus* and *Sistrurus* and a division of the Elapid genus *Micrurus. Australasian Journal of Herpetology* 11:2-24.

Hidalgo, H. N. 1980. *Enyaliosaurus quinquecarinatus* (Gray) and *Leptodeira nigrofasciata* Günther in El Salvador. *Herpetological Review* 11:42-43.

Jansen, M. and Köhler, G. 2003. Biogeographische Analyse der Herpetofauna von ausgewählten Hochlandgebieten Nicaraguas. *Salamandra* 38(4) [2002]:269-286.

Lee, J. C. 2000. *A field guide to the amphibians and reptiles of the Maya world.* Cornell University Press, Ithaca.

Liner, E. A. 2007. *A Checklist of the Amphibians and Reptiles of Mexico.* Louisiana State University Occasional Papers of the Museum of Natural Science 80:1-60.

McCranie, J. R. 2011. *The snakes of Honduras.* SSAR, Salt Lake City:725 pp.

Mulcahy, D. G. 2007. Molecular systematics of neotropical cat-eyed snakes: a test of the monophyly of *Leptodeirini* (Colubridae: Dipsadinae) with implications for character evolution and biogeography. *Biological Journal of the Linnean Society*, 92:483-500.

Mulcahy, D. G., Beckstead, T. H. and Sites, J. W. jnr. 2011. Molecular systematics of the Leptodeirini (Colubroidea: Dipsadidae) Revisited: Species-tree Analyses and Multi-locus Data. *Copeia* (3):407-217.

Myers, C. W. 1982. Blunt-headed vine snakes (*Imantodes*) in Panama, including a new species and other revisionary notes. *American Museum Novitates* (2738):1-50.

Myers, C. W. 2011. A new genus and new tribe for *Enicognathus melanauchen* Jan, 1863, a neglected South American snake (Colubridae: Xenodontinae), with taxonomic notes on some Dipsadinae. *American Museum Novitates* 3715:1-33.

Oliver, J. A. 1942. A new snake of the genus *Imantodes* from Mexico. *Copeia* 1942 (1):1-2.

Peters, J. A., Donoso-Barros, R. and Orejas-Miranda, B. 1970. Catalogue of the Neotropical Squamata: Part I Snakes. Part II Lizards and Amphisbaenians. *Bull. US Natl. Mus.* 297:347 pp.

Peterson, H. W., Smith, H. M. and Chizsar, D. 1995. Some

noteworthy amphibians and reptiles from the region of Chapala, Jalisco, Mexico. *Bulletin of the Chicago Herpetological Society* 30 (5):90-91.

Pizzatto, L., Cantor, M., de Oliveira, J. L., Marques, O. A. V. and Capovilla, V. 2008. Reproductive Ecology of Dipsadine Snakes, with emphasis on South American Species *Herpetologica* 64(2):168-179.

Porras, L. W. 2006. Die Schlangen des costa-ricanischen Trockenwaldes. *Reptilia* (Münster) 11(5):32-37.

Porras, L. W. and Solórzano, A. 2006. Costa Rica's venomous snakes. *Reptilia* (GB) (48):11-17.

Reyes-Velasco, J., and Mulcahy, D. G. 2010. Additional taxonomic remarks on the genus *Pseudoleptodeira* (Serpentes: Colubridae) and the phylogenetic placement of "*P. uribei*.". *Herpetologica* 66:99-110.

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").

Rivas, G. A., Molina, C. R. Ugueto, C. N., Barros, T. R. and Bar-Rio-Amoros, C. L. 2012. Reptiles of Venezuela: an updated and commented checklist. *Zootaxa* 3211:10-64.

Savage, J. M., and Norman, S. Jnr. 1987. The *Imantodes* (Serpentes: Colubridae) of Costa Rica: Two or three species? *Rev. Biol. Trop.* 33:107-132.

Savage, J. M. 2002. *The Amphibians and Reptiles of Costa Rica: A Herpetofauna Between Two Continents, Between Two Seas*. University of Chicago Press:934 pp.

Schmidt, K. P, and Andrews, E. W. 1936. Notes on snakes from Yucatán. *Field Mus. Nat Hist. Zool. Ser.* 20:167-187.

Smith, H. M. 1942. Mexican herpetological miscellany. *Proc. US Natl. Mus.* 92 (3153):349-395.

Smith, H. M., Ramirez-Bautista, A and Chiszar, D. 1995. The nomenclatural status of Muller's two varietal names of *Dipsas cenchoa* (Reptilia: Serpentes). *Bull. Maryland Herp. Soc. 31* (4):198-203.

Smith, H. M. and Tanner, W. W. 1944. Description of a new snake from Mexico. *Copeia* 1944(3):131-136.

Taub, A. M. 1967. Comparative histological studies on Duvernoy's gland of colubrid snakes. *Bulletin of the American Museum of Natural History* 138:1-50.

Taylor, E. H. 1936. Notes on the Herpetological fauna of the Mexican state of Sinaloa. *Univ. Kansas Sci. Bull.* 24(20):505-537.

Taylor, E. H. 1938. Notes on the Mexican snakes of the genus *Leptodeira*, with a proposal of a new snake genus, *Pseudoleptodeira*. *University of Kansas Science Bulletin* 25:315-355.

Taylor, E. H. 1951. A brief review of the snakes of Costa Rica. *Univ. Kansas Sci. Bull.* 34 (1):3-188.

Vences, M., Franzen, M., Flaschendräger, A., Schmitt, R. and Regös, J. 1998. Beobachtungen zur Herpetofauna von Nicaragua: kommentierte Artenliste der Reptilien. *Salamandra* 34(1):17-42.

Whithworth, A. and Beirne, C. 2011. *Reptiles of the Yachana Reserve*. Global Vision International:130 pp.

Wilson, L. D., and Meyer, J. R. 1985. *The Snakes of Honduras.* 2d ed. Milwaukee Publ. Mus. Publ., Biol. and Geol. No. 6:150 pp.

Wilson, L. D., McCranie, J. R. and Porras, L. 1979. New departmental records of amphibians and reptiles from Honduras. *Herpetological Review* 10(1):25.

Zaher, H. 1999. Hemipenial morphology of the South American Xenodontine snakes, with a proposal for a monophyletic Xenodontinae and a reappraisal of colubroid hemipenes. *Bulletin of the American Museum of Natural History* 240:1-168.

Zaher, H., Grazziotin, F. G., Cadle, J. E. Murphy, R. W., Moura-Leite, J. C. and Bonatto, S. L. 2009. Molecular phylogeny of advanced snakes (Serpentes, Caenophidia) with an emphasis on the South American Xenodontines: a revised classification and descriptions of new taxa. *Papéis Avulsos de Zoologia* 49:115-153.

Zug, G. R., Hedges, S. B. and Sunkel, S. 1979. Variation in reproductive parameters of three neotropical snakes, *Coniophanes fissidens*, *Dipsas catesbyi*, and *Imantodes cenchoa*. *Smithsonian Contr. Zool.* 300:1-20.

Zweifel, R. G. 1959a. The provenance of reptiles and amphibians collected in Western Mexico by J. J. Major. *American Museum Novitates* (1949):1-9.

Zweifel, R. G. 1959b. Snakes of the genus *Imantodes* in western Mexico. *American Museum Novitates* 1961:1-17.

Australasian Journal of Herpetology

Publishes original research in printed form in relation to reptiles, other fauna and related matters.

It is a peer reviewed printed journal for permenant public scientific record, with a sizeable print run and has a global audience.

Full details at: 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 **12:48-53.**
Published 30 April 2012.

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

A review of the North American Garter Snakes Genus *Thamnophis* 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*: viper007@live.com.au**
Received 17 March 2012, Accepted 6 April 2012, Published 30 April 2012.

ABSTRACT

The Garter Snakes, *Thamnophis* Fitzinger, 1843 are familiar to most American herpetologists. The taxonomy of this and related Colubrid genera has been unstable as modern molecular methodology has shown that at times morphological convergence between species has hidden actual phylogenetic relationships between wider groups of taxa.

Alternatively, morphologically distinct snakes have been shown to be closely related.

As a result, genera have been named, later relegated to synonymy and at times resurrected to accommodate species subsequently found to be divergent as earlier believed.

Most recently Hoser (2012) divided the related genera *Regina* Baird and Girard, 1853 and *Nerodia* Baird and Girard, 1853, to place component species within the resurrected genus *Liodytes* Cope, 1892 and to create the new genera *Funkus* Hoser, 2012 and *Mariolisus* Hoser, 2012 to accommodate species.

Phylogentic studies by Pyron et. a. (2011) confirmed the obviously paraphyletic nature of *Thamnophis* as generally defined at the time, leading the authors to specifically note the paraphyletic nature of the genus.

This paper subdivides the four obvious groups into the genera *Thamnophis* Fitzinger, 1843, *Chilopoma* Cope, 1875, and two new genera, *Gregswedoshus* gen. nov. and *Brucerogersus* gen. nov. for the unnamed groups.

The genus *Adelophis* Dugès, 1879 includes the two species currently placed within the genus, namely *copei* and *foxi*, herein relegated to subgenus status within *Chilopoma* Cope, 1875, and has several related taxa added.

The taxon *sirtalis* is placed in the new monotypic subgenus *Pughus* subgen. nov., within *Thamnophis*. The species *cyrtopsis* is placed in a new subgenus *Whybrowus* subgen. nov. within *Gregswedoshus* gen. nov.. The so-called *eques* group is placed in a subgenus *Neilsonnemanus* subgen. nov. also within *Gregswedoshus* gen. nov..

Keywords: new genus; subgenus; taxonomy; nomenclature; Garter Snake; *Thamnophis; Adelophis; Gregswedoshus; Brucerogersus; Pughus; Chilopoma*; *Whybrowus; Neilsonnemanus.*

Hoser 2012 - Australasian Journal of Herpetology 12:48-53.

INTRODUCTION

Garter Snakes of the genus *Thamnophis* Fitzinger, 1843 are familiar to many people in North America, being the most widely distributed genus on the continent and the only snake native to Alaska.

Named Garter Snakes, because most are longitudinally lined, like the fancy garters that men used to use to hold up socks, these snakes are smallish, usually averaging about 60 cm as adults in total length and of thin build.

In Canada in particular, large breeding aggregations occur in spring and at times become draw cards for tourists.

In the 1950's and 1960's when herpetoculture was in its infancy, they were commonly kept as pets.

While still popular as a pet snake species, Garter Snakes have declined in relative popularity in favor of larger species, in particular Corn Snakes, Boas, Pythons and other species.

While most of the "True" Garter Snakes have been placed within the broad genus *Thamnophis* Fitzinger, 1843 for many years, some taxa have been moved between this and other genera including the closely related "Water Snake" genera *Nerodia* and *Regina*.

Modern phylogenetic studies have confirmed the relationships between the various species and seen the genus *Thamnophis* as broadly recognized in early 2012 to in fact consist of four monophyletic groups which should be separated at the genus level.

Of relevance is that recently Hoser (2012) divided the related genera *Regina* Baird and Girard, 1853 and *Nerodia* Baird and Girard, 1853, to place component species within the resurrected genus *Liodytes* Cope, 1892 and to create the new genera *Funkus* Hoser, 2012 and *Mariolisus* Hoser, 2012 to accommodate species, thereby in effect dividing two paraphyletic genera into five.

Phylogentic studies by Pyron et. a. (2011) confirmed the obviously paraphyletic nature of *Thamnophis* as generally defined at the time (see fig 2, p. 337), leading the authors to specifically note the paraphyletic nature of the genus (p. 340).

The wide-ranging results of Pyron et. al. (2011) have been calibrated by myself against other similar molecular phylogenetic studies specific to the Snail-eating Snakes (Guo et. al. 2011), True Vipers (Wüster et. al. 2008), Pitvipers (Castoe et. al. 2003, 2005, and 2006), Coral Snakes (da Silva and Sites 2001), various colubrids (Lawson et. al. 2005) among others as well as earlier molecular phylogenetic studies on *Thamnophis sensu lato* (e.g. Queiroz et. al. 2002) and been shown to be accurate and consistent.

As a result, those results are accepted for the Garter Snakes (*Thamnophis*) as accurate.

The taxa missed in Pyron et. al's analysis can also be readily assigned to the various species groups tested, meaning the results were in effect more-or-less comprehensive for the Garter Snakes (*Thamnophis senso lato*).

Following on from this is the inevitable result that this paper subdivides the four obvious groups into the genera *Thamnophis* Fitzinger, 1843, *Chilopoma* Cope, 1875, and two new genera, *Gregswedoshus* gen. nov. and *Brucerogersus* gen. nov. for the unnamed groups.

The genus *Adelophis* Dugès, 1879 includes the two species currently placed within the genus, namely *copei* and *foxi*, herein relegated to subgenus status within *Chilopoma* Cope, 1875, due to the issue of date priority and has several related taxa added, all presently known under the generic name *Thamnophis*.

The taxon *sirtalis* is placed in the new monotypic subgenus *Pughus* subgen. nov. within *Thamnophis*. The species *cyrtopsis* is placed in a new subgenus *Whybrowus* subgen. nov. within *Gregswedoshus* gen. nov.. The so-called *eques* group is placed in a subgenus *Neilsonnemanus* subgen. nov. also within *Gregswedoshus* gen. nov..

The body of literature detailing with and summarizing what's known about Garter Snakes (*Thamnophis* senso lato) is vast and includes the following key publications: Amiel and Wassersug (2010), Baird and Girard (1853), Boulenger (1893), Boundy (1999), Conant (1938, 2003), Conant and Cope (1875, 1886), Collins (1991), Cope (1876, 1885, 1888, 1892), Conant (1950), de Queiroz and Smith (1996), Dowling (1951), Fitch (1940), Gartside et. al. (1977), Hallmen and Sonnerberg (2006), Holbrook (1842), Kennicott (1860), Langford and Borden (2006a, 2006b), Langford et. al. (2011), Linnaeus (1766), McGuire and Grismer (1993), Price (1978), Pyron and Burbink (2009), Rossman (1961, 1963, 1969, 1970), Rossman and Burbink (2005), Rossman and Stewart (1987), Rossman and Wallach (1987), Rossman et. al. (1989, 1996), Smith (1945), Smith (1939, 1942a, 1942b, 1951), Smith and Chiszar (2003), Stebbins (1985), Tanner (1959), Thompson (1957), Todd and Wassersug (2010), Taylor (1940) and Wood et. al. (2011).

GENUS *THAMNOPHIS* FITZINGER, 1843 *SENSO LATO*

Thamnophis as a genus has been defined in many texts so a detailed description here is not necessary. The primary purpose of this paper is to formally name and define according to the Zoological Code (Ride et. al. 1999), the two genera and one subgenus within the species group that currently are unnamed, as well as to redefine the other similarly defined groups.

In summary, *Thamnophis* is defined herein as the Common Garter Snake and nearest relatives, otherwise known as the *sirtalis* group, diagnosed below.

The Garter Snakes *senso lato* are typically smallish slender snakes, usually attaining about 60 cm total length as adults, sporting some kind of pattern involving longitudinal stripes. Most have two very small white or yellow spots on the top of the head. They have keeled scales, 130-170 ventrals and a single anal.

They are separated from Water Snakes (*Natrix*) by the fact that *Natrix* have a divided anal.

When agitated or alarmed these snakes will flatten out their bodies thereby enhancing the overall body patterning. Wild specimens commonly pass an anal discharge with a distinctive odor. Diet is varied and is known to include vertebrates and other small animals.

While these snakes live in all kinds of habitats, in drier areas they are generally found in proximity to water.

GENUS *THAMNOPHIS* FITZINGER, 1843

Type species: *Coluber saurita* Linnaeus, 1766.

Diagosis: This group of Garter Snakes are separated from all other relevant genera (defined herein), formerly placed within *Thamnophis* by the following suite of characters: Single anal, lateral stripe involving the fourth dorsal scale row anteriorly, 3 or more maxillary teeth, 19 or less mid-body rows, no vertical bars on any supralabials; or if 17 dorsal scale rows anteriorly, the lateral stripe involves most of the second dorsal scale row at midbody.

Content of *Thamnophis* Fitzinger, 1843

Thamnophis sauritus (Linnaeus, 1766)

Thamnophis sirtalis (Linnaeus, 1758)

Thamnophis proximus (Say, 1823)

SUBGENUS *PUGHUS* SUBGEN. NOV.

Type species: *Coluber sirtalis* Linnaeus, 1758.

Diagnosis: This monotypic subgenus is separated from all others within the genus *Thamnophis* by the fact that this taxon has a lateral stripe including most of the second dorsal scale row at mid-body. It also has 17 or 19 mid-body scale rows.

Other snakes within the genus *Thamnophis* (subgenus *Thamnophis*) are characterized and diagnosed herein by the following suite of characters: lateral stripe involving the fourth dorsal row anteriorly, 3 or more maxillary teeth, 19 or less mid-body rows, single anal plate, keeled dorsal scales and no vertical bars on any supralabials.

Etymology: Named in honour of the long-term President of the Victorian Association of Amateur Herpetologists, Mick Pugh, of Geelong, Victoria, Australia for an enormous amount of largely unrecognized work in terms of Australian herpetology and reptile conservation.

GENUS *CHILOPOMA* COPE, 1875

Type species: *Chilopoma rufipunctatum* Cope, 1875

Diagnosis: The group of snakes within the genus *Thamnophis* as defined within this paper (above) are separated from the snakes of the genus *Chilopoma* by the following suite of characters: That group of Garter Snakes are separated from all other relevant genera (defined herein), formerly placed within *Thamnophis* by the following suite of characters: Single anal, lateral stripe involving the fourth dorsal scale row anteriorly, 3 or more maxillary teeth, 19 or less mid-body rows, no vertical bars on any supralabials; or if 17 dorsal scale rows anteriorly, the lateral stripe involves most of the second dorsal scale row at midbody.

The two species of snakes formerly placed in the genus *Adelophis* Dugès, 1879, but now placed in the genus *Chilopoma* Cope, 1875, namely *foxi* and *copei*, share several morphological characteristics not seen in any *Thamnophis* (*senso lato*) as in all genera defined in this paper, including all others in *Chilopoma* Cope, 1875, and this includes the presence of only five supralabial scales (vs six or more in all other species formerly placed within *Thamnophis*) and a lack of reduction in dorsal scale row numbers posteriorly. In addition, both *foxi* and *copei* have striping patterns unlike those of any *Thamnophis* (*senso lato*), although they also differ from each other in this respect (Rossman and Blaney, 1968).

The species *rufipunctatum* Cope, 1875, the type species for the nominate subgenus *Chilopoma subgen. nov.* identified in this paper, is separated from all other snakes in the genera identified and defined within this paper by the following suite of characters: the presence of two moderately small, separate nuchal blotches, broad supralabial bars, black-edged brown wedges on each side of the belly, a dorsum olive or brown with conspicuous dark brown spots that fade on the tail. There are no well-defined or developed stripes or pale crescent behind the corner of the mouth. Vestiges of the dorsal and lateral stripes are sometimes present on the neck. Venter is grayish-brown, lightening on the throat, the head is long, the snout is blunt and there are 8 supralabials and 21 dorsal mid-body rows.

The other snakes within the genus *Chilopoma* are diagnosed and separated from others within the relevant genera identified in this paper (*Thamnophis*, *Gregswedoshus* gen. nov. and *Brucerogersus* gen. nov.) by the following suite of characters: maximum number of dorsal mid-body rows usually 17; maxillary teeth 16-20; top of head usually unpatterned; two rows of relatively small black spots between the light vertebral and lateral stripes; nuchal blotches predominantly brown; there may or may not be a prominence of black bar along posterior suture of SL 5 equal to, or less than, bar along SL 6 and 7 suture; ventrals averaging 135-155 in males, 130-150 in females; subcaudals averaging 60-75 in males, 50-65 in females; tail of moderate length, prefrontal suture usually slightly longer than the internasal suture (mean PFL/INL 105-106%); muzzle tip usually moderately broad (mean INR/NR 105-120%); anterior nasal usually shorter than posterior nasal (mean AN/PN 75-78%); parietals usually of moderate length (mean FL/PL 70-85%); and frontal usually of moderate width posteriorly (mean FWP/FWA 70-90%); the dorsal color typically including longitudinal vertebral stripes may or may not be obscured by speckling.

One species within *Chilopoma*, namely *Chilopoma valida* (Kennicott, 1860) is unusual in that it has a divided anal. All others within this genus have a single anal plate.

All have keeled scales.

The center of distribution for the genus is Mexico.

Content of Genus *Chilopoma* Cope, 1875

Chilopoma rufipunctatum Cope, 1875 (Type species)
Chilopoma angustirostris (Kennicott, 1860)
Chilopoma copei (Dugès, 1879)
Chilopoma bogerti (Rossman and Burbink, 2005)
Chilopoma conanti (Rossman and Burbink, 2005)
Chilopoma exsul (Rossman, 1969)
Chilopoma foxi (Rossman and Blaney, 1968)
Chilopoma godmani (Günther, 1894)
Chilopoma lineri (Rossman and Burbink, 2005)
Chilopoma melanogaster (Weigmann, 1830)
Chilopoma mendax (Walker, 1955)
Chilopoma scalaris (Cope, 1861)
Chilopoma scaliger (Jan, 1863)
Chilopoma sumichrasti (Cope, 1866)
Chilopoma valida (Kennicott, 1860)

SUBGENUS *ADELOPHIS* DUGÈS, 1879

Type species: *Adelophis copei* Dugès, 1879

Diagnosis: The subgenus *Adelophis* now includes all species within the genus *Chilopoma* except for the single taxon placed within the subgenus *Chilopoma*, namely *C. rufipunctatum* Cope, 1875.

This obviously means *Adelophis* now includes species formerly referred to the genus *Thamnophis.*

The diagnosis for this subgenus (*Adelophis*) is most easily done by diagnosing the species *C. rufipunctatum* Cope, 1875, thereby eliminating it from the genus *Chilopoma*, as a result leaving all other species within this subgenus.

The type species for the nominate subgenus *Chilopoma subgen. nov.* identified in this paper, is *C. rufipunctatum* Cope, 1875 and separated from all other snakes in the genera identified and defined within this paper as well as all *Chilopoma* placed in the subgenus *Adelophis* by the following suite of characters: the presence of two moderately small, separate nuchal blotches, broad supralabial bars, black-edged brown wedges on each side of the belly, a dorsum olive or brown with conspicuous dark brown spots that fade on the tail. There are no well-defined or developed stripes or pale crescent behind the corner of the mouth. Vestiges of the dorsal and lateral stripes are sometimes present on the neck. Venter is grayish-brown, lightening on the throat, the head is long, the snout is blunt and there are 8 supralabials and 21 dorsal mid-body rows.

Content of subgenus *Adelophis* Dugès, 1879

Chilopoma (*Adelophis*) *copei* (Dugès, 1879)
Chilopoma (*Adelophis*) *bogerti* (Rossman and Burbink, 2005)
Chilopoma (*Adelophis*) *conanti* (Rossman and Burbink, 2005)
Chilopoma (*Adelophis*) *exsul* (Rossman, 1969)
Chilopoma (*Adelophis*) *foxi* (Rossman and Blaney, 1968)
Chilopoma (*Adelophis*) *godmani* (Günther, 1894)
Chilopoma (*Adelophis*) *lineri* (Rossman and Burbink, 2005)
Chilopoma (*Adelophis*) *melanogaster* (Weigmann, 1830)
Chilopoma (*Adelophis*) *mendax* (Walker, 1955)
Chilopoma (*Adelophis*) *scalaris* (Cope, 1861)
Chilopoma (*Adelophis*) *scaliger* (Jan, 1863)
Chilopoma (*Adelophis*) *sumichrasti* (Cope, 1866)
Chilopoma (*Adelophis*) *valida* (Kennicott, 1860)

GENUS *BRUCEROGERSUS* GEN. NOV.

Type species: *Eutaenia chrysocephala* Cope, 1885

Diagnosis: The genus is separated from the genera *Thamnophis*, *Chilopomoa* and *Gregswedoshus* by the following suite of characters: A slender body, and a wide, flat head, with a large eye. *Brucerogersus* gen. nov. has a head more triangular in shape than seen in other Garter Snakes in the genera *Thamnophis*, *Chilopomoa* and *Gregswedoshus* gen. nov..

The side of the eye contracts the frontal plate, so that it is not wider than the superciliaries posteriorly. Superior labials eight, none higher than long, fourth and fifth below orbit. The inferior surfaces are dark which causes a good definition of the lateral line. There are representations of two rows of lateral black spots, but they are merely black scale-borders, those of the inferior row the more distinct, although these may vary and sometimes appear bar or zig-zag like, sometimes intersperced with white. A similar row of black edges on the first row of scales. All of these spots become distinct on the sides of the neck. Nuchal spot large, black, conspicuous and with a shallow notch behind; no occipital or other spots on the head. The gastrosteges often have black bases. Keeled dorsal scales and a single anal plate.

This genus is known from two described species only. These occur in Mexico, Honduras, El Salvador, and Guatamala.

Etymology: Named in honor of Bruce Rogers, of Kangaroo Ground, Victoria, Australia for services to Australian culture and environment.

Content of Genus *Brucerogersus* gen. nov.

Brucerogersus chrysocephalus (Cope, 1885)

Brucerogersus fulvus (Bocourt, 1893)

GENUS *GREGSWEDOSHUS* GEN. NOV.

Type species: *Eutainia elegans* Baird and Girard, 1853

Diagnosis: In the first instance, this genus can be diagnosed and separated from *Thamnophis*, *Chilopomoa* and *Brucerogersus* gen. nov. by the following suite of characters: keeled or unkeeled dorsal scales, single anal, 17-21 dorsal mid-body rows, usually reducing by two near the vent, 120-170 ventrals, less than 27 maxillary teeth, the number usually being in the range 20-23, usually 6-7 supralabials, the posterior ones the same color as the temporal and set off before and after with black-edged light areas, vertebral stripe is usually but not always brightly colored and distinct, nuchal blotches not usually conspicuous or absent, venter may or may not have dark pigment, but if it does it usually forms several rows of dark spots or an irregular dark reticulated pattern.

Separated from all other relevant genera, namely *Thamnophis*, *Chilopomoa* and *Brucerogersus* gen. nov. also by eliminating the other three genera, with which this one can be possibly confused with by using the characters to define each as given above.

Thamnophis are separated from all other relevant genera (defined herein), formerly placed within *Thamnophis* by the following suite of characters: Single anal, lateral stripe involving the fourth dorsal scale row anteriorly, 3 or more maxillary teeth, 19 or less mid-body rows, no vertical bars on any supralabials; or if 17 dorsal scale rows anteriorly, the lateral stripe involves most of the second dorsal scale row at midbody.

The two species of snakes formerly placed in the genus *Adelophis* Dugès, 1879, but now placed in the genus *Chilopoma* Cope, 1875, namely *foxi* and *copei*, share several morphological characteristics not seen in any *Thamnophis* (*senso lato*) as in all genera defined in this paper, including all others in *Chilopoma* Cope, 1875, and this includes the presence of only five supralabial scales (vs six or more in all other species formerly placed within *Thamnophis*) and a lack of reduction in dorsal scale row numbers posteriorly. In addition, both *foxi* and *copei* have striping patterns unlike those of any *Thamnophis* (*senso lato*), although they also differ from each other in this respect (Rossman and Blaney, 1968).

The species *rufipunctatum* Cope, 1875, the type species for the nominate subgenus *Chilopoma subgen. nov.* identified in this paper, is separated from all other snakes in the genera identified and defined within this paper by the following suite of characters: the presence of two moderately small, separate nuchal blotches, broad supralabial bars, black-edged brown wedges on each side of the belly, a dorsum olive or brown with conspicuous dark brown spots that fade on the tail. There are no well-defined or developed stripes or pale crescent behind the corner of the mouth. Vestiges of the dorsal and lateral stripes are sometimes present on the neck. Venter is grayish-brown, lightening on the throat, the head is long, the snout is blunt and there are 8 supralabials and 21 dorsal mid-body rows.

The other snakes within the genus *Chilopoma* are diagnosed and separated from others within the relevant genera identified in this paper (*Thamnophis*, *Gregswedoshus* gen. nov. and *Brucerogersus* gen. nov.) by the following suite of characters: maximum number of dorsal mid-body rows usually 17; maxillary teeth 16-20; top of head usually unpatterned; two rows of relatively small black spots between the light vertebral and lateral stripes; nuchal blotches predominantly brown; there may or may not be a prominence of black bar along posterior suture of SL 5 equal to, or less than, bar along SL 6 and 7 suture; ventrals averaging 135-155 in males, 130-150 in females; subcaudals averaging 60-75 in males, 50-65 in females; tail of moderate length, prefrontal suture usually slightly longer than the internasal suture (mean PFL/INL 105-106%); muzzle tip usually moderately broad (mean INR/NR 105-120%); anterior nasal usually shorter than posterior nasal (mean AN/PN 75-78%); parietals usually of moderate length (mean FL/PL 70-85%); and frontal usually of moderate width posteriorly (mean FWP/FWA 70-90%); the dorsal color typically including longitudinal vertebral stripes may or may not be obscured by speckling.

One species within *Chilopoma*, namely *Chilopoma valida* (Kennicott, 1860) is unusual in that it has a divided anal. All others within the genus Chilopoma have a single anal plate and keeled scales.

The center of distribution for the genus *Chilopoma* is Mexico.

The genus *Brucerogersus* gen. nov. is separated from the genera *Thamnophis*, *Chilopomoa* and *Gregswedoshus* by the following suite of characters: A slender body, and a wide, flat head, with a large eye. *Brucerogersus* gen. nov. has a head more triangular in shape than seen in other Garter Snakes in the genera *Thamnophis*, *Chilopomoa* and *Gregswedoshus* gen. nov..

The side of the eye contracts the frontal plate, so that it is not wider than the superciliaries posteriorly. Superior labials eight, none higher than long, fourth and fifth below orbit. The inferior surfaces are dark which causes a good definition of the lateral line. There are representations of two rows of lateral black spots, but they are merely black scale-borders, those of the inferior row the more distinct, although these may vary and sometimes appear bar or zig-zag like, sometimes interspersed with white. A similar row of black edges on the first row of scales. All of these spots

become distinct on the sides of the neck. Nuchal spot large, black, conspicuous and with a shallow notch behind; no occipital or other spots on the head. The gastrosteges often have black bases. Keeled dorsal scales and a single anal plate.

This genus *Brucerogersus* gen. nov. is known from two described species only. These occur in Mexico, Honduras, El Salvador, and Guatamala.

The genus *Gregswedoshus* gen. nov. is found widely in North and Central America.

Etymology: Named in honor of Greg Swedosh, of Warrandyte, Victoria, Australia for many hours of unpaid computer services, without which the books, *Smuggled:The Underground Trade in Australia's Wildlife* (Hoser 1993), and *Smuggled-2:Wildlife trafficking, crime and corruption in Australia* (Hoser 1996), may never have been published. It was only as a direct consequence of the publication of these books that Australian governments were forced to repeal draconian laws banning private ownership of reptiles and other native species as pets. Those laws had been in place for over 20 years when this happened.

As this paper goes to print in 2012, those rights are again under threat.

Hoser 2012 - Australasian Journal of Herpetology 12:48-53.

Content of Genus *Gregswedoshus* gen. nov.

Gregswedoshus elegans (Baird and Girard, 1853) (Type species)

Gregswedoshus atratus (Kennicott, 1860)

Gregswedoshus brachystoma (Cope, 1892)

Gregswedoshus butleri (Cope, 1889)

Gregswedoshus couchii (Kennicott, 1859)

Gregswedoshus cyrtopsis (Kennicott, 1860)

Gregswedoshus eques (Reuss, 1834)

Gregswedoshus gigas (Fitch, 1940)

Gregswedoshus hammondii (Kennicott, 1860)

Gregswedoshus marcianus (Baird and Girard, 1853)

Gregswedoshus nigronuchalis (Thompson, 1957)

Gregswedoshus ordinoides (Baird and Girard, 1852)

Gregswedoshus postremus (Smith, 1942)

Gregswedoshus rossmani (Conant, 2000)

Gregswedoshus pulchrilatus (Cope, 1885)

Gregswedoshus radix (Baird and Girard, 1853)

SUBGENUS *WHYBROWUS* SUBGEN. NOV.

Type Species: *Eutaenia cyrtopsis* Kennicott, 1860

Diagnosis*: Whybrowus* subgen. nov. is separated from all other species in the genus *Gregswedoshus* gen. nov. (and *Thamnophis*, *Chilopomoa* and *Brucerogersus* gen. nov.) by the following suite of characters: A whitish or pale yellow vertebral stripe separates two large black blotches on the back of the head. A white crescent occurs between each blotch and the corner of the mouth. There is a lateral stripe on the second and third scale rows, often wavy or irregular because it may be partly invaded by black spots from above and below. Dorsally the ground color is usually olive brown with two alternating rows of elongate spots between the stripes which often present as a zig-zag line. The spots fade on the tail. Belly is greenish white, 19 mid-body dorsal rows. While easily confused with subgenus *Neilsonnemanus* subgen. nov. That subgenus normally has 21 mid-body rows (rarely 19), the lateral stripe is on the third or fourth rows and any dorsal pattern extends well out onto the tail (as opposed to fading at the anterior part of the tail).

As for all *Gregswedoshus* gen. nov., in *Whybrowus* subgen. nov. dorsal scales are keeled and the anal single.

This monotypic subgenus is found from southwestern USA to El Salvador and Guatemala.

First or subsequent reviser note: In the event that a decision is made at any stage to merge the subgenera *Whybrowus* subgen. nov. with *Neilsonnemanus* subgen. nov., then *Whybrowus* subgen. nov. should be the name used.

Etymology: Named in honor of Pete Whybrow of Taggerty, Victoria, Australia for numerous services to herpetology.

Content of *Whybrowus* subgen. nov.

Gregswedoshus (*Whybrowus*) *cyrtopsis* (Kennicott, 1860) (Monotypic for the type species)

SUBGENUS *NEILSONNEMANUS* SUBGEN. NOV.

Type species: *Coluber eques* Reuss, 1834

Diagnosis: The snakes in the subgenus *Neilsonnemanus* subgen. nov. are similar in most respects to those of subgenus *Whybrowus* subgen. nov. from which they can be separated by having 21 mid-body rows (rarely 19), as opposed to 19 in *Whybrowus* subgen. nov.; in *Neilsonnemanus* subgen. nov. the lateral stripe is on the third or fourth rows and any dorsal pattern extends well out onto the tail (as opposed to fading at the anterior part of the tail).

Neilsonnemanus subgen. nov. are striped or checkered Garter Snakes of varying color, often with a whitish or greenish crescent behind the mouth, paired black blotches at the back of the head and the lateral stripe on the third or fourth rows anteriorly, sometimes only the third, this stripe often moving slightly to be on the second and third rows posteriorly. Sides are usually checkered in some way with dark spots on an olive or brown background. There are invariably vertical bars present on at least some supralabial sutures.

As for all *Gregswedoshus* gen. nov., dorsal scales are keeled and the anal single.

This subgenus is distributed in North and Central America.

Etymology: Named in honour of Neil Sonneman of Murmungee, near Myrtleford, Victoria, Australia in recognition for his services to herpetology spanning a number of decades.

Content of subgenus *Neilsonnemanus* subgen. nov.

Gregswedoshus (*Neilsonnemanus*) *eques* (Reuss, 1834) (Type species)

Gregswedoshus (*Neilsonnemanus*) *marcianus* (Baird and Girard, 1853)

Gregswedoshus (*Neilsonnemanus*) *postremus* (Smith, 1942)

Gregswedoshus (*Neilsonnemanus*) *pulchrilatus* (Cope, 1885)

Gregswedoshus (*Neilsonnemanus*) *rossmani* (Conant, 2000)

REFERENCES CITED

Amiel, J. J. and Wassersug, R. J. 2010. Temperature differentials between the bodies and tails of ribbon snakes (*Thamnophis sauritus*): ecological and physiological implications. *Amphibia-Reptilia* 31:257-263.

Baird, S. F. and C. Girard. 1853. Catalogue of North American Reptiles in the Museum of the Smithsonian Institution. Part 1.- Serpents. Smithsonian Inst., Washington, xvi:172 pp.

Barton, A. J. 1956. A statistical study of *Thamnophis brachystoma* (Cope) with comments on the kinship of *T. butleri* (Cope). *Proc. Biol. Soc. Washington* 69:71-82.

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

Boundy, J. 1999. Systematics of the garter snake *Thamnophis atratus* at the southern end of its range. *Proc. Cal. Acad. Sci.* 51(6):311-336.

Castoe, T. A., Chippindale, P. T., Campbell, J. A., Ammerman, L. L. and Pa, C. L. 2003. Molecular systematics of the Middle American jumping vipers (genus *Atropoides*) and phylogeography of the *Atropoides nummifer* complex. *Herpetologica* 59(3):420-431.

Castoe, T. A., Mahmood, M. S. and Parkinson, C. L. 2005. Modeling nucleotide evolution at the mesoscale: The phylogeny of the Neotropical pitvipers of the *Porthidium* group (Viperidae: Crotalinae). *Molecular Phylogenetics and Evolution* 37(3):881-898.

Castoe, T. A. and Parkinson, C. L. 2006. Bayesian mixed models and the phylogeny of pitvipers (Viperidae: Serpentes). *Molecular Phylogenetics and Evolution* 39(1):91-110.

Conant, R. 1938. The Reptiles of Ohio. *American Midland Naturalist* 20(1):1-200.

Conant, R. 1950. On the taxonomic status of *Thamnophis butleri* (Cope). *Bulletin of the Chicago Academy of Sciences* 9(4):71-77.

Conant, R. 2003. Observations on Garter Snakes of the *Thamnophis eques* Complex in the Lakes of Mexico's Transvolcanic Belt, with Descriptions of New Taxa. *American Museum Novitates* 3406:1-64.

Conant, R. and Collins, J. T. 1991. *A Field Guide to Reptiles and Amphibians of Eastern/Central North America*, 3rd ed. Houghton Mifflin (Boston/New York), xx + 450 pp.

Cope, E. D. 1875. In Yarrow, H.C., Report upon the collections of batrachians and reptiles made in portions of Nevada, Utah, California, Colorado, New Mexico, and Arizona, during the years 871, 1872, 1873, and 1874, Chapter IV, L, pp. 509-584, In: *Report upon geography.* Government Printing office, Washington D.C.

Cope, E. D. 1886. Thirteenth contribution to the herpetology of tropical America. *Proc. Amer. Philos. Soc.* 23:271-287[1885]

Cope, E. D. 1888. On the *Eutaenia* of Southeastern Indiana. *Proc. US Natl. Mus.* 11:399-400. [1889]

Cope, E. D. 1892. A new species of *Eutaenia* from western Pennsylvania. *American Naturalist* 26:964-965.

da Silva, N. G. and Sites, J. W. 2001. Phylogeny of South American Triad Coral Snakes (Elapidae: *Micrurus*) Based on Molecular Characters. *Herpetologica* 57(1):1-22.

de Queiroz, A. and Smith, H. M. 1996. Geographic Distribution. *Thamnophis eques*. *Herpetological Review* 27(3):155.

Dowling, H. G. 1951. A practical solution of the nomenclature of the common gartersnake and the ribbonsnake. *Copeia* 1951(4):309-310.

Gartside, D. F., Rogers, J. S. and Dessauer, H. C. 1977. Speciation with Little Generic and Morphological Differentiation in the Ribbon Snakes *Thamnophis proximus* and *T. sauritus* (Colubridae). *Copeia* 1977(4):697-705.

Guo, Y., Yunke, W., Shunping, H., Haito, S. and Zhao, E. 2011. Systematics and molecular phylogenetics of Asian snail-eating snakes (Pareatidae). *Zootaxa* 3001:57-64.

Hallmen, M. and Sonnenberg, J. 2006. Hilfen zur Unterscheidung einiger Unterarten und Farbformen bei Strumpfbandnattern (1.-3. *T. s. sirtalis*, *T. s. similis*; 4. *T. proximus*, *T. sauritus*, *T. radix*, *T. s. sirtalis*). *Draco* 6 (25):50-59.

Fitch, H. C. 1940. A biogeographical study of the *ordinoides artenkreis* of garter snakes (genus *Thamnophis*). *Univ. Calif. Publ. Zool*. 44:1-150.

Holbrook, J. E. 1842. *North American Herpetology; or, A description of the reptiles inhabiting the United States*. Vol I (2nd ed.). J. Dobson, Philadelphia:152 pp.

Kennicott, R. 1860. Descriptions of new species of North American serpents in the museum of the Smithsonian Institution, Washington. *Proc. Acad. Nat. Sci. Philadelphia* 12:328-338.

Langford, G. and Borden, J. A. 2006a. *Thamnophis sauritus sauritus* Maximum size. *Herpetological Review* 37(1):95.

Langford, G. J. and Borden, J. A. 2006b. *Thamnophis sauritus sauritus* (Eastern ribbon snake). Maximum size. *Herpetological Review* 37(1):95.

Langford, G. J., Borden, J. A. and Nelson, D. H. 2011. Ecology of the Eastern Ribbonsnake (*Thamnophis sauritus*) in Southern Alabama with Evidence of Seasonal Multiple Broods. *Herp. Cons. Biol.* 6(3).

Lawson, R., Slowinski, J. B., Crowther, B. I. and Burbink, F. T. 2005. Phylogeny of the colubroidea (Serpentes): New evidence from the mitochondrial and nuclear genes. *Molecular phylogenetics and evolution* 37:581-601.

Linné, C. von [= Linnaeus, C.] 1766. *Systema naturæ per regna tria naturæ, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis*. Tomus I. Editio duodecima, reformata. Laurentii Salvii, Stockholm, Holmiae:532 pp.

Mcguire, J. A. and Grismer, L. L. 1993. The taxonomy and biogeography of *Thamnophis hammondii* and *Thamnophis digueti* (Reptilia: Squamata: Colubridae) in Baja California, Mexico. *Herpetologica* 49(3):354-365.

Price, A. H. 1978. New locality records and range extensions for *Thamnophis brachystoma* (Reptilia: Serpentes) in Pennsylvania Bull. *Maryland Herp. Soc.* 14(4):260-263.

Pyron, R. A. and Burbrink, F. T. 2009. Neogene diversification and taxonomic stability in the snake tribe Lampropeltini (Serpentes: Colubridae). *Molecular Phylogenetics and Evolution* 52(2):524-529.

Pyron, R. A., et. al. 2011. The phylogeny of advanced snakes (Colubroidea), with discovery of a new subfamily and comparison of support methods for likelihood trees**.** *Mol. Phylogenet. Evol.*

58:349-342.

Queiroz, A., Lawson, R. and Lemos-Espinal, J. A. 2002. Phylogenetic Relationships of North American Garter Snakes (*Thamnophis*) Based on Four Mitochondrial Genes: How Much DNA Sequence Is Enough? *Molecular Phylogenetics and Evolution* 22:315-329.

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.

Rossman, D. A. 1961. Nomenclatural status of the Neotropical subspecies of the colubrid snake, *Thamnophis sauritus*. *Notulae Naturae* (340):1-2.

Rossman, D. A. 1963. The colubrid snake genus *Thamnophis*: A revision of the *sauritus* group. *Bull. Florida St. Mus.* 7:99-178.

Rossman, D. A. 1969. A new Natricine snake of the genus *Thamnophis* from Northern Mexico. *Occasional papers of the Museum of Zoology*, Louisiana State University (39):1-4.

Rossman, D. A. 1970. *Thamnophis sauritus*. Catalogue of American Amphibians and Reptiles (99):1-2.

Rossman, D. A. and Blaney, R. M. 1968. A new Natricine snake of the genus *Adelophis* from western Mexico. *Occasional papers of the Museum of Zoology*, Louisiana State University (35):1-12.

Rossman, D. A. and Burbrink, F. T. 2005. Species limits within the Mexican garter snakes of the *Thamnophis godmani* complex. *Occ. Papers Mus. Nat. Science* (79):1-43.

Rossman, D. A. and Stewart, G. R. 1987. Taxonomic reevaluation of *Thamnophis couchii* (Serpentes: Colubridae). *Occ. Pap. Mus. Zool. Louisiana Sata Univ*. (63):1-25.

Rossman, D. A. and Wallach, V. 1987. *Adelophis* Dugès. Mountain meadow snakes. Catalogue of American Amphibians and Reptiles 408:1-2.

Rossman, D. A., Liner, E. A., Trevino, C. H. and Chaney, A. H. 1989. Redescription of the garter snake *Thamnophis exsul* Rossman, 1969 (Serpentes: Colubridae). *Proc. Biol. Soc. Washington* 102(2):507-514.

Rossman, D. A., Ford, N. B. and Seigel, R. A. 1996. *The Garter Snakes: Evolution and Ecology*. University of Oklahoma Press, Norman, OK:322 pp.

Smith, A. G. 1945. The status of *Thamnophis butleri* Cope, and a redescription of *Thamnophis brachystoma* (Cope). *Proc. Biol. Soc. Washington* 58:147-154.

Smith, H. M. 1939. Notes on Mexican reptiles and amphibians. *Zoological Series of Field Museum of Natural History* 24(4):15-35.

Smith, H. M. 1942a. The synonymy of the garter snakes (*Thamnophis*), with notes on Mexican and Central American species. *Zoologica*, Scientific Contributions of the New York Zoological Society 27(3/4):97-123.

Smith, H. M. 1942b. Summary of the collections of snakes and crocodilians made in Mexico under the Walter Rathbone Bacon Traveling Scholarship. *Proceeding of the U. S. National Museum* 93(3169):393-504.

Smith, H. M. 1951. The identity of the ophidian name *Coluber eques* Reuss. *Copeia* 1951(2):138-140.

Smith, H. M. and Chiszar, D. 2003. The checkered nomenclatural history of the Narrow-headed Garter Snake, *Thamnophis rufipunctatus* (Cope). *Bulletin of the Chicago Herpetological Society*. 38(3):46-48.

Stebbins, R. C. 1985. *A Field Guide to Western Reptiles and Amphibians*, 2nd ed. Houghton Mifflin, Boston.

Tanner, W. W. 1959. A new *Thamnophis* from western Chihuahua with notes on four other species. *Herpetologica* 15(4):165-172.

Taylor, E. H. 1940. Two new snakes of the genus *Thamnophis* from Mexico. *Herpetologica* 1(7):183-189.

Thompson, F. G. 1957. A new Mexican gartersnake (Genus *Thamnophis*) with notes on related forms Occasional Papers of the Museum of Zoology, *University of Michigan* (584):1-10.

Todd, J. and Wassersug, R. 2010. Caudal pseudoautotomy in the Eastern Ribbon Snake *Thamnophis sauritus*. *Amphibia-Reptilia* 31:213-215.

Wood, D. A.,Vandergast, A. G., Lemos Espinal, J. A., Fisher, R. N. and Holycross, A. T. 2011. Refugial isolation and divergence in the narrowhead Garter Snake species complex (*Thamnophis rufipunctatus*) as revealed by multilocus DNA sequence data. *Molecular Ecology* 20:3856-3878.

Wüster, W., Peppin, L., Pook, C. E. and Walker, D. E. 2008. A nesting of vipers: Phylogeny and historical biogeography of the Viperidae (Squamata: Serpentes). *Molecular Phylogenetics and Evolution* 49(2):445-459.

***Australasian Journal of Herpetology* 12:48-53.**
Published 30 April 2012.

Australasian Journal of Herpetology **12:54-57.**
Published 30 April 2012.

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

A three-way division of the New World Genus *Lampropeltis* 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*: viper007@live.com.au**
Received 15 March 2012, Accepted 2 April 2012, Published 30 April 2012.

ABSTRACT

The King and Milk Snakes, *Lampropeltis* Fitzinger, 1843 are familiar to most American herpetologists. Notwithstanding their familiarity and general abundance. the taxonomy of the genus has remained unstable to the present time.

Confusion and dispute remains in terms of the exact number of species.

Even the generic placement of members has been unstable in recent years.

In 2009, Pyron and Burbink placed the short-tailed snake, known widely as *Stilosoma extenuatum* within the synonymy of *Lampropeltis*.

Other available genus names for subgroups and species groups have generally not been used.

Most recently the detailed evidence published by Pyron et. al. (2011) led the authors to note that they viewed the genus *Lampropeltis* to be paraphyletic at the genus level as currently defined.

Viewing this evidence and the obvious morphological and behavioral differences between the species groups, this paper divides the genus as currently accepted in three ways.

Lampropeltis retains the type species *getula* and several others, including *Stilosoma* which remains subsumed as does *Ophibolus* Baird and Girard, 1853. *Oreophis* Dugès, 1897 is resurrected to contain the type species *mexicana* and several others. Finally the divergent taxon, *calligaster* is placed within its own monotypic genus *Eksteinus* gen. nov.

Keywords: new genus; Kingsnake; Milksnake; *Lampropeltis*; *Stilosoma*; *Ophibolus*; *Oreophis*; *Eksteinus*; *calligaster*; Prairie Kingsnake; Mole Snake; Florida Mole Snake.

INTRODUCTION

The King and Milk Snakes, *Lampropeltis* Fitzinger, 1843 are abundant across a wide area in the United States.

Consisting about 14 described species and another 30 recognised subspecies, they are popular pets in the reptile-keeping hobby. The snakes are reasonably active, docile and generally only bite when feeding.

Kingsnakes are regularly seen in pet shops across the United States, Europe and South Africa.

Notwithstanding their familiarity and general abundance in the region stretching from southern Canada, through most of the United States, Central America and to Equador in northern South America, the taxonomy of the genus has remained unstable to the present time.

Confusion and dispute remains in terms of the exact number of species and the generic placement of members has also been unstable.

Most recently in 2009, Pyron and Burbink (2009a) placed the short-tailed snake, known widely as *Stilosoma extenuatum* within the synonymy of *Lampropeltis*, based on newly obtained phylogenetic evidence.

Available generic names for subgroups and species groups have generally not been used.

Most recently the detailed evidence published by Pyron et. al. (2011) led the authors to note that they viewed the genus *Lampropeltis* to be paraphyletic at the genus level.

However the authors made no taxonomic decisions at the time, save for their continued placement of the species *extenuatum* within *Lampropeltis.*

Viewing the evidence published by Pyron et. al. 2011 and the obvious morphological and behavioral differences between the species groups, this paper divides the genus as currently accepted three ways.

Lampropeltis retains the type species *getula* and several others, including *Stilosoma* which remains subsumed as does *Ophibolus* Baird and Girard, 1853. The holotype for the genus *Ophibolus* is *sayi,* a synonym for *L. getula.*

Oreophis Dugès, 1897 is resurrected to contain the type species *mexicana* and several others. Finally the divergent taxon, *calligaster* is placed within its own monotypic genus *Eksteinus* gen. nov..

GENERA *LAMPROPELTIS* FITZINGER, 1843 AND *OREOPHIS* DUGÈS, 1897

Diagnosis: Herein the two similar genera are diagnosed as one, in that they are both subject to diagnoses in other publications and this diagnosis is only for the purposes of setting out the diagnosis of the new genus *Eksteinus* gen. nov. defined below according to the Zoological Code (Ride et. al. 1999) in terms of separating it from these snakes.

The joint diagnosis of these genera is also made from the perspective that the genus *Eksteinus* gen. nov. is divergent from all members of both physically and phylogentically and so can be differentiated against both other genera at the same time, as well as the fact that most readers in 2012 will probably still treat both *Lampropeltis* and *Oreophis* as a single group.

It should also be noted that the most recent phylogeny of these three groups of snakes placed *calligaster* as basal to the rest (Pyron et. al. 2011).

Both *Lampropeltis* and *Oreophis* consist of the so-called Kingsnakes and Milksnakes, which are small to medium-sized snakes usually from 30-90 cm in total adult length, although some species exceed a metre.

They are all shiny non-venomous snakes with smooth scales, 19-27 (usually about 23) dorsal mid-body scale rows and a single anal plate. They are powerful constrictors with other serpents featuring in the diet of several species. For this reason, captives should not be housed together and if placed together for breeding they should be watched at all times.

In the normal course of events, other vertebrates such as lizards and rodents form the main part of their diets.

For the Kingsnakes, most specimens are black or dark brown with white or yellowish spots on their scales, the exact size and arrangements varying between species and even within species.

When encountered in the wild these snakes often hiss and strike, but once picked up they become calm almost immediately.

The so-called Milksnakes are usually tri-coloured with red or brown, black and white or yellow in the form of transverse rings. In some kinds there are rows of blotches instead of rings, but in all cases the reddish part of the pattern is surrounded by black. These snakes are usually somewhat more pugnacious with specimens commonly biting when handled. The name “Milksnakes”, comes from the myth that these snakes milk cows and has been perpetuated by this being the “common name” for the snakes in all major reptile field guides and the like, including Stebbins (1966) and Conant (1975).

Hatchlings measure 17-25 cm in total length.

The body of literature in terms of these snakes, including the species *calligaster* is huge and includes field guides, captive notes in herpetological journals and various taxonomic treatises and reviews. Relevant and important publications include, Allen (1932), Allen and Neill (1954), Anonymous (2007), Austin and Gregory (1999), Bailey (1939), Baird and Girard (1853), Barbour (1917), Barbour and Engels (1942), Bateman et. al. (2009), Bentley (1919), Bergman (1998), Bird et. a. (2005), Blainville (1835), Blanchard (1919, 1920, 1932), Blaney (1973, 1977, 1979), Blom (2003), Boback, et. al. (1996), Brady (1927), Burkett and Painter (1988), Burt (1933, 1935), Collins (1995), Collins and Collins (2010), Collins and Sapienza (1998), Conant (1934, 1938), Conant and Collins (1991), Cope (1860, 1875, 1892), Carrington (1927, 1929), Crother (2000), Davenport et. al. (1998), Degenhardt et. al. (1996), Dessauer and Pough (1975), Duméril and Bibron (1835), Enge (2009), Fitch (1936), Franklin (1998), Green and Pauley (1987), Grismer (1999), Gutberlet and Franklin (1996), Hallmen (2005, 2006), Hay (1902), Hibbitts (1998), Irwin (2004), Jan (1865a, 1865b), Klauber (1938), Kreutz (2005), Krysko (1998), Krysko and Hurt (1998), Krysko and Judd (2006), Lara-Gongora et. al. (1993), Lazell and Musick (1973), LeClere (1995), Liner (1996), Linné (1766), Lönnberg (1894), Mattison (2007), Means (1998), Meierkord (2010), Mitchell (1994), Murphy and Ottley (1984), Neill and Ross (1949), Palmer and Braswell (1995), Phillips and Petzing (1998), Price (1987), Pyron and Burbink (2009a, 2009b, 2009c), Schmidt (2004, 2005), Seufer and Jauch (1980a, 1980b), Shoop (1957), Skubowius (2009, 2010), Slevin (1950), Smith (1956), Snyder (1945), Stebbins (1985), Stejneger (1902), Stevens (1994), Tanner (1927), Tanner (1958), Taylor (1952), Thissen and Hansen (2001), Thornton and Smith (1993), Thums (2004), Van Denburgh and Slevin (1921), Werner (1924), Wilgers et. al. (2006), Woodbury (1928), Yarrow (1882), Young and Iverson (1997) and Zweifel and Norris (1955).

GENUS *EKSTEINUS* GEN. NOV.

Type species: *Coluber calligaster* Harlan, 1827.

Diagnosis: The nominate form is known in most contemporary texts as the Prairie Kingsnake *Lampropeltis calligaster.* This taxon (including subspecies), monotypic for *Eksteinus* gen. nov. is easily separated from all other *Lampropeltis* and *Oreophis* by the following suite of characters: It is a distinctly blotched snake, relatively uncommon among Kingsnakes and Milksnakes; in this taxon the back and tail are patterned with about 60 brown reddish or greenish black-edged markings or alternatively about 55 or 52 small well-separated spots in the subspecies *rhombomaculata* and *occipitolineata*. Occasionally these are split in two down the back. There are two alternating rows of dark markings on each side, but pairs of these may fuse together. The ground colour is brownish grey or tan. Older specimens with faded pattern are commonly known as the “dark phase” often characterized by longitudinal dusky stripes. These snakes are characterized by a distinctive “V”-shaped arrow-head marking on the crown of the head. The venter is yellowish with squarish brown blotches. The young are strongly spotted, sometimes with lengthwise dark streaks on the neck and 23-28 cm in total length when hatched.

There are usually 23 dorsal mid-body rows, 9 infralabials, 7 supralabials, with numbers 3 and 4 in contact with the eye.

These snakes are similar in appearance to some Milksnakes (*Lampropeltis* spp.), which they are separated from by the fact that in Milksnakes the reddish blotches or rings are very boldly surrounded by black, and there are black markings on the belly.

These snakes are most commonly confused with Ratsnakes (*Elaphe*), and Cornsnakes (*Pantherophis*), which differ in having a divided anal, keeled scales and with the underside of tail often striped. Glossy Snakes (*Arizona*) have plain white venters.

The preferred habitat of *Eksteinus* gen. nov. is open grassland with loose, dry soil, typically on the edge of a forested region, not far from a permanent source of water. The diet consists primarily of rodents, but they will also consume lizards, frogs and occasionally other snakes. They are typically docile when handled, even as wild-caught. Like most colubrids if harassed they will shake their tail, which if in dry leaf litter can sound remarkably like a Rattlesnake (Crotalids). They are not typically prone to biting, but in terms of wild snakes, if handled will often excrete a foul-smelling musk. When threatened, they flatten and appear to have white spots.

Many specimens are found by earth-moving operations and the like, these snakes being more prone to burrowing than other species within *Lampropeltis* and *Oreophis.*

As already mentioned, the genus *Eksteinus* gen. nov. is monotypic for the species *E. calligaster.* There are three recognised subspecies, namely:

E. calligaster calligaster Harlan, (1827), (Common name: Prairie Kingsnake),

E. calligaster rhombomaculata (Holbrook, 1840), (Common name: Mole snake),

E. calligaster occipitolineata (Price, 1987), (Common name: Florida Mole Snake).

Distribution: A United States endemic, found in mid-western areas from Nebraska to Florida in the south-east.

Etymology: Named in honor of Bob Ekstein of Belrose in Sydney, Australia for various services to herpetology.

SPECIES REMAINING IN *LAMPROPELTIS*

Lampropeltis getula (Linnaeus, 1766) (type species)
Lampropeltis alterna (Brown, 1901)
Lampropeltis californiae (Blainville, 1835)
Lampropeltis extenuata (Brown, 1890)
Lampropeltis holbrooki (Stejneger, 1902)
Lampropeltis nigra (Yarrow, 1882)
Lampropeltis splendida (Baird and Girard, 1853)
Lampropeltis triangulum (Lacepède, 1789)

SPECIES WITHIN *OREOPHIS*

Oreophis mexicana (Type species)
Oreophis elapsoides (Allen, 1932)
Oreophis pyromelana (Cope, 1866)
Oreophis ruthveni (Blanchard, 1920)
Oreophis webbi (Bryson, Dixon and Lazcano)
Oreophis zonata (Lockington, 1835)

REFERENCES CITED

Allen, M. J. 1932. A survey of the Amphibians and reptiles of Harrison County, Mississippi *American Museum Novitates* (542):1-20.

Allen, E. R. and Neill, W. T. 1954. Juveniles of Brooks' kingsnake, *Lampropeltis getulus* brooksi. *Copeia* (1):59.

Anonymous. 2007. *Snakes of New Jersey*. New Jersey Division of Fish and Wildlife.

Austin, J. D. and Gregory, P. T. 1999. Relative roles of thermal and chemical cues in the investigative behavior of prey in colubrid (*Elaphe guttata* and *Lampropeltis getulus*) and Boid (*Python regius*) snakes. *Herpetological Natural History* 6(1):47-50. [1998]

Bailey, R. M. 1939. *Carphophis amoena vermis* and *Lampropeltis calligaster* in Iowa. *Copeia* 1939(4):218-220.

Baird, S. F. and C. Girard. 1853. *Catalogue of North American Reptiles in the Museum of the Smithsonian Institution. Part 1.- Serpents.* Smithsonian Inst., Washington, xvi + 172 pp.

Barbour, T. 1917. Another New Jersey King Snake. *Copeia* 1917(49):92.

Barbour, T. and Engels, 1942. *Proc. New England Zool. Club* 20:101-104.

Bateman, H. L., Chung-MacCoubrey, A., Snell, A. L. and Finch, D. M. 2009. Abundance and Species Richness of Snakes along the Middle Rio Grande Riparian Forest in New Mexico. *Herp. Cons. Biol.* 4:1.

Bentley, G. H. 1919. Reptiles collected in the vicinity of Current, Nye County, Nevada *Copeia* 1919(75):87-91.

Bergman, E., Montgomery, C., Childers, T., Manzer, J. D., Sifert, J., Hill, B. and Mac 1998. Geographic Distribution. *Lampropeltis getula. Herpetological Review* 29(2):113.

Bird, W., Peak, P. and Collins, J. T. 2005. *Lampropeltis calligaster* (Prairie Kingsnake). New record length for the entire range. *Journal of the Kansas Herpetology* 15:12.

Blainville, H. M. D. 1835. Description de quelques espèces de reptiles de la Californie précédée de l'analyse d'un système général d'herpétologie et d'amphbiologie. *Nouv. Ann. Mus. Hist. Nat. Paris* 4:232-296.

Blanchard, F. N. 1919. Two new snakes of the genus *Lampropeltis. Occasional Papers of the Museum of Zoology*, University of Michigan (70):1-11.

Blanchard, F. N. 1920. A synopsis of the king snakes: Genus *Lampropeltis* Fitzinger Occasional Papers of the Museum of Zoology, University of Michigan (87):1-7.

Blanchard, F. N. 1932. A clutch of eggs of the speckled king snake, *Lampropeltis getulus holbrooki* (Stejneger). *Copeia* 1932(2):98.

Blaney, R. M. 1973. *Lampropeltis*. Catalogue of American Amphibians and Reptiles (150):1-2.

Blaney, R. M. 1977. Systematics of the common kingsnake, *Lampropeltis getulus* (Linnaeus). *Tulane Studies in Zoology and Botany* 19(3-4):47-103.

Blaney, R. M. 1979. *Lampropeltis calligaster* (Harlan). Prairie kingsnake. *Catalogue of American Amphibians and Reptiles*. 229:1-2.

Blom, M. 2003. Algemene verzorging en kweek van *Lampropeltis* en *Elaphe* soorten. *Lacerta* 61(1):32-39.

Boback, S., Shelly, L., Bergman, E., Hill, B., Montgomery, C., Hobert, J. And Mackessey, S. 1996. Geographic Distribution. *Lampropeltis getula. Herpetological Review* 27(4):213.

Brady, M. 1927. Notes on the reptiles and amphibians of the Dismal Swamp. *Copeia* 1927 (162):26-29.

Burkett, D. and Painter, C. W. 1998. Geographic Distribution. *Lampropeltis getula splendida. Herpetological Review* 29(2):113.

Burt, C. E. 1933. A contribution to the herpetology of Kentucky. *American Midland Naturalist* 14(6):669-679.

Burt, C. E. 1935. Further records of the ecology and distribution of amphibians and reptiles in the middle west. *American Midland Naturalist* 16(3):311-336.

Collins, J. T. 1995. *Lampropeltis calligaster*. *Herpetological Review.* 26(2):110.

Collins, J. T. and Collins, S. L. 2010. *A pocket guide to Kansas snakes*, 3rd ed. Great Plains Nature Center, Wichita, 69 pp.

Collins, J. T. and Sapienza, D. C. 1998. Geographic distribution. *Lampropeltis getula nigra. Herpetological Review* 29(3):177.

Conant, R. 1934. Observations on the eggs and young of the black king snake, *Lampropeltis getulus nigra* (Yarrow). *Copeia* 1934(4):188-189.

Conant, R. 1938. The Reptiles of Ohio. *American Midland Naturalist* 20(1):1-200.

Conant, R. 1975. *Reptiles and Amphibians of Eastern and Central North America*. Houghton Mifflin, USA:429 pp.

Conant, R. and Collins, J. T. 1991. *A Field Guide to Reptiles and Amphibians of Eastern/Central North America*, 3rd ed. Houghton Mifflin (Boston/New York):xx + 450 p.

Cope, E. D. 1860. Catalogue of the Colubridae in the Museum of the Academy of Natural Sciences of Philadelphia, with notes and descriptions of new species. Part II. *Proc. Acad. Nat. Sci. Philadelphia* 12:241-266.

Cope, E. D. 1875. The herpetology of Florida. *Proc. Acad. Nat. Sci. Philadelphia* 1875:10-11.

Cope, E. D. 1892. The Batrachia and Reptilia of North West Texas. *Proc. Acad. Nat. Sci. Philadelphia* 1892:331-337.

Corrington, J. D. 1927. Field note on some amphibians and reptiles at Biloxi, Mississippi *Copeia* 1927(165):98-102.

Corrington, J. D. 1929. Herpetology of the Columbia, South Carolina, region. *Copeia* 1929 (172):58-83.

Crother, B. I. 2000. Scientific and standard English names of amphibians and reptiles of North America north of Mexico, with comments regarding confidence in our understanding. *Herpetological Circular*, No. 29:1-82.

Davenport, S. R., Stuart, J. N. and Sias, D. S. 1998. Geographic Distribution. *Lampropeltis getula californiae. Herpetological Review* 29(1):53.

Degenhardt, W. G., Painter, C. W. and Price, C. W. 1996. *Amphibians and reptiles of New Mexico*. Univ. New Mexico Press:431 pp.

Dessauer, H. C. and Pough, F. H. 1975. Geographical variation of blood proteins and the systematic of Kingsnakes (*Lampropeltis getulus*). *Comp. Biochem. Physiol.* 50B: 9-12

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.

Enge, K. M. 2009. Venomous and non-venomous snakes of Florida. Publication of the Florida Fish & Wildlife Conservation Commission:16 pp.

Fitch, H. S. 1936. Amphibians and reptiles of the Rouge River Basin, Oregon American *Midland Naturalist* 17:634-652.

Franklin, C. J. 1998. Geographic Distribution. *Lampropeltis calligaster. Herpetological Review* 29(1):53.

Green, N .B. and Pauley, T. K. 1987. *Amphibians and reptiles in West Virginia*. Univ. of Pittsburgh Press, Pittsburgh:241 pp.

Grismer, L. L. 1999. An evolutionary classification of reptiles on islands in the Gulf of California, México. *Herpetologica* 55(4):446-469.

Gutberlet, R. L. and Franklin, C. J. 1996. Geographic Distribution. *Lampropeltis calligaster calligaster. Herpetological Review* 27(4):213.

Hallmen, M. 2005. Farb- und Zeichnungszuchten in der Terraristik. *Reptilia* (Münster) 10(55):16-22.

Hallmen, M. 2006. Selective Breeding for color and pattern. *Reptilia* (GB)(44):12-18.

Harlan, R. 1827. Genera of North American Reptilia, and synopsis of

the species. *J. Acad. Nat. Sci. Philadelphia* 5:317-372.

Hay, W. P. 1902. The color of the fully adult *Ophibolus rhombomaculatus* Holbrook. *Proc. Biol. Soc. Washington* 15:90.

Hibbitts, T. J. 1998. Geographic distribution. *Lampropeltis calligaster calligaster. Herpetological Review* 29(3):177.

Hubbs, B. 2009. *Common Kingsnakes, a natural History of* Lampropeltis getula. Tricolor Books, Tempe AZ:436 pp.

Irwin, K. J. 2004. *Arkansas Snake Guide*. Arkansas Game and Fish Commission, Little Rock:50 pp.

Jan, G. 1865a. *Iconographie générale des ophidiens. 12. Livraison.* J.B. Bailière et Fils, Paris -

Jan, G. 1865b. *Iconographie générale des ophidiens. 14. Livraison. [*Elapomorphus d'Orbignyi, Coronella getulus var. sayi*]* J.B. Bailière et Fils, Paris.

Klauber, L. M. 1938. Notes from a herpetological diary, I. *Copeia* 1938(4):191-197.

Kreutz, R. 2005. Farb- und Zeichnungsstandard der Kornnatter (*Pantherhophis guttatus*). Kirschner und Seufer Verlag, Keltern-Weiler:158 pp.

Krysko, K. L. 1998. Geographic Distribution. *Lampropeltis calligaster rhombomaculata. Herpetological Review* 29(2):113.

Krysko, K. L. and Hurt, C. 1998. Geographic distribution. *Lampropeltis calligaster occipitolineata. Herpetological Review* 29(3):177.

Krysko, K. L. and Judd, W. S. 2006. Morphological systematics of kingsnakes*, Lampropeltis getula* complex (Serpentes: Colubridae), in the eastern United States. *Zootaxa* 1193:1-39.

Lara-Gongora, G., Beaman, K. R., Grismer, L. L. and Lawler, H. E. 1993. *Lampropeltis getula californiae* (California Kingsnake). México: *Sonora Herpetological Review* 24(2):67-68.

Lazell, J. D. and Musick, J. A. 1973. The kingsnake, *Lampropeltis getulus sticticeps*, and the ecology of the Outer Banks of North Carolina. *Copeia* 1973(3):497-503.

LeClere, J. B. 1995. *Lampropeltis getula holbrooki. Herpetological Review* 26(2):110.

Liner, E. A. 1966. *Lampropeltis calligaster rhombomaculata* (Holbrook) in Louisiana. *Journal of the Ohio Herpetological Society* 5(3):105.

Linné, C. von [= Linnaeus, C.] 1766. *Systema naturæ per regna tria naturæ, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis. Tomus I. Editio duodecima, reformata.* Laurentii Salvii, Stockholm, Holmiae:532 pp.

Lönnberg, E. 1894. Notes on reptiles and batrachians collected in Florida in 1892 and 1893. *Proc. US Natl. Mus.* 17(1003):317-339.

Mattison, C. 2007. *The New Encyclopedia of Snakes*. Princeton University Press.

Means, D. B. 1998. Geographic Distribution. *Lampropeltis getula. Herpetological Review* 29(2):113.

Meierkord, R. 2010. Haltung und Zucht der Kalifornischen Kettennatter, *Lampropeltis californiae. Reptilia* (Münster)15(82):52-55.

Mitchell, J. C. 1994. *The reptiles of Virginia*. Virginia Department of Game and Inland Fisheries, ca:350 pp.

Murphy, R. W. and Ottley, J. R. 1984. Distribution of amphibians and reptiles on islands in the Gulf of California. *Annals of Carnegie Museum* 53(8):207-230.

Neill, W. T. and Ross, A. E. 1949. A new Kingsnake (genus *Lampropeltis*) from Florida. *Herpetologica* 5(5):101-106.

Palmer, W. M. and Braswell, A. L. 1995. *Reptiles of North Carolina*. Univ. North Carolina Press.

Phillips, C. A. and Petzing, J. E. 1998. Geographic distribution. *Lampropeltis getula holbrooki. Herpetological Review* 29(3):177.

Price, R. M. 1987. Disjunct occurrence of mole snakes in Peninsular Florida, and the description of a new subspecies of *Lampropeltis calligaster. Bull. Chicago Herpetol. Soc.* 22(9):148.

Pyron, R. A. and Burbrink, F. T. 2009a. Neogene diversification and taxonomic stability in the snake tribe Lampropeltini (Serpentes: Colubridae). *Molecular Phylogenetics and Evolution* 52(2):524-529.

Pyron, R. A. and Burbrink, F. T. 2009ba. Lineage diversification in a widespread species: roles for niche divergence and conservatism in the common Kingsnake, *Lampropeltis getula. Molecular Ecology* 18:3443-3457.

Pyron, R. A. and Burbrink, F. T. 2009c. Systematics of the Common Kingsnake (*Lampropeltis getula*: Serpentes: Colubridae) and the burden of heritage in taxonomy. *Zootaxa* 2241:22-32.

Pyron, R. A., et. al. 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.

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. 2004. Die Kettennatter *Lampropeltis getula. Natur und Tier Verlag* (Münster):64 pp.

Schmidt, D. 2005. Eine Kettennatter als Vegetarierin. *Reptilia* (Münster) 10(51):8-9.

Seufer, H. and Jauch, H. 1980a. Die Kettennatter *Lampropeltis getulus. Herpetofauna* 2(6):11-14.

Seufer, H. and Jauch, H. 1980b. Die Kettennatter *Lampropeltis getulus* Teil 2. *Herpetofauna* 2 (7):31-32.

Shoop, C. R. 1957. Eggs and young of the prairie king snake, *Lampropeltis c. calligaster*. *Copeia* 1957(1):48-49.

Skubowius, B. 2009. Haltung und Nachzucht der Kettennattern, *Lampropeltis getula*. Floridas. *Draco* 10(37):56-62.

Skubowius, B. 2010. New Jersey - Mit „Fieldherpern" und „Pineys" auf der Suche nach der Nördlichen Kiefernnatter (*Pituophis melanoleucus melanoleucus*). *Reptilia* (Münster)15(84):52-60.

Slevin, J. R. 1950. A remarkable concentration of desert snakes [*Lampropeltis getula yumensis californiae nigrita*]. *Herpetologica* 6(1):12-13.

Smith, P. W. 1956. A blotch-count gradient in snakes [*Lampropeltis triangulum syspila calligaster getula getulus niger*]. *Herpetologica* 12(2):156-160.

Snyder, R. C. 1945. Notes on the snakes of southeastern Alabama. *Copeia* 1945(3):173-174.

Stebbins, R. 1966. *A field guide to Western Reptiles and Amphibians*. Houghton Mifflin, USA:279 PP.

Stebbins, R. C. 1985. *A Field Guide to Western Reptiles and Amphibians*, 2nd ed. Houghton Mifflin, Boston.

Stejneger, L. 1902. The reptiles of the Huachuca Mountains, Arizona. *Proc. US Natl. Mus.* 25[1902]:149-158.

Stevens, K. 1994. Notes on the prairie Kingsnake, *Lampropeltis calligaster calligaster. Herptile: Journal of the International Herpetological Society* 19(2):57-60.

Tanner, V. M. 1927. Distributional list of the amphibians and reptiles of Utah. *Copeia* 1927(163):54-58.

Tanner, W. W. 1958. Herpetological range extensions. *Herpetologica* 14:195-196.

Taylor, E. H. 1952. Third contribution of the herpetology of the Mexican state of San Luis Potosí. *Univ. Kansas Sci. Bull.* 34(13):793-815.

Thissen, R. and Hansen, H. 2001. *Königsnattern* - Lampropeltis. Natur und Tier Verlag (Münster):172 pp.

Thornton, O. W. and Smith, J. R. 1993. New county records of amphibians and reptiles from West-Central Texas. *Herpetological Review* 24(1):35-36.

Thums, M. 2004. Die schwarze Mexiko-Kettennatter (*Lampropeltis getula nigrita*) im Terrarium. *Reptilia* (Münster)9(49):72-75.

Van Denburgh, J. and Slevin, J. R. 1921. Preliminary diagnoses of more new species of reptiles from islands in the gulf of California, Mexico. *Proc. Cal. Acad. Sci.* (4)11(17):395-398.

Werner, F. 1924. *Neue oder wenig bekannte Schlangen aus dem Naturhistorischen Staatsmuseum in Wien.* I. Teil. Sitz. Ber. Akad. Wiss., Wien, Abt. I, 133:29-56.

Wilgers, D. J., Horne, E. A., Sandercock, B. K. and Volkmann, A. W. 2006. Effects of rangeland management on community dynamics of the herpetofauna of the Tall-grass Prairie [Flint Hills, Kansas/ Oklahoma]. *Herpetologica* 62(4):378-388.

Woodbury, A. M. 1928. The reptiles of Zion National Park. *Copeia* 1928(166):14-21.

Yarrow, H. C. 1882. Description of new species of reptiles and amphibians in the US National Museum. *Proc. US Natl. Mus.* 5:438-443

Young, C. A. and Iverson, J. B. 1997. Geographic Distribution. *Lampropeltis getula nigra. Herpetological Review* 28(1):52.

Zweifel, R. G. and Norris, K. S. 1955. Contributions to the herpetology of Sonora, Mexico: Descriptions of new subspecies of snakes (*Micruroides euryxanthus* and *Lampropeltis getulus*) and miscellaneous collecting notes. *American Midland Nat.* 54:230-249.

Australasian Journal of Herpetology **12:58-62.**
Published 30 April 2012.

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

A review of the taxonomy of the European Colubrid snake genera *Natrix* and *Coronella*, with the creation of three new monotypic genera (Serpentes:Colubridae).

RAYMOND T. HOSER

488 Park Road, Park Orchards, Victoria, 3134, Australia.
***Phone*: +61 3 9812 3322 *Fax*: 9812 3355 *E-mail*: viper007@live.com.au**
Received 2 March 2012, Accepted 8 April 2012, Published 30 April 2012.

ABSTRACT

There have been several phylogenetic studies involving the Keeled Snakes of genus *Natrix* and Smooth Snakes of genus *Coronella* as recognized at start 2012.

The exact status of each genus in terms of species composition has been the subject of argument among taxonomists, including whether or not well-recognized species such as *N. tessellata, N. natrix* and *C. girondica* are actually composites of several similar species.

Within the last decade, several studies have shown the divergence between the three members of the genus *Natrix* to be from 12 to 27 million years ago (Guicking et. al. 2006), and probably further back for the three extant members of the genus *Coronella* (see comparative results in Pyron et. al. 2011).

As a result each genus is subdivided three ways.

Natrix natrix remains as the sole taxon in that genus. *N. maura* is placed within a new genus *Jackyhosernatrix* gen. nov. and *N. tessellata* is placed in the new genus *Guystebbinsus* gen. nov.

Coronella austriaca remains as the sole taxon in that genus, while *C. brachyura* is placed in the genus *Wallophis* Werner, 1929, and *C. girondica* is placed in the genus *Sharonhoserea* gen. nov.

Keywords: Taxonomic revision; new genera; genus; species; *Coronella*; *Natrix*; *Wallophis*; *Jackyhosernatrix*; *Sharonhoserea; Guystebbinsus; tessellata; maura; girondica; austriaca; brachyura*.

INTRODUCTION

Numerous studies have been completed in terms of the Keeled Snakes currently placed in the genus *Natrix*, and the Smooth Snakes, currently placed in the genus *Coronella.*

The three species remaining within each genus as of 2012, have had a fairly stable taxonomic history in recent years, following the partitioning of the relevant genera (e.g. Rossman and Eberle 1977) and the placement of component species in various other genera including those identified by Rossman and Eberle (1977).

While the remaining snakes in each genus are physically very similar, recent phylogentic studies have shown them to have histories far more divergent than their obvious morphologies would suggest.

Most recent taxonomic studies on these snakes have concentrated on the divergences of scattered European populations in the recent geological past, with a view to managing ongoing conservation issues caused by human overpopulation.

Alternatively they have been conducted with a view to the resolution of disputes in terms of alleged species and subspecies.

As another alternative, the genera themselves have been scrutinized from the perspective of their positions in higher taxonomic hierarchies at the family level or even higher (e.g. Lawson et. al. 2005, Pyron et. al. 2011).

However no recent authors have investigated the possibility that in the light of this new molecular data, whether or not snakes are appropriately placed within given genera which have been previously assigned.

The results published by Pyron et. al. (2011) in terms of a global review of the Colubroidea in particular shows that the continued treatment of snake species within each genus (*Natrix* and *Coronella*) as monotypic is inconsistent when compared to other colubrid genera as recognized, including for example *Pituophis* and *Pantherophis* being divided into two genera when the more divergent members of *Coronella* are not.

Recent papers dealing with the phylogeny and taxonomy of *Natrix* and/or *Coronella* include: Bagherian and Kami (2009), Guicking et. al. (2006), Guicking et. al. (2009), Guicking and Joger (2011) and Pyron et. al. (2011).

Studies and publications dealing with relevant aspects in terms of *Natrix* include: Abo-Eleneen et. al. (2011), Ahmadzadeh et. al. (2011), Ananjeva et. al. (2006), Anonymous (1992), Baier and Wiedl (2010), Bar and Haimovich (2012), Barata et. al. (2008), Bassu et. al. (2008), Bergmans (1976), Billings and Langford (1991), Böhme and Wiedl (1994), Borczyk (2007), Boulenger (1891), Boulenger (1893), Boulenger (1913), Brecko et. al. (2011), Cortés (1982), Engelmann (1993), Frotzler et. al. (2011), Günther (1866), Hutinek et. al. (2011), Ingle and Sarsavan (2011), Schleich et. al. (1996), Jandzic (2005), Joger et. al. (2007), Klesius (2009), Kühnel (2002), Lantermann and Lantermann (2007), Lantermann and Lantermann (2011), Laurent (1935), Leviton et. al. (1992), Linnaeus (1758), Liu et. al. (2011), Orlov and Tuniyev (1987), Orlov, et. al. (1992), Santos et. al. (2005), Santos et. al. (2011), Schätti (1982), Schlüter (2009), Schlüter (2012), Sindaco et. al. (2007), Sos (2008), Thorpe (1975a, 1975b, 1979, 1980a, 1980b, 1981, 1984), Tuniyev (1990), Venchi and Sindaco (2006), Willsch (1984) and Wirth and Hähnlein (2009).

Studies and publications dealing with relevant aspects in terms of *Coronella* include: Bombi et. al. (2009), Boulenger (1889), Daudin (1802), Dusej (1993), Najbar (2006), Pernetta and Reading (2009), Santos et. al. (2008), Schlüter (2004, 2009, 2012), Sharma (2004), Smith (1943) and Vyas and Patel (2007).

As composites, these studies also yield a compelling argument for the division of the relevant genera as currently recognized.

Therefore the two genera are herein subdivided as follows:

Natrix natrix remains as the sole taxon in that genus. *N. maura* is placed within a new genus *Jackyhosernatrix* gen. nov and *N. tessellata* is placed in the new genus *Guystebbinsus* gen. nov..

Coronella austriaca remains as the sole taxon in that genus, while *C. brachyura* is placed in the resurrected genus *Wallophis* Werner, 1929, and *C. girondica* is placed in the genus *Sharonhoserea* gen. nov..

GENUS *NATRIX* LAURENTI, 1768

Type species: *Coluber natrix* Linnaeus, 1766

Diagnosis: The genus as recognized as of early 2012 consisted of three species of medium to large snakes with clearly keeled body scales, large scales on the head and round pupils. The belly pattern is often chequered. There are 19-23 dorsal mid body rows, 7-8 upper labials, 1-2 pre-oculars, 2 internasals, 2-4 postoculars, nostrils pointing laterally.

In terms of this paper, the genus *Natrix* (species *natrix*) is herein separated from the other two species formerly placed in the genus by having seven supralabials and three postoculars, versus two postoculars in the species *maura* (genus *Jackyhosernatrix* gen. nov) or 8 upper labials in the species *tessellata* (genus *Guystebbinsus* gen. nov.).

They are usually found in moist places or in or near water.

THE DIVISION OF *NATRIX*

Evidence and reasons for the division of the genus *Natrix* as known in early 2012 have come from several sources.

One was Guicking et. al. 2006.

They wrote in their abstract:

"Some aspects of the natural history of snakes of the colubrid genus *Natrix* have been well studied. With their extensive European distribution and relative abundance, their ecology, reproduction and behaviour are well known. Yet other facets of their biology remain poorly understood. These include knowledge of *Natrix* phylogeny, hypotheses explaining the current distribution of the three extant members of the genus, and their evolution and relationships. In this study we used molecular data, the nucleotide sequences of four protein-coding mitochondrial genes (3806 bp total), to provide a well-supported phylogeny for the genus *Natrix*. With these molecular data, evidence from the fossil record, and knowledge of palaeogeological events, we used two approaches in designing a time scale which we used to date the major events in *Natrix* speciation and intraspecific variation. Our data strongly support a phylogeny for the genus in which *N. maura* is basal with *N. natrix* and *N. tessellata* being sister species. The calibrated molecular clock suggests that *N. maura* diverged from the common ancestor of the three species 18-27 mya and that *N. natrix* and *N. tessellata* diverged 13-22 mya. Although the ranges of these estimates are large they support an early Miocene to late Oligocene origin for the three species. Intraspecific divergence is estimated to have commenced 5.3, 6.0 and 6.7 mya with evolutionary rates of 1 : 1.25 : 1.35% per million years for *N. maura, N. natrix* and *N. tessellata*, respectively."

The time frame for divergence puts all three species sufficiently apart to be reasonably placed in separate genera.

Furthermore the so-called intra-specific divergences within the three named taxa supports the likelihood that one or more of these is in fact composite.

Notwithstanding this, the species described as *Natrix megalocephala* Orlov and Tuniyev, 1987, has been questioned by several authors, including Venchi and Sindaco 2006 and Bohme 2009, who have treated it as synonymous with *N. natrix scutatus.* However other authors including, Engelmann et. al. 1993 and Ananjeva et. al. 2006 have regarded *megalocephala* as a valid species.

Notable is that the published results of Pyron et. al. (2011) showed the three species of *Natrix* as recognized in early 2012 to have diverged at a point comparable to that where other taxa are placed in separate genera.

The species *maura* was found to have diverged from the common ancestor prior to *natrix* and *tessellata*, which concurs with the results of Guicking et. al. 2006, who also found this taxon as the first to diverge.

With obvious morphological differences between the taxa as well as clear and defined habitat partitioning between species when they are sympatric, it is clear that generic division between the taxa is warranted and hence this is done according to the Zoological Code (Ride et. al. 1999), below.

GENUS *JACKYHOSERNATRIX* GEN. NOV.

Type species: *Coluber maurus* Linnaeus, 1758

Diagnosis: The genus *Natrix* (species *natrix*) is herein separated from the other two species formerly placed in the genus by having seven supralabials and three postoculars, versus two postoculars in the species *maura* (this genus *Jackyhosernatrix* gen. nov.) or 8 upper labials in the species *tessellata* (genus *Guystebbinsus* gen. nov.).

Snakes in this genus have seven supralabials, with numbers 3 and 4 entering the eye and two postoculars. In snakes of both genus *Guystebbinsus* gen. nov. and *Natrix* there are three postoculars.

The species within this genus (*Jackyhosernatrix* gen. nov.) are medium to large snakes with clearly keeled body scales, large scales on the head and round pupils. The belly pattern is often chequered. There are 19-23 (usually 21) dorsal mid body rows, 7 upper labials, 2 pre-oculars, 2 internasals, 2 postoculars, nostrils pointing laterally.

These snakes grow up to 100 cm in total length, but most adults are less than 70 cm.

Females are the larger sex.

Coloration varies, but dorsally is usually brown or grayish but may be tinged with yellow, red or olive. Typically there are two rows of staggered dark blotches running down the mid-back that may merge to produce bars or a well-defined zig-zag stripe. Flanks have dark blotches or more commonly large light-centered occeli. Some specimens have two narrow, light yellow or reddish stripes running along the back. Usually the head is boldly marked often with one or two "A"-shaped marks on the crown and neck that may be joined by a central blotch. The light supralabials have conspicuous dark borders. The belly is whitish, yellow, red or brown chequered with dark brown.

Hoser 2012 - Australasian Journal of Herpetology 12:58-62.

While these snakes are often confused with vipers (Viperidae), they are readily separated by the fact that vipers have elliptical pupils, smaller head shields and obvious hollow fangs that fold up when the mouth closes.

These snakes are more thick-set than *Natrix* and *Guystebbinsus* gen. nov. (see below). In this genus the head is also usually broader and the snout is more rounded.

Distribution: Iberia, most of France except the far north, South-west Switzerland, North-west Italy, Balearic Islands, Iles d'Hyeres, Mallorca, Menorca and Sicily and north-west Africa, including Morocco, Algeria, Tunisia and Galita Island.

Common name: Viperine Water Snake.

Etymology: Named in honor of my daughter Jacky Hoser for more than ten years of valuable service to reptile education.

GENUS *GUYSTEBBINSUS* GEN. NOV.

Type species: *Coronella tessellata* Laurenti, 1768.

Diagnosis: Snakes within this genus, *Guystebbinsus* gen. nov. are separated from *Natrix* and *Jackyhosernatrix* gen. nov. by having 8 supralabials and only the fourth upper labial entering the eye.

In genera *Natrix* and *Jackyhosernatrix* gen. nov. there are 7 labials and the third and fourth both enter the eye.

Snakes within *Guystebbinsus* gen. nov. have three or more postoculars, versus just two in *Jackyhosernatrix* gen. nov..

The species within this genus (*Guystebbinsus* gen. nov.) are medium to large snakes with clearly keeled body scales, large scales on the head and round pupils. The belly is whitish, yellowish, pink or red, with a chequered pattern or with one or two irregular dark stripes or almost entirely black. There are 19-23 (usually 21) dorsal mid body rows, 8 upper labials, 3 or more pre-oculars, 2 internasals, 2 postoculars, nostrils pointing laterally.

These snakes grow up to 100 cm in total length, but most adults are less than 70 cm.

Females are the larger sex.

Coloration varies, but dorsally is usually brown or grayish but may be yellowish or greenish often with a pattern of regular dark spots evenly dispersed over the body. These spots may be large, small or sometimes completely absent, or they may fuse to form dark bars on the back and flanks. Those on flanks often alternate with narrower light bars. Sometimes there is an "A"-shaped mark on the nape, but often head markings are obscure.

These snakes are even more aquatic than *Jackyhosernatrix* gen. nov., often spending considerable time in the water and able to remain submerged for considerable periods. The diet is dominantly fish.

Distribution: Most of the Balkans, Italy (except the extreme south), north to South Switzerland, East Austria, Czechoslovakia and south Russia. Isolated populations are known from West Austria, North-east Switzerland, on mid-Rhine and Elbe, the islands of Crete and Kithera and eastwards to south-west and central Asia.

Common name: Dice Snake.

Etymology: Named in honour of Guy Stebbins of Ascot Vale, Melbourne, Australia, for services to herpetology, including many hours of unpaid work building reptile cages and the like for Snakebusters - Australia's best reptiles shows.

GENUS *CORONELLA* LAURENTI, 1768

Type species: *Coronella austriaca* Laurenti, 1768

Diagnosis: As recognized up to the beginning of 2012 snakes of this genus are relatively small species, rarely growing to more than 60 cm in total length. The head is only slightly distinct from the neck and the pupils round. The teeth of the upper jaw increase in size towards the back. The body is almost cylindrical and covered with smooth scales. The subcaudals are paired.
They are terrestrial and rather secretive, spending much of their time under cover.

The only species remaining within the genus *Coronella* as defined herein is *C. austriaca*. It is separated from the species *girondica* (now placed in the genus *Sharonhoserea* gen. nov.) and the species *brachyura* (now placed in the genus *Wallophis* Werner, 1929) by having 19 dorsal mid body rows.

The number is 21 in *Sharonhoserea* gen. nov. and 23 in *Wallophis.*

Coronella as defined herein is further separated from the genera *Sharonhoserea* gen. nov. and *Wallophis* by having 7 supralabials, versus 8 in the other two genera.

Snakes in *Coronella* as defined herein are small (up about 60 cm in total length), rarely over 80 cm. The color is usually variable, but usually grayish or brownish, pinkish or even reddish, sometimes more intense on each side of the midline giving the effect of two often vague streaks. Usually small dark blotches are present on the back and usually clearest on the neck where there are often two dark stripes, and often form irregular transverse bars or are arranged in two lines. There is nearly always a dark stripe from the side of the neck to the nostril and sometimes a vague "brindle" on the snout as well. The venter is usually darkish red, orange, grey or blackish, generally with some mottling or fine spotting.

These snakes feed mainly on other reptiles, which are held in coils when attacked.

They are live-bearing.

Distribution: Found in isolated pockets in southern England, France, North Iberia, east to South Scandinavia and Russia and south to Italy, Sicily and Greece. Also found in north Asia Minor to North Iran.

GENUS *WALLOPHIS* WERNER, 1929

Type species: *Zamenis brachyura* Gu¨nther, 1866

Diagnosis: *Wallophis* is a monotypic genus containing the species *brachyura.* The genus name *Wallophis* has not been used widely in recent years, with the relevant taxon being placed in the genus *Coronella.*

The morphology and habits of the species *brachyura* are sufficiently different to warrant it's placement in a separate genus, for which the name *Wallophis* is available and herein used.

The diagnosis for the monotypic genus follows: It is separated from all other species recently referred to in the genus *Coronella*, namely *austriaca* and *girondica*, now placed in the genus *Sharonhoserea* gen. nov. (see below), by having 23 dorsal mid body scale rows. In *Sharonhoserea* gen. nov. it is 21 mid body rows, whereas in *Coronella* it is 19 mid body rows.

Wallophis is also separated from the genera *Coronella* and *Sharonhoserea* gen. nov. by the fact that it's frontal shield is triangular in shape, which is not the case in the other genera.

Wallophis is best specifically diagnosed referring to the following suite of characters:
Nostril large, between two nasals; internasals 0.3 to 0.5 as long as the prefrontals ; frontal nearly as broad as long, in contact with a large preocular ; loreal longer than high ; 2 postoculars ; temporals 2+2 ; 8 supralabials, 4th and 5th touching the eye ; anterior genials larger than the posterior, the latter separated by two or three series of small scales. Scales in 23:23:19 rows; ventrals large, rounded; tail rather short. Ventrals 200-224; subcaudals 46-53; Anal is single.

Hemipenis extends to the 13th caudal plate, is not forked. The distal half is calyculate, the cups being large and with scalloped edges; the proximal half is spinose, two or three spines at the base being much larger than the others.

The dorsal color is olive-brown, with indistinct light variegations on the anterior half of the body and head; lower parts are whitish. Total body length in adult males is 515 mm, tail 75 mm; females 460 mm, tail 55 mm.

Distribution: Found only in Northern India, namely the Poona district and Visapur, near Bombay and South-east Berar. Distribution alone separates this genus from *Coronella* and *Sharonhoserea* gen. nov..

GENUS *SHARONHOSEREA* GEN. NOV.

Type species: *Coluber girondicus* Daudin, 1803

Diagnosis: *Sharonhoserea* gen. nov. is a monotypic genus containing the species *girondicus.*

It is separated from all species formerly placed in *Coronella* by the fact that it has 21 mid body scale rows, versus 19 in *Coronella austriaca* and 23 in *Wallophis brachyura* (formerly *Coronella brachyura*).

Wallophis is also separated from the genera *Coronella* and *Sharonhoserea* gen. nov. by the fact that it's frontal shield is triangular in shape, which is not the case in the other genera.

Wallophis is most easily separated from the genera *Coronella* and *Sharonhoserea* gen. nov. by distribution, being the only species known from India. The other two genera have their distributions centered on Europe and adjacent regions.

Sharonhoserea gen. nov. in particular is found mainly in Western

Europe and nearby parts of Africa, some thousands of kilometers from where *Wallophis* is found.

See also the diagnosis for *Wallophis* above.

This genus *Sharonhoserea* gen. nov. is similar in appearance to *Coronella*, but is differentiated by it's slightly smaller average adult size of 50 cm total length, versus 60 cm in *Coronella*. Snakes in this genus, *Sharonhoserea* gen. nov. are also noticeably more slender in build and with a more rounded snout.

Separated from *Coronella* by the belly coloration, in that it is often yellow, orange or red overlaid with black in a bold diced pattern. Sometimes forming two lines, but not more-or-less uniform as seen in *Coronella austriaca*. The belly of *Wallophis* separates this genus from the other two. In *Wallophis* the belly is brownish, each scale with a yellowish posterior edge, while near the tail, the venter is immaculate.

In *Sharonhoserea* gen. nov. the rostral scale is not as large as in *Coronella* and does not extend between the supranasals.

In *Coronella* and *Wallophis*, when viewed from above the head, part the rostral scale is clearly visible dorsally as a triangle shape. This is not the case in *Sharonhoserea* gen. nov. where the rostral is barely visible and presents only as an elongate stripe on the margin of the snout.

Sharonhoserea gen. nov. differs from *Coronella austriaca* in habits.

Compared to *Coronella*, *Sharonhoserea* gen. nov. is generally more a lowland species, although sometimes being found in hilly areas up to about 1,500 metres. In contrast to *Coronella* which is dominantly diurnal, *Sharonhoserea* gen. nov. is often crepuscular.

Sharonhoserea gen. nov. is noticeably more docile than *Coronella* and rarely bites when handled.

Distribution: Iberia, South France, Italy, Sicily and North-west Africa, including Morocco, Algeria and Tunisia.

Etymology: Named in honor of my cousin, Sharon Hoser for various services to herpetology.

REFERENCES CITED

Abo-Eleneen, R. E. and Allam, A. A. 2011. Comparative Morphology of the Skin of *Natrix tessellata* (Family: Colubridae) and *Cerastes vipera* (Family: Viperidae). *Zoological Science* 28 (10):743-748.

Ahmadzadeh, F., Mebert, K., Ataei, S., Rezazadeh, E., Goli, L. A. and Bo¨h, W. 2011. Ecological and Biological Comparison of Three Populations of Dice snakes (*Natrix tessellata*) from the southern Caspian sea Coast, Iran. *Mertensiella* 18:403-414.

Ananjeva, N. B., Orlov, N. L., Khalikov, R. G., Darevsky, I. S., Ryabov, I. S. and Barabanov, A. V. 2006. *The Reptiles of North Eurasia. Taxonomic Diversity, Distribution, Conservation Status* [this comprises the territory of the former Soviet Union and Mongolia]. Pensoft Series Faunistica (47):250 pp.

Anonymous, 1992. Opinion 1686: *Natrix gemonensis* Laurenti, 1768 (currently *Coluber gemonensis*), *Coluber viridiflavus* Lacepede, 1789 and *Coluber helveticus* Lacepede, 1789 (currently *Natrix natrix helvetica*) (Reptilia, Serpentes): specific names conserved. *Bull. Zool. Nomencl.* 49:174-175.

Bagherian, A. and Kami, H. G. 2009. Systematic identification of *Natrix natrix* and *Natrix tessellata* based on multivariate analysis. [in Persian] Pajouhesh and Sazandegi (79):128-134.

Baier, F. and Wiedl, H. J. 2010. The re-evaluated conservation status of the mountain populations of the highly endangered Cyprus Grass Snake, *Natrix natrix cypriaca* (Hecht, 1930), with miscellaneous natural history notes. *Salamandra* 46(1):16-23.

Bar, A. and Haimovitch, G. 2012. *A Field Guide to Reptiles and Amphibians of Israel.* Pazbar Ltd.

Barata, M., Harris, D. J. and Castilho, R. 2008. Comparative phylogeography of northwest African *Natrix maura* (Serpentes: Colubridae) inferred from mtDNA sequences. *African Zoology* 43(1):1-7.

Bassu, L., Nulchis, V., Satta, M. G., Fresi, C. and Corti, C. 2008. Atlas of amphibians and reptiles of Sardinia - state of the art and general considerations. *Herpetologia Sardiniae* (Claudia Corti, ed.), Edizioni Belvedere:504 pp.

Bergmans, H. 1976. Die Vipernatter, *Natrix maura*. *Aquarien Terrarien* Z. 29:318-320.

Billings, D., and Langford, M. 1991. The Care and Breeding of the Grass Snake (*Natrix natrix helvetica*) in Captivity. *Brit. Herp. Soc. Bull.* (36):39-42.

Böhme, W. and Wiedl, H. 1994. Status and zoogeography of the herpetofauna of Cyprus, with taxonomic and natural history notes on selected species (genera *Rana*, *Coluber*, *Natrix*, *Vipera*). *Zoology in the Middle East* 10:31-52.

Bombi, P., Luiselli, L., Capula, M., and Salvi, D. 2009. Predicting elusiveness: potential distribution model of the Southern smooth snake, *Coronella girondica*, in Italy *Acta Herpetologica* 4(1):7-13.

Borczyk, B. 2007. The causes of intraspecific variation in sexual dimorphism in the common grass snake populations, *Natrix natrix* Linnaeus, 1758 (Serpentes, Colubridae): Data from the South Western Poland. *Acta zoologica cracoviensia*, 50A(1-2):9-13.

Boulenger, G. A. 1889. On the reptiles and batrachians obtained in Morocco by M. Henry Vaucher. *Ann. Mag. nat. Hist.* (6)3:303-307.

Boulenger, G. A. 1891. Catalogue of the reptiles and batrachians of Barbary (Morocco, Algeria, Tunisia), based chiefly upon the notes and collections made in 1880-1884 by M. Fernand Lataste. *Tr. Zool. Soc.* 13:93-164.

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

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

Brecko, J., Vervust, B., Herrel, A. and Van Damme, R. 2011. Head Morphology and Diet in the Dice snake (*Natrix tessellata*). *Mertensiella* 18:20-30.

Cortés, J. E. 1982. The herpetofauna of Gibraltar - status, recent history and current research. *British Journal of Herpetology* 6:273-275.

Daudin, F. M. 1802. *Histoire Naturelle, Générale et Particulière des Reptiles*, Vol. 4. F. Dufart, Paris.

Dusej, G. 1993. *Coronella girondica* - Girondische Glatt- oder Schlingnatter. In: Böhme, W. (ed.), *Handbuch der Reptilien und Amphibien Europas*, Band 3/I., Schlangen (Serpentes) I. Aula-Verlag Wiesbaden:247-266.

Engelmann, W. E. et al. 1993. *Lurche und Kriechtiere Europas*. Neumann Verlag (Radebeul, Germany):440 pp.

Frotzler, N., Davitashvili, N. and Mebert, K. 2011. Distribution of the Dice snake (*Natrix tessellata*) in Georgia (transcaucasia) and Comparative notes on the Genus *Natrix*. *Mertensiella* 18:357-365.

Guicking, D. and Joger, U. 2011. Molecular Phylogeography of the Dice snake *Mertensiella* 18:1-10.

Guicking, D., Joger, U. and Wink, M. 2009. Cryptic diversity in a Eurasian water snake (*Natrix tessellata*, Serpentes: Colubridae): Evidence from mitochondrial sequence data and nuclear ISSR-PCR fingerprinting. *Organisms Diversity and Evolution* 9(3):201-214.

Guicking, D., Lawson, R. Joger, U. and Wink, M. 2006. Evolution and phylogeny of the genus *Natrix* (Serpentes: Colubridae). *Biological Journal of the Linnean Society* 87(1):127-143.

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.

Hutinec, J., Mebert, B. and Mebert, K. 2011. Ecological Partitioning between Dice snakes (*Natrix tessellata*) and Grass snakes (*Natrix natrix*) in southern Croatia. *Mertensiella* 18:225-234.

Ingle, M. and Sarsavan, A. 2011. A new Locality Record of *Coronella brachyura* (Günther, 1866) (Serpentes, Colubridae, Colubrinae) from Madhya Pradesh, India, with Notes on its Distribution and Natural History. *Sauria*, Berlin 33(2):59-61.

Jandzik, D. 2005. Record of a black-colored *Natrix* in northeastern Turkey, with comments on the validity of the bigheaded grass snake, *Natrix megalocephala* Orlov and Tunijev, 1987. *Zoology in the Middle East* 34:27-34.

Joger, U., Fritz, U., Guicking, D., Kalyabina-Hauf, S., Nagy, Z. T. and Wink, M. 2007. Phylogeography of western Palaearctic reptiles - Spatial and temporal speciation patterns. *Zoologischer Anzeiger* 246:293-313.

Klesius, T. 2009. Die Vipernatter *Natrix maura*. *Natur und Tier Verlag* (Münster):64 pp.

Kühnel, D. 2002. *Natrix maura* (Linneaus). *Sauria* (Suppl.) 24(3):569-572.

Lantermann, W. and Lantermann, W. 2011. Notizen zu einer Ringelnatter-Population an einem Angelteich in Mecklenburg-Vorpommern. *Elaphe* 19(1):73-76.

Lantermann, W. and Lantermann, Y. 2007. Würfel- (*Natrix tessellata*) und Ringelnattern (*Natrix natrix*) am ungarischen Plattensee. *Elaphe* 15(2):60-64.

Laurent, P. 1935. Contribution à la connalssance de la faune des Vertebres du Maroc (Batraciens, Reptiles, Mammiferes). *Bull. Soc. d'Hist. nat. de l'Afrique du Nord* 26:344-359.

Laurenti, J. N. 1768. *Specimen medicum, exhibens synopsin reptilium emendatam cum experimentis circa venena et antidota reptilium austracorum, quod authoritate et consensu.* Vienna, Joan. Thomae:217 pp.

Lawson, R., Slowinski, J. B., Crowther, B. I. and Burbink, F. T. 2005. Phylogeny of the colubroidea (Serpentes): New evidence from the mitochondrial and nuclear genes. *Molecular phylogenetics and evolution* 37:581-601.

Leviton, A. E., Anderson, S. C., Adler, K., and Minton, S. A. 1992. *Handbook to Middle East Amphibians and Reptiles*. SSAR, Oxford, Ohio (Contr. to Herpetol. No. 8):1-252.

Linnaeus, C. 1758. *Systema naturæ per regna tria naturæ, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis. Tomus I. Editio decima, reformata. Laurentii Salvii, Holmiæ.* 10th Edition:824 pp.

Liu, Y., Mebert, K. and Shi, L. 2011. Notes on Distribution and Morphology of the Dice snake (*Natrix tessellata*) in China. *Mertensiella* 18:430.

Orlov, N. L, and Tuniyev B. S. 1987. New species of the grass snake from the Caucasus, *Natrix megalocephala* sp. nov [in Russian]. Trudy Zoologicheskogo Instit. Akademii Nauk SSSR 158: 116-130.

Orlov, N. L. and Tuniyev, B. S. 1992. A new species of grass snake, *Natrix megalocephala*, from the Caucasus (Ophidia: Colubridae) [translation of the original Russian paper of 1987]. *Asiatic Herpetological Research* 4: 42-54.

Pernetta, A. P. and Reading, C. J. 2009. Observations of two melanistic smooth snakes (*Coronella austriaca*) from Dorset, United Kingdom. *Acta Herpetologica* 4(1):109-112.

Najbar, B. 2006. The occurrence and the characteristics of *Coronella austriaca austriaca* (Laurenti, 1768) (Serpentes: Colubridae) in western Poland. *Acta Zoologica Cracoviensia* - Series A: Vertebrata 49(1-2):33-40.

Pyron, R. A., et. al. 2011. The phylogeny of advanced snakes (Colubroidea), with discovery of a new subfamily and comparison of support methods for likelihood trees. *Mol. Phyl. Evol.* 58:329-342.

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").

Rossman, D. A. and Eberle, W. G. 1977. Partition of the Genus *Natrix*, with Preliminary Observations on Evolutionary Trends in Natricine Snakes. *Herpetologica* 33(1):34-43.

Santos, X., Llorente, G. A., Feriche, M., Pleguezuelos, J. M., Casals, F. and de Sostoa, A. 2005. Food availability induces geographic variation in reproductive timing of an aquatic oviparous snake (*Natrix maura*). *Amphibia-Reptilia* 26(2):183-191.

Santos, X., Roca, J., Pleguezuelos, J. M., Donaire, D. and Carranza, S. 2008. Biogeography and evolution of the Smooth snake *Coronella austriaca* (Serpentes: Colubridae) in the Iberian Peninsula: evidence for Messinian refuges and Pleistocenic range expansions. *Amphibia-Reptilia* 29(1):35-47.

Santos, X., Feriche, M., León, R., Filippakopoulou, A. and Vidal-García, M. 2011. Tail breakage frequency as an indicator of predation risk for the aquatic snake *Natrix maura Amphibia-Reptilia* 32(3):375-383.

Schätti, B. 1982. Bemerkungen zur Ökologie, Verbreitung und intraspezifische Variation der Vipernatter, *Natrix maura* (Linne, 1758) (Reptilia, Serpentes). *Rev. suisse Zool.* 89(2):521-542.

Schleich, H. H., Kästle, W., Kabisch, K. 1996. *Amphibians and Reptiles of North Africa.* Koeltz, Koenigstein:627 pp.

Schlüter, U. 2004. Die Herpetofauna des Mittleren Atlas von Marokko. *Reptilia* (Münster) 9(45):42-49.

Schlüter, U. 2009. Die Schlangenfauna Europas. *Draco* 10(39):4-21.

Schlüter, U. 2012. The Rock. Die Herpetofauna Gibraltars. *Reptilia* (Münster) 17(94):93-101.

Sharma, R. C. 2004. *Handbook Indian Snakes*. Akhill Books, New Delhi:292 pp.

Sindaco, R., Venchi, A., Carpaneto, G. M. and Bologna, A. 2000. The Reptiles of Anatolia: a Checklist and Zoogeographical analysis. *Biogeographia*, 21-2000:441-554.

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.

Sos, T. 2008. Review of recent taxonomic and nomenclatural changes in European Amphibia and Reptilia related to Romanian herpetofauna. *Herpetologica Romanica* 2:61-91.

Thorpe, R. S. 1975a. Quantitative handling of characters useful in snake systematics with particular reference to intraspecific variation in the ringed snake *Natrix natrix* (L.). *Biol. J. Linn. Soc.* 7(1):27-43.

Thorpe, R. S. 1975b. Biometric analysis of incipient speciation in the ringed snake *Natrix natrix* (L.). *Experientia* 31:180-182.

Thorpe, R. S. 1979. Multivariate analysis of the population systematics of the ringed snake *Natrix natrix* (L.). *Proc. Roy. Soc. Edinburgh* 78 B:1-62.

Thorpe, R. S. 1980a. A comparative study of ordination techniques in numerical taxonomy in relation to racial variation in the ringed snake *Natrix natrix* (L.). *Biological Journal of the Linnean Society* 13:7-40.

Thorpe, R. S. 1980b. Microevolution and taxonomy of European reptiles with particular reference to the grass snake *Natrix natrix* and the wall lizards *Podarcis sicula*, *P. melisellensls*. *Biological Journal of Linnean Society* 14:215-233.

Thorpe, R. S. 1981. Racial divergence and subspecific status of the Gotland grass snake: a comment on Nilson and Andrens paper. *Zoological Journal of the Linnean Society* 72:369-370.

Thorpe, R. S. 1984. Primary and secondary transition zones in speciation and population differentiation: a phylogenetic analysis of range expansion. *Evolution* 38(2):233-243.

Tuniyev, B. S. 1990. On the Independence of the Colchis Center of Amphibian and Reptile Speciation. *Asiatic Herpetological Research* 3:67-84.

Venchi, A. and Sindaco, R. 2006. Annotated checklist of the reptiles of the Mediterranean countries, with keys to species identification. Part 2 -Snakes (Reptilia, Serpentes). *Annali del Museo Civico di Storia Naturale* "G. Doria", Genova, XCVIII:259-364

Vyas, R. and Patel, S. S. 2007. New distributional records of the endemic snake Coronella brachyura (Günther 1866) (Serpentes, Colubridae, Colubrinae) from Gujarat State, India [in German and English]. *Sauria* 29(3):47-50.

Willsch, J. 1984. Viermalige Eiablage von *Natrix maura* (Linnaeus, 1758) *Herpetofauna* 6(32):19-21.

Wirth, M. and Hähnlein, R. 2009. Die europäischen Wassernattern: Freilandbeobachtung, Haltung und Zucht von *Natrix natrix* (Linnaeus, 1758), *Natrix maura* (Linnaeus, 1758) und *Natrix tessellata* (Laurenti, 1768). *Draco* 10(39):49-60.

Australasian Journal of Herpetology

Publishes original research in printed form in relation to reptiles, other fauna and related matters.

It is a peer reviewed printed journal for permenant public scientific record, with a sizeable print run and has a global audience.

Full details at: 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 12:63-64.
Published 30 April 2012.

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

A New Genus and new species and new subspecies of skink from Victoria.

RAYMOND T. HOSER

488 Park Road, Park Orchards, Victoria, 3134, Australia.
***Phone*: +61 3 9812 3322 *Fax*: 9812 3355 *E-mail*: adder@smuggled.com**
Received 20 March 2012, Accepted 25 March 2012, Published 30 April 2012.

ABSTRACT

This paper describes a new taxon from near Shepparton, Victoria, closely related to the species formerly known as "*Lampropholis delicata".* At the same time, the entire group of skinks in the "*delicata*" group formerly placed in the genus *Lampropholis* Fitzinger, 1843, are hereby placed into a new genus, namely *Allengreerus* gen. nov.

The new species is herein described as *Allengreerus ronhoseri* sp. nov..

Furthermore a subspecies of the taxon, *delicata* from the environs of Melbourne, Victoria is also described herein as *Allengreerus delicata jackyhoserae* subsp. nov.

Keywords: Skink; Lizard; *Allengreerus*; *Lampropholis*; *ronhoseri*; *jackyhoserae*; species; genus; subspecies; taxonomy.

INTRODUCTION

The genus *Lampropholis* as defined to date, contains a number of small skinks and may ultimately be split into several genera.

The "Delicate Skink" to date known as "*Lampropholis delicata"*, as presently defined in most texts (e.g. Cogger 2000), is common and well-known in Eastern Australia. Most texts, including Wilson and Swan 2003, report on the taxon as being found throughout south-east Australia.

Their distribution map does not include large parts of Victoria, but another text, Swan and Watharow 2005, gives added distribution for the "taxon" as including a disjunct population from Little Desert Victoria.

Those specimens are quite different in appearance to both the type race and the taxa described below and quite likely also is an undescribed taxon.

While numerous similar species have been described from the northern part of the range from specimens that would otherwise have previously keyed out as *L. delicata*, (e.g. *L. colossus* and *L. couperi*), this has not been the case in the south.

In July 2008, I caught a number of specimens that keyed to the taxon, *L. delicata* as per Cogger 2000, but were clearly different to specimens attributable to that taxon from Sydney, Melbourne and Brisbane, with which I have been familiar with for decades.

As a result, it is herein described as a new species.

Furthermore, it has long been known that the "*delicata"* from Melbourne environs (Victoria) are substantially different from those further north in NSW and Queensland, where the holotype for the species came from.

The Melbourne taxon previously referred to that species is herein described as a new subspecies, *Allengreerus delicata jackyhoserae* subsp. nov.

The taxon *L. guichenoti* as described in most texts (including Cogger 2000) includes a number of well-defined regional races, that will ultimately be identified either at the subspecies or species level.

Broadly sympatric with this taxon is the "*delicata*" group, readily separated from the "*guichenoti*" group by a suite of characters, most notably being a usual lack of a defined mid-vertebral stripe in the "*delicata*" group as seen in the "*guichenoti*" group.

There are numerous other features that separate the two groups.

While Greer and others have established the relationships of the taxa within both groups as being reasonably closely related based on anatomy, it is my considered opinion that they are however sufficiently differentiated to be placed in separate genera.

Hence the erection of a new genus to cover the "*delicata*" group.

***ALLENGREERUS* GEN. NOV.**

TYPE SPECIES

MOCOA DELICATA DE VIS, C. W. 1888

DIAGNOSIS

Separated from *Lampropholis* (type species *guichenoti*), to which it/they would otherwise be identified as, by the general lack of a distinct mid-vertebral stripe as seen in adult specimens.

All species lacking the mid-vertebral stripe as seen in *guichenoti* are hereby transferred to this new genus.

Occasional specimens of *Allengreerus* gen. nov. that may have a partial or broken mid-dorsal stripe or line can be separated from *Lampropholis* by the presence of dark flecks (on whitish background) on the underside of the neck, usually forming a somewhat striated appearance.

The genus "*Lampropholis*" as known to this date is defined and diagnosed on pages 380-381 and 505 of Cogger 2000.

ETYMOLOGY

In honor of Allen E Greer, herpetologist of many years at the Australian Museum, Sydney, who perhaps more than anyone else has resolved taxonomic questions in relation to Australasian skinks, including issues arising from controversial work by Richard Wells and his friend Ross Wellington in the 1980's.

***ALLENGREERUS DELICATA JACKYHOSERAE* SUBSP. NOV.**

HOLOTYPE

An adult specimen in the National Museum of Victoria, specimen number, D 76838, from Pakenham, Victoria, Australia. (38 04 S, 145 28 E). It is recorded on their database as: "D 76838, Lampropholis delicata (De Vis, 1888) : Scincidae : Squamata : Reptilia : Chordata, Australia, Victoria, Pakenham (38 04 S, 145 28 E)"

DIAGNOSIS

While in the past this taxon would have keyed as *A. delicata*, it is easily separated from that species (Holotype from Warro, Qld) by the following suite of characters: The nominate race has a very distinct white stripe along each side of the lower flanks commencing behind the ear and before the front leg and running to the hind leg. The same stripe in this subspecies is indistinct and only runs between the limbs in most specimens. The type race of *A. delicata* has a distinct bronze sheen, whereas *A. delicata jackyhoserae* lacks this sheen and presents as a grayish black color instead.

Physically the taxon *A. delicata jackyhoserae* is smaller in adult size to the nominate form (35 mm S-V versus 40 mm s-v in the nominate form) and also more gracile in build.

A. delicata jackyhoserae has a tiny white spot behind the eye (sometimes faded) which is not seen in *A. delicata* from northern NSW and Queensland.

A. delicata jackyhoserae like *A. delicata* elsewhere is an invasive species that does well in human modified environments, where it is often found in larger numbers than would be the case in unaltered bushland. They are common in Melbourne's inner, middle and outer suburbs, more-so in the south-east and east rather than the west, south-west or northwest.

ETYMOLOGY

Named in honor of my daughter, Jacky Hoser for valuable work she did with the family reptile education company, Snakebusters, over a period of 8 years.

***ALLENGREERUS RONHOSERI* SP. NOV.**

HOLOTYPE

A specimen in the Museum Victoria, D 73711 Caught at 7.45 AM on 22 July 2008, from a site 20 km south-east of Shepparton (the site being 146 km by road from the Melbourne CBD) adjacent to the main Goulburn Valley Highway between Arcadia and Murchison East (Lat 145° 20' E, Long 36°40' S)), the exact location about 20 meters west-south-west of the road.

PARATYPE

Five other specimens in the Museum Victoria, numbers D737112-D737116 inclusive, caught at the same time and place as the holotype.

DIAGNOSIS

Similar in most respects to *Allengreerus delicata*, to which it would key to in Cogger 2000.

Separated from *A. delicata* by the following suite of characters.

Midlateral stripes are absent in *A. ronhoseri* sp. nov., as opposed to strongly visible in *A. delicata*. Lightening of colour around the labial scales as seen in typical *A. delicata* and all other described and named *Allengreerus* is either absent or not very pronounced in *A. ronhoseri* sp. nov.

A. ronhoseri sp. nov. is separated from all others in this genus and *Lampropholis* by a distinct peppering colouration on the lower parts of the upper labials, a colour trait only seen in this taxon. This colouration is best seen by looking at photos of adult specimens in life.

Average adult size is slightly smaller in *A. ronhoseri* in terms of specimens seen as compared to *A. delicata*.

Scalation of the head varied in the original series of specimens seen, so no diagnostic characters for these are given.

Colouration of the taxon is generally brownish dorsally. For detail either refer to the type specimens or photos of them in life.

In terms of known distribution, the taxon is presently known only from the type location.

However it is reasonable to assume that it may occur in a wide area throughout the lower Goulburn River and Murray basins and perhaps elsewhere.

It is fair to assume that as a small innocuous skink, specimens caught previously have either been overlooked, or misidentified as other taxa, most notably *A. delicata*.

ECOLOGICAL NOTES

Details of the location of the type series is given below.

At 7.45 AM on the morning of 22 July 2008, I stopped on the side of the main Goulburn Valley Highway to Shepparton (adjacent to the Melbourne 146 km signpost) and headed to a paddock immediately west of the road and abutting a watercourse with a view to lift scattered rubbish and debris in search of insects and worms to feed frogs (held under DSE permit for demonstrations).

The "habitat" was typical of the agricultural landscape in the area, with trees generally absent, except along the watercourse and periphery. In other words the area was degraded and primarily agricultural.

The search and collection of insects took all of about 15 minutes and yielded 17 lizards, including 15 *A. ronhoseri* sp. nov under a single piece of wood, as well as 2 *Morethia boulengeri*, both found separately under pieces of tin. The aggregating lizards, rested in a clump, save for a single "outlier" resting about 6 cm away under the same piece of wood.

The aggregation consisted of lizards of all ages, ranging from last season's juveniles up.

The weather at the time was cold, with a moderately severe frost on the ground and an ambient air temperature of 1 Degree Celsius.

In previous days the weather in the area had been cool (max temps in low teens), with steady rain two days prior.

Furthermore, based on the time of year, it is therefore reasonable to assume that the lizards were "hibernating" as in a sustained period of inactivity.

While sheets of metal are regarded as good cover for reptiles, experience has shown that in frosty conditions, such are avoided due to the conductivity of the tin, with reptiles and other small animals showing a preference for cover away from frosts.

In terms of surface cover, wood is preferred, especially if of sufficient thickness to afford protection from frosts.

This was seen in this very area, where sheets of tin were also devoid of insects.

The aggregation of skinks was found under a disused wood post, being an outlier of a pile, seen between the paddock fence and the roadway.

In that pile of wood and outliers there were no other skinks and in terms of that species, no others were found in the vicinity, even though there were similar (in appearance) bits of wood in the immediate and nearby area.

This indicates that the aggregation was deliberate on the part of the lizards, as opposed to a chance gathering of individual lizards seeking a piece of shelter.

The lizards while very torpid when seen (they didn't move at all in the period between my going to the car to get a camera and my return some minutes later), they were not frozen, having been insulated by the wood from the frost.

It appears that the group hibernation was deliberate. That no *Morethia boulengeri* were found in the aggregation is significant, as this may indicate a lack of tolerance for one species over the other, bearing in mind the other species was evident in the area.

That two *Morethia boulengeri* were found separately under other bits of wood may indicate that this species is less likely to hibernate in aggregations.

While lizards are regarded as "cold-blooded" their limited biological activity does generate some heat and as a group may afford added protection or insulation against particularly cold and freezing conditions. This was probably the reason for the lizards seeking to hibernate in an aggregation.

To bypass the need to aggregate the lizards could have chosen a deeper refuge or one less exposed to the frosts.

The downside of this is that when the weather warms, the lizards must wait longer, before they can enjoy the benefits of heating where they hibernate, be that earlier feeding or mating.

Hence as a trade-off the lizards are able to aggregate over-winter nearer outside heat sources, enabling a slightly earlier emergence from hibernation, or perhaps earlier warming from under cover.

In summary this new taxon appears to be highly adaptable to human altered habitats and is presumably an invasive species.

ETYMOLOGY

Named in honour of the now deceased Ron Hoser, who happened to be my uncle. In the 1960's he encouraged my early interest in reptiles, when in 1967 he gave me my first ever pair of Bearded Dragons (*Pogona barbata*), that he'd caught in the general vicinity of "The Crossroads", just west of Liverpool, NSW.

That was back in the days when one could legally trap and keep common reptiles without running the risk of imprisonment as is the case now in Australia, where to "interfere with wildlife" of any kind and in any way is an offence punishable by heavy fines and/or jail and/or seizure of property.

REFERENCES

Cogger, H. G. 2000. *Reptiles and Amphibians of Australia*. Reed/New Holland.

De Vis, C. W. 1888. A contribution to the herpetology of Queensland. Proceedings of the Linnaean Society of New South Wales 2(2)811-826.

Swan, M. and Watharow, S. 2005. *Snakes, lizards and frogs of the Victorian Mallee*. CSIRO Publishing.

Wilson, S. and Swan, G. 2003. *A complete guide to reptiles of Australia*. Reed/New Holland.

Australasian Journal of Herpetology **12:65-76.**
Published 30 April 2012.

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

Divisions of the Asian Colubrid snake genera *Xenochrophis, Dendrelaphis* and *Boiga* (Serpentes: Colubridae).

RAYMOND T. HOSER

488 Park Road, Park Orchards, Victoria, 3134, Australia.
***Phone*: +61 3 9812 3322 *Fax*: 9812 3355 *E-mail*: viper007@live.com.au**
Received 12 March 2012, Accepted 8 April 2012, Published 30 April 2012.

ABSTRACT

Numerous reviewed published studies have shown that the three genera of (mainly) Asian Colubrid snakes, *Xenochrophis, Dendrelaphis* and *Boiga* are clearly paraphyetic. As a result, new genera and subgenera are created and named according to the Zoological Code to accommodate the divergent members.

Similarly a new species and two new subspecies of Tree Snake, both from the New Guinea region are described and named according to the Zoological Code.

Keywords: Taxonomic revision; new genera; genus; species; *Xenochrophis*; *Dendrelaphis*; *Boiga; Rentonus*; *Jackyhoserae*; *Charlespiersonus*; *Macmillanus*; *Downieea*; *Dorisious*; *Mulvanyus*; *tyeipperae*; *lizelliottae;* systematics.

INTRODUCTION

Numerous studies have been completed in terms of Asian Colubrid genera *Xenochrophis, Dendrelaphis* and *Boiga.* However almost without exception the taxonomic studies have been mainly preoccupied with delineating species rather than genera.

Alternatively the genera themselves have been scrutinized from the perspective of their positions in higher taxonomic hierarchies at the family level and beyond (e.g. Lawson et. al. 2005, Pyron et. al. 2011, Vidal et. al. 2007), rather than whether or not snakes are appropriately placed within given genera which have been previously assigned.

However in the wake of several molecular studies of snakes within these genera, including Pyron et. al. (2011), it's clear that they are paraphyletic at the genus level.

The genetic evidence is also confirmed by a view of the morphology of component species as well as the somewhat different habits of the member species.

Each of the three above-named genera has been assessed in terms of placement of component species.

For the genus *Xenochrophis* the molecular data is conclusive and indicates the split as indicated in this paper.

For the large and obvious composite genera *Dendrelaphis* and *Boiga*, molecular data is somewhat incomplete, but when combined with morphological data, shows that these genera should also be split.

For these genera, I have taken a conservative position and only named the most obviously divergent taxa.

In each genus, there may be other species that should be either removed from the nominate genus, or at least placed in a separate subgenus.

GENUS *XENOCHROPHIS* GÜNTHER, 1864

Most snakes within the Keelback genus *Xenochrophis* have been shuffled between several genera until 1960.

In that year, Malnate (1960) divided the former genus *Natrix* Laurenti, 1768 into five genera and revalidated the name *Fowlea* Theobold, 1868 for the species, *F. piscator*, *F. punctulata* and *F. vittata.* For this placement he relied on hemipenal structure, form of the maxillary teeth and position of the nostrils.

In 1965, Malmate and Minton (1965), discarded *Fowlea* in favor of the earlier named genus *Xenochrophis* Günther, 1864, by including the type species *Psammophis cerasogaster* Cantor, 1839, and placing it in the same genus as the other three species.

Vogel and David (2006) worked on morphological variation in the genus, subdividing the group into several species.

As of early 2012, there are thirteen widely recognized species within the genus.

Important published studies on the snakes within *Xenochrophis* include, Blake (1995), Blyth (1863), Boie (1827), Boulenger (1890, 1891, 1893), Captain and Patel (1998), Chanard et. al. (1999), Cox et. al. (1998), Das and De Silva (2005), David and

Vogel (1996, 2010), De Haas (1949), de Lang and Vogel (2005), Dutt (1970), Frith (1977), Geissler et. al. (2011), Glässer-Trobisch and Trobisch (2011), Gmelin (1789), Gravenhorst (1807), Günther (1858), Joseph et. al. (2005), Khan (2002), Kopstein (1938), Kramer (1977), Kusuma et. al. (2010), Lazell (2002), Malnate (1960), Malnate and Minton (1965), Malnate and Underwood (1988), Manthey and Grossmann (1997), Mohapatra et. al. (2010), Nguyen et. al. (2009), Pauwels et. al. (2001), Pratyush et. al. (2010), Purkayastha et. al. (2010), Richards (1918), Sharma (2004), Sourav and Purkayastha (2011), Taylor (1965), Vogel and David (2006), Wall (1905a, 1905b, 1907, 1908a, 1921a), Whittaker and Captain (2004), Zhao and Adler (1993), Ziegler (2002), Zug et. al. (2006) .

Phylogenetic and molecular studies on the genus have been limited, but Pyron et. al. (2011) found that the species *vittatus* to be widely divergent of the others in the genus, being more closely related to Keelback snakes of the genus *Rhabdophis* Fitzinger, 1843 than to other *Xenochrophis.*

Both genera are separated from *Amphiesma* by their larger eye.

However the species *vittatus* is significantly divergent from both genera (*Rhabdophis* and *Xenochrophis*), both groups of snake being considerably more stout in build than *vittatus.* As it is not tenable to merge the two genera and also include the divergent taxon *vittatus*, the most sensible course of action is to create a new genus for the species *vittatus.*

The molecular data is also in accordance with observations of the morphology and behavior of *vittatus* as compared to other species within *Xenochrophis*.

Typical *Xenochrophis* species such as *X. piscator* are moderately thick-set and pugnacious in behavior. The same applies for *Rhabdophis* species.

By contrast *vittatus* is of thin build and rarely inclined to bite when handled.

With most of *Xenochrophis* being found in the region to the west and north of where *vitattus* occurs and most *Rhabdophis* species found to the north, it is clear that *vittatus* is part of a separate apparently monophyletic clade.

On that basis, the taxon *vittatus* is placed in a (presently) monotypic genus defined according to the Zoological Code (Ride et. al. 1999), below.

GENUS *RENTONUS* GEN. NOV.

Type species: *Coluber vittatus* Linneaus, 1758

(Known in most contemporary texts as *Xenochrophis vittatus*)

Diagnosis: This snake is easily separated from all other species within the genus *Xenochrophis*.

All snakes within what's left of the genus *Xenochrophis* are easily separated from *Rentonus* gen. nov. by the presence of a distinctive nuchal marking that is one of the following four, A/ An inverted "V"-shape, where the marking opens anteriorly on the nape, B/ A direct "V"-shape where the marking opens on the nape, C/ A straight, broad, often subrectangular crossbar, D/ A widely open "U"-shape or even double "YY"-shape present in populations from Indonesia and the Andaman Islands, or as an alternative to the preceding the snakes lack such markings as part of a patternless body in specimens of two species from the Indian Subcontinent.

By contrast to the preceding, *Rentonus* gen. nov. are characterized by a lack of nuchal markings conforming to the previous description, with a head and neck generally consisting of a dark colour with large white flecks, but not with any well-defined obvious shape or pattern, although in the nuchal region these tend to join to form the beginnings of the lines that run down the dorsum of the body.

Rentonus is further separated from *Xenochrophis* by the presence of two distinct thick white bars running from the lip to the top of the head, one in front of the eye and one behind. A third half-length bar is behind the second bar. No *Xenochrophis* have this configuration of white bars on the head.

As mentioned already, *Rentonus* gen. nov. differs from snakes remaining in *Xenochrophis* by their slimmer build and more even temperament.

The genus is oviparous usually having 9-12 eggs per clutch. Hatchlings measure about 13 cm in total length, with adult males averaging about 50 cm and females 70 cm. The diet is dominantly fish and frogs.

Colouration of *Rentonus* gen. nov. is distinctive. On the dorsal surface are four pale yellow-brown stripes against a black background : these persist along the entire length of the body and tail. The chin, lips, neck and all ventral scales are distinctively barred black and white, including the diagnostic bars mentioned above.

The venter of this taxon is also distinctive (from all *Xenochrophis*) in that it is white with each plate very thickly marginated with black, versus at best only thinly marginated black on subcaudals seen in some *Xenochrophis piscator* .

The taxon has 9 supralabials and 19 mid-body rows, both traits common to other species of *Xenochrophis.*

Important publications relevant to this taxon include, Blake (1995), Boulenger (1893), De Haas (1949), de Lang and Vogel (2005), Glässer-Trobisch and Trobisch (2011), Kopstein (1938), Linnaeus (1758) and Manthey and Grossmann (1997).

Distribution: The single species within the genus is believed to occur in Sumatra, Java and Borneo. It has been found in grassy areas of Singapore, where it's locally common, but is considered an introduced species (Lim and Lim 1992).

It is common in Java.

Common name: Striped Keelback.

Etymology: Named in honour of Ian Renton of Paradise, South Australia. For more than 20 years he has performed an invaluable public service with his company "Snake-away Services" in the form of emergency snake rescue and removals in Adelaide, as well as reptile education in a country (Australia) that desperately needs accurate information on venomous snakes to be disseminated.

Species within the genus *Rentonus* gen. nov.

Rentonus is monotypic for the type species *R. vittatus.*

Species now within the genus *Xenochrophis* Günther, 1864

Xenochrophis cerasogaster (Cantor, 1839) (Type species)
Xenochrophis asperrimus (Boulenger, 1891)
Xenochrophis bellula (Stolicza, 1871)
Xenochrophis flavipunctatus (Hallowell, 1860)
Xenochrophis maculatus (Edeling, 1864)
Xenochrophis melanzostus (Gravenhorst, 1807)
Xenochrophis piscator (Schneider, 1799)
Xenochrophis punctulatus (Günther, 1858)
Xenochrophis sanctijohannis (Boulenger, 1890)
Xenochrophis schnurrenbergeri Kramer, 1977
Xenochrophis trianguligerus (Boie, 1827)
Xenochrophis tytleri (Blyth, 1863)

GENUS *DENDRELAPHIS* BOULENGER, 1890

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 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, 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 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 the three below 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, six Australia/New Guinea species, plus another newly described one (see below) from Australia/New Guinea are herein placed in the newly created genus for all seven species called *Charlespiersonserpens* gen. nov. Three of these species are further placed within newly named subgenera, one subgenus *Downieea* includes one species *papuenis*, while the other subgenus, *Macmillanus* gen. nov. includes the species *lorentzi* and a newly described cogener, *Charlespiersonserpens* (*Macmillanus*) *jackyhoserae* sp. nov..

The genus *Dendrelaphis* as herein recognized is certainly composite and warranting further divisions at the subgenus level.

A list of currently recognized species remaining within this genus is provided below the summary for *Charlespiersonserpens* gen .nov..

The body of literature and published in relation to the genus *Dendrelaphis* as widely recognized is large. Key publications 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), 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), Gray (1825, 1826, 1835, 1841, 1842), Grismer et. al. (2008), Günther (1867, 1872), 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 Ng (1999), Lidth De Jeude (1911), Loveridge (1948), 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), 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), Vijayakumar and David (2006), Vogel (1995, 2010), Vogel and van Rooijen (2007, 2008, 2011a, 2011b, 2011c), Wall (1908b, 1910, 1913, 1921a, 1921b), Werner (1893), Whitaker et. al. (1982), Zeigler and Vogel (1999) and Zhao and Adler (1993).

GENUS *CHARLESPIERSONSERPENS* GEN. NOV.

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 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* gen. nov..

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* gen. nov..

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.

Etymology: Americans historically have cherished the freedom of the individual.

Included here is the freedom of individuals to keep and study snakes and other wildlife. In recent years this right has come under threat from a raft of ridiculous bureaucratic impediments. In Australia in the early 1970's these rights were removed from most Australians. It was only as a result of the publication of two different books, *Smuggled* and *Smuggled-2* (Hoser 1993 and 1996) that led to these rights being restored to most Australians.

The success in Australia in terms of these books and their legislative outcomes reverberated around the world and in the case of the United States, meant that a major push to outlaw private ownership of reptiles in 1993 was also stopped in its tracks.

Charles Pierson as publisher of the first book, took an incredibly courageous step in publishing it.

For North Americans reading this, it should be noted that the Australian government (at all levels) has considerably more powers than their North American counterparts, including control of mideia and information flow to the public. Persons publishing material critical of government, even when totally true and correct, run the risk of immense fines, jail or similar.

I have suffered both!

The book *Smuggled: The Underground Trade in Australia's Wildlife* (Hoser 1993) was (as totally expected), illegally banned by the NSW National Parks and Wildlife Service, (NPWS NSW) in May 1993. Only as a result of a supreme effort by Pierson and an extremely brave and courageous journalist Fia Cumming, the ban was lifted.

(Cumming subsequently lost her job as a result of this, but the book became a best-seller).

Fighting the ban ultimately cost Pierson his home in the expensive Sydney suburb of Mosman and he lost his business.

However this huge life-altering sacrifice against the tyranny of a corrupt and oversized government wildlife control bureaucracy should be permanently recognized. This is especially so in the context of reptiles, those who choose to study them and their conservation, including those many people who have the right to keep live reptiles as pets, solely as a consequence of Pierson's selfless actions.

Pierson also put wildlife conservation on the global agenda, with the publication of the seminal works *Endangered Animals of Australia*, (Hoser 1991) and *Australian Reptiles and Frogs* (Hoser 1989), the latter used extensively by the late Steve Irwin

Hoser 2012 - Australasian Journal of Herpetology 12:65-76.

and other television "personalities", including Bruce George, Mark O'Shea, Chris Humfrey and others as a reference source to bring Australian animals to TV viewers globally.

Unfortunately as this paper goes to press in 2012 there are new assaults on the rights of reptile keepers and herpetologists both in the USA and Australia with new restrictions either passed or about to be passed in both jurisdictions.

Species within *Charlespiersonserpens* gen. nov.

Charlespiersonserpens punctulatus (Gray, 1826)

Charlespiersonserpens calligastra (Günther, 1867)

Charlespiersonserpens gastrosticus (Boulenger, 1894)

Charlespiersonserpens jackyhoserae sp. nov.

Charlespiersonserpens lorentzi (Lidth De Jeude, 1911)

Charlespiersonserpens papuensis (Boulenger, 1895)

Charlespiersonserpens salomonis (Günther, 1872)

***CHARLESPIERSONSERPENS GASTROSTICUS TYEIPPERAE* SUBSP. NOV.**

Holotype: Specimen number 95570 at the American Museum of Natural History (AMNH). The snake is a male from Masba Creek, Papua New Guinea, (elevation 2,100 feet) with 36 left maxillary teeth and 170 ventrals.

The relevant Museum is a government owned public facility that allows researchers access to their collections and the holotype specimen is already lodged with and belongs to this facility.

Paratypes: Specimen number 95569 at the American Museum of Natural History (AMNH). The snake is a juvenile from Kabwum, Papua New Guinea, (elevation 4,500 feet) with 37 left maxillary teeth and 164 ventrals.

Specimen number 66669 at the American Museum of Natural History (AMNH). The snake is a juvenile male from Gusiko, Papua New Guinea, with 34 left maxillary teeth and 170 ventrals.

The relevant Museum is a government owned public facility that allows researchers access to their collections and the paratype specimens are already lodged with and belongs to this facility.

Diagnosis: *Charlespiersonserpens gastrosticus tyeipperae* subsp. nov. is separated from the nominate form *Charlespiersonserpens gastrosticus gastrosticus* by having dark interstitial skin on the neck, without vertical white bars. This feature is not seen in *Charlespiersonserpens gastrosticus gastrosticus.*

Charlespiersonserpens gastrosticus tyeipperae subsp. nov. has significantly more maxillary teeth than the nominate form, (34-37, mean 35.667 in *Charlespiersonserpens gastrosticus tyeipperae* subsp. nov., versus 30-36, mean 32.636 in *Charlespiersonserpens gastrosticus gastrosticus*).

Charlespiersonserpens gastrosticus tyeipperae subsp. nov. and the form *Charlespiersonserpens gastrosticus gastrosticus* are separated from other similar species, including all other *Charlespiersonserpens* by the following suite of characters: There is a dark stripe present along the upper edge of the lip scales, separating light labial scales from darker pigment of dorsum of head; scales of dorsum of head lack pits, average total body length of .7 to 1 metre and never exceeding 1.3 metres.; more than 140 subcaudals, large nostril and completely divided nasal scale; ventrals 160-180, 147-164 subcaudals; 30-41 maxillary teeth, last 3-5 the longest; a notably and diagnostically short and wide brain case, an index of which is the shape of the part of the supraoccipital bone exposed between the jaw adductor muscles covering its lateral edges and anterior to the axial muscles that cover the rear portion of the bone; the exposed supraorbital is much broader than long (easily ascertained by slitting the skin just behind the parietal scutes).

The maxillary teeth count alone easily separates *Charlespiersonserpens gastrosticus* from *Charlespiersonserpens lorentzi, C. calligastra* and *C. papuensis.*

The ventral count of 160-180 is diagnostically lower than for *C. punctulatus.*

C. salomonis is separated from *C. gastrosticus* by its higher ventral and subcaudal counts.

These are 173-191 ventrals and 124-166 subcaudals in *C. salomonis*, versus 160-180 ventrals and 147-164 subcaudals in *C. gastrosticus.*

C. gastrosticus is found in highland and montane habitats and Milne Bay (Normanby and Fergusson Islands), versus lowland island habitats of the North Solomons and Milne Bay (Misima Island) in *C. salomonis.*

Etymology: Named in honour of Ty Eipper, wife of herpetologist Scott Eipper, now both based in Brisbane, Queensland who for many years has worked in the reptile education industry and for her other services to herpetology.

SUBGENUS *DOWNIEEA* GEN. NOV.

Type Species: *Dendrelaphis papuensis* Boulenger, 1895

Diagnosis: Separated from all other similar species, including all other six members of the genus *Charlespiersonserpens* gen. nov. by the following suite of characters: There is a dark stripe present along the upper edge of the lip scales, separating light labial scales from darker pigment of dorsum of head; scales of dorsum of head lack pits, average total body length of .7 to 1 metre and never exceeding 1.3 metres.; fewer than 140 subcaudals, 183-203 ventrals; pale vertebral stripe is absent or present, a small nostril, the nasal scale is not completely divided; black interstitial skin on the neck and 19-27 maxillary teeth.

This subgenus is also separated from all other *Charlespiersonserpens* and *Dendrelaphis* on the basis of unique hemipenal morphology.

In this subgenus the hemipenis organ is of moderate length (ending at subcaudal 8-13), with a strictly terminal attachment of the retractor longus, so that there is no suggestion of terminal awn; distally the organ has numerous shallow calyces with many small spines on their borders; proximally there are one to five transverse whorls of large spines, some of which are at least equal to one subcaudal in length. With the exception of specimens from Woodlark Island, specimens have a distinct transverse fold between the calyculate and spinose zones, an obvious homologue of the fold between the (smooth) calyces and small proximal spines seen in some other *Charlespiersonserpens* gen. nov.. No such fold is evident in Woodlark Island specimens or those from Bougainville. These are herein described as a new subspecies.

The subgenus *Downieea* subgen. nov. is monotypic for the species *D. papuensis.*

Downieea is endemic to Island New Guinea and immediately adjacent satellite islands.

Etymology: The subgenus is named in honour of Meg Downie of Donvale, Victoria who tried with great difficulty to remove corruption from the Manningham (Melbourne) council in her role as elected councilor, as well as for her services towards improving animal welfare, in particular domestic dogs.

***CHARLESPIERSONSERPENS* (*DOWNIEEA*) *PAPUENIS LIZELLIOTTAE* SUBSP. NOV.**

Holotype: Specimen number 42400, a male, at the American Museum of Natural History (AMNH) from Bougainville, New Guinea.

The relevant Museum is a government owned public facility that allows researchers access to their collections and the holotype specimen is already lodged with and belongs to this facility.

Diagnosis: This taxon would normally identify as *D. papuensis*, from which it is separated definitively by hemipenal morphology.

In this species the hemipenis organ is of moderate length (ending at subcaudal 8-12), with a strictly terminal attachment

of the retractor longus, so that there is no suggestion of terminal awn; distally the organ has numerous shallow calyces with many small spines on their borders; proximally there are one to five transverse whorls of large spines, some of which are at least equal to one subcaudal in length. While specimens of the nominate form *papuenis papuenis* have a distinct transverse fold between the calyculate and spinose zones, an obvious homologue of the fold between the (smooth) calyces and small proximal spines seen in some other *Charlespiersonserpens* gen. nov., no such fold is evident in specimens of this subspecies.

The subspecies *lizelliottae* is further separated from *papuenis* by the greater number of maxillary teeth, 26-27 in *lizelliottae*, versus 19-23 for *papuenis.*

At the present time, the subspecies is only known from Bougainville and Woodlark Island, New Guinea.

Etymology: Named in honor of Liz Elliott, in recognition of her role as faithful wife and helper of herpetologist Adam Elliott of Hoppers Crossing, Victoria. She has spent many hours looking after reptiles while Adam has been in the field conducting research and the like.

More significantly, she has had to endure the terrorism and trauma of late night and early morning armed raids by Victorian government wildlife officers, headed by Glen Sharp and others as they have trashed the family home inhabited by herself, Adam and two very young children and also been forced to endure the undercurrent of violence that has accompanied these raids.

These officers have merely been acting on a warped sense of hatred for Adam because sometime earlier he refused to act as "informant" for them within the herpetological community.

Most specifically, this was an attempt to get him to give false information and false statements against a herpetologist who had previously blown the whistle on corruption within the same government department.

SUBGENUS *MACMILLANUS* GEN. NOV.

Type Species: *Dendrophis lorentzi* Lidth De Juede, 1911

Diagnosis: This genus includes all the snakes formerly referred to the species *Dendrophis lorentzi* Van Lidth De Juede, 1911, more recently known as *Dendrelaphis lorentzi*.

The genus includes the southern specimens still referred to the species *lorentzi* and the northern specimens from the Huon Peninsula, formerly referred to that species and herein described as a new species, namely *Charlespiersonserpens jackyhoserae* sp. nov.

Macmillanus subgen. nov. are separated from all other similar species, including all five other members of the genus *Charlespiersonserpens* gen. nov. by the following suite of characters: There is a dark stripe present along the upper edge of the lip scales, separating light labial scales from darker pigment of dorsum of head; scales of dorsum of head lack pits, average total body length of .7 to 1 metre and never exceeding 1.3 metres.; fewer than 140 subcaudals, 156-181 ventrals; 8 or 9 supralabials on each side, pale vertebral stripe is absent, a small nostril, the nasal scale is not completely divided and the nasal scute above the nostril has obvious cornification.

This subgenus is also separated from all other *Charlespiersonserpens* and *Dendrelaphis* on the basis of unique hemipenal morphology.

The hemipenis extends to subcaudal 12-15, with the major retractor muscle attaching almost, but not quite, at its tip, so that there is a short uninverted apical awn formed by the narrowed extreme tip of the organ lying distal to the attachment of the major retractor; this distal part of the organ has numerous closely packed calyces, but each calyx has numerous small spines along its border, so that the general texture of the distal end of the organ is spinose with inconspicuous longitudinal folds between the bases of the spinules,; proximal to this spinose calyculate region there is a region of numerous spines not mounted on calyces, but each spine much less than a subcaudal in length; this spinose zone is distinctly, but not conspicuously set off from the spinose calyculate zone.

The Lesser Sunda taxon *D. inornatus* Boulenger, 1897 has a similar hemipenis, but is separated by having 15 instead of dorsal 13 mid-body rows.

Macmillanus subgen. nov. is endemic to Island New Guinea and immediately adjacent satellite islands.

Etymology: The subgenus is named in honor of Graeme Macmillan of Park Orchards, Victoria who tried with great difficulty to remove corruption from the Manningham (Melbourne) council in his role as elected councilor, as well as for his services towards financial probity in local government.

***CHARLESPIERSONSERPENS* (*MACMILLANUS*) *JACKYHOSERAE* SP. NOV.**

Holotype: A male specimen lodged at the National Museum of Natural History, Smithsonian Institution, USNM, from Gusiko, Huon Peninsula, New Guinea.

The relevant Museum is a government owned public facility that allows researchers access to their collections and the holotype specimen is already lodged with and belongs to this facility.

Diagnosis: Separated from the species *Charlespiersonserpens lorentzi* by the following suite of characters: *Charlespiersonserpens jackyhoserae* sp. nov. has 181 ventrals versus a range of 156-173 in *Charlespiersonserpens lorentzi; Charlespiersonserpens lorentzi* has 8 supralabials (rarely nine on one side), versus 9 supralabials on both sides in *Charlespiersonserpens jackyhoserae* sp. nov..

Furthermore *Charlespiersonserpens jackyhoserae* sp. nov. is the only species within any *Charlespiersonserpens* or *Dendrelaphis* with the entire supraoccipital covered by the axial musculature.

Charlespiersonserpens jackyhoserae sp. nov. also differs from *Charlespiersonserpens lorentzi* in hemipenal morphology.

In this species the hemipenis extends to subcaudal 13, with longitudinal rows of small spines (each about one sixth of a subcaudal long), the rows of spines nearly to the tip and well distal to the rightward angulation of the sulcus at subcaudal 9; an apical awn, about three subcaudals long and with numerous tiny spinules; no crossfold on the organ, but lips of sulcus raised as a pair of prominent folds. The structure of the hemipenis in *Charlespiersonserpens jackyhoserae* sp. nov. shares traits with *Charlespiersonserpens lorentzi* including the black spotting on top of the head that looks like calligraphic penciling, but differs in that the apical awn is longer, being only 1-2 subcaudals in *lorentzi.*

Charlespiersonserpens jackyhoserae sp. nov. is known only from the holotype. It is therefore currently only known from the Huon Peninsula, New Guinea, but presumably also occurs in nearby parts of New Guinea north of the Central Cordillera.

Until proven otherwise, the taxon, *Charlespiersonserpens lorentzi* should be regarded as confined to the region south of the Central Cordillera of island New Guinea in the general vicinity of the type locality in southern Irian Jaya in the general vicinity of the Lorentz and Mimika Rivers.

Etymology: Named in honor of my daughter Jacky Hoser who has spent the first 11 years of her life educating others about reptiles in Australia in the face of incredible adversity, including attacks from inexperienced business competitors motivated solely by a desire to extract money from people on false pretexts aided and abetted by corrupt wildlife officers who happen to be their friends. These wildlife officers and agents acting on their behalf have unlawfully assaulted and attacked Jacky both at school (on 10 August 2011) and even in her bedroom at home on 17 August 2011.

Her courage in dealing with these attacks and in continuing to educate others about reptiles with correct factual information deserves more than one great honor and recognition.

SPECIES WITHIN GENUS *CHARLESPIERSONUS* GEN. NOV. SUBGENERA

Charlespiersonserpens (*Charlespiersonserpens*) *punctulatus* (Gray, 1826)

Charlespiersonserpens (*Charlespiersonserpens*) *calligastra* (Günther, 1867)

Charlespiersonserpens (*Charlespiersonserpens*) *gastrosticus* (Boulenger, 1894) (1 subspecies)

Charlespiersonserpens (*Charlespiersonserpens*) *salomonis* (Günther, 1872)

Charlespiersonserpens (*Downieea*) *papuensis* (Boulenger, 1895) (1 subspecies)

Charlespiersonserpens (*Macmillanus*) *jackyhoserae* sp. nov.

Charlespiersonserpens (*Macmillanus*) *lorentzi* (Lidth De Jeude, 1911)

SPECIES REMAINING WITHIN THE GENUS *DENDRELAPHIS* BOULENGER, 1890

Dendrelaphis andamanensis (Anderson, 1871)

Dendrelaphis ashoki Vogel and Van Rooijen, 2011

Dendrelaphis bifrenalis (Boulenger, 1890)

Dendrelaphis biloreatus Wall, 1908

Dendrelaphis caudolineatus (Gray, 1834)

Dendrelaphis caudolineolatus (Günther, 1869)

Dendrelaphis chairecaeos (Boie, 1827)

Dendrelaphis cyanochloris (Wall, 1921)

Dendrelaphis formosus (Boie, 1827)

Dendrelaphis girii Vogel and Van Rooijen, 2011

Dendrelaphis grandoculis (Boulenger, 1890)

Dendrelaphis grismeri Vogel and Van Rooijen, 2008

Dendrelaphis hollinrakei Lazell, 2002

Dendrelaphis humayuni Tiwari and Biswas, 1973

Dendrelaphis inornatus Boulenger, 1897

Dendrelaphis kopsteini Vogel and Van Rooijen, 2007

Dendrelaphis marenae Vogel and Van Rooijen, 2008

Dendrelaphis ngansonensis (Bourett, 1935)

Dendrelaphis oliveri (Taylor, 1950)

Dendrelaphis pictus (Gmelin, 1789)

Dendrelaphis schokari (Kuhl, 1820)

Dendrelaphis striatus (Cohn, 1905)

Dendrelaphis subocularis (Boulenger, 1888)

Dendrelaphis tristis (Daudin, 1803)

Dendrelaphis underwoodi Vogel and Van Rooijen, 2011

Dendrelaphis walli Vogel and Van Rooijen, 2011

GENUS *BOIGA* FITZINGER, 1826 *SENSO LATO*

This is a clearly composite genus in urgent need of major taxonomic review.

This paper continues the somewhat piecemeal review process of the genus, most recently commenced by herpetologists such as Meirte (1992), who have recently removed African species from the genus.

Meirte (1992), resurrected the genus *Toxicodryas* Hallowell, 1857 for the two African species previously assigned to the genus *Boiga.*

This move was rejected by Broadley (1998), a position that was supported by others including Hughes (2000).

However the placement of the two African species in the genus *Toxicodryas* has more recently in effect been supported by the very limited molecular data provided by Pyron et. al. in 2011.

Their results only showed data for two species within *Boiga senso lato*, including what they called *Boiga pulverulenta* and the well-known Asiatic species *B. dendrophila*.

While these results showed the two species to be related, the division between the two was more than ample to warrant the splitting of the species between two genera when compared to other species tested within and between related genera.

While *B. dendrophila* is not the type species of the genus *Boiga*, it is safe to infer a similar result would have been obtained by Pyron et. al. if they had tested *Boiga irregularis* against African *Boiga pulverulenta.*

What has not yet been determined by molecular means is the differences between the Asiatic and Australian species groups within *Boiga* or for that matter differences between the various Asiatic groups.

It's worth noting that what's left of *Boiga* after the two *Toxicodryas* are removed is still a very paraphyletic group of common origin with a distribution ranging through most of Asia, from eastern Iran, across Indonesia and into north and east Australia. These species range from large moderately built species, to very thin and sometimes much smaller animals.

In terms of morphology and habits, the species are diverse and often sympatric, with different taxa occupying different habitats and ecological positions, even though all are similar in obvious key respects such as their large eyes, laterally compressed bodies and so on.

The taxonomic position is made even less clear by the fact that while there are about 30 recognized species and another 15 or so subspecies, these numbers do not give an accurate reflection of the true composition of the genus.

Instead the current composition of the genus in many ways reflects collection localities and interpretations of morphological variants by different herpetologists.

Therefore I should note that the current content compositions (total numbers) of the two newly named genera as well as the remaining *Boiga* beyond those listed within each, should be treated as provisional on the basis of further taxa likely to be described and/or added to given genera.

Coluber irregularis Bechstein, 1802, now widely known as *Boiga irregularis* is the type species of the genus *Boiga* Fitzinger. The name *Ibiba* Gray, 1825, as suppressed under the plenary powers in ICZN Opinion 1374, has been placed on the Official Index of Rejected and Invalid Generic Names in Zoology.

Genus *Dipsadomorphus* Fitzinger, 1843 appears to be a valid name for the type species *Coluber trigonatus* Schneider, 1802, now known widely as *Boiga trigonatus.*

To a greater degree than others within the genus *Boiga* as presently understood, this taxon is divergent in being more terrestrial in habit and invades habitats not used by other *Boiga,* as well as being somewhat smaller in average size than many other members, including the type species for *Boiga*, namely *B. irregularis.*

It is my view that this taxon should be placed within the genus *Dipsadomorphus.*

Other taxa within *Boiga*, are also likely to be better placed in *Dipsadomorphus instead of Boiga* but this potential move is deferred for the time being.

Noting the situation in terms of the rest of *Boiga*, the obvious divergent groups within the genus as currently understood and the current lack of molecular data on the genus, I have herein only removed the most obviously morphologically and ecologically divergent members of *Boiga* from the genus.

I note however that further division of the genus, at least to subgenus and species groups is almost inevitable when firm molecular data is obtained for all species.

Many of the south-east Asian species have little in common with the type species *Boiga irregularis* or the type for *Dipsadomorphus* and to complicate matters further there remain several undescribed forms in Indonesia and probably

elsewhere.

Within this paper I hereby create two new genera in which to place members of *Boiga* that are clearly divergent from both the *Dipsadomorphus* Fitzinger, 1843 type species and the species *Boiga irregularis.*

The species *Boiga dendrophila* is placed in a monotypic genus *Dorisious* gen. nov..

The highly divergent so-called *Boiga drapiezii* group, including species both described and undescribed are placed in the genus *Mulvanyus* gen. nov..

While the genus *Boiga senso lato* remains one of the less understood groups of common snakes, there are a number of relevant publications in terms of the genus and particular species. With more than 30 species taxa formally named it isn't practical for to cite all the noteworthy literature, however some of the more important relevant published studies and records include, Acala (1986), Ahl (1933), Auliya (2006), Bauer and Günther (1992), Brongersma (1934), Bulian (2000), Cox et. al. (1998), Das (1999), David and Vogel (1996), de Lang and Vogel (2005), Duméril, Bibron and Duméril (1854), Even (2009), Ferner et. al. (2000), Gaulke (1994), Gaulke et. al. (2003), Geissler et. al. (2011), Greene (1989), Groen (2006, 2008), Günther (1863), Khan (1988, 2002), Kramer (1977), Leong et. al. (2009), Leviton (1968), Longman (1915, 1918), Macleay (1877, 1884, 1888), Manamendra-Arachchi and Pethiyagoda (2007), Manthey and Grossmann (1997), McCoy (2006), Mertens (1961), Minton and Dunson (1978), Neier (1981), Nguyen et. al. (2009), Orlov and Ryabov (2002), Orlov, et. al. (2003), Pauwels and Vogel (2011), Pauwels et. al. (2005), Ramadhan et. al. (2010), Rodda and Fritts (1992), Schmidt (2012), Smith (1943), Taylor (1923), Taylor (1965), Tillack et. al. (2004), van Rooijen and van Rooijen (2004), Vogel (2000), Wall (1908c, 1909, 1921), Wen (1998), Werner (1899a, 1899b) and Zhao and Adler (1993).

GENUS *BOIGA* FITZINGER, 1826

Diagnosis: As currently understood this is a composite group of snakes.

They are venomous rear fanged generally arboreal "Tree Snakes" or climbing species characterized by a broad head and large often bulbous eyes with a vertically elliptical pupil.

There are solid teeth on both jaws, the prefrontal is in contact with the nasal, the tail is more-or-less cylindrical and pointed, 19-25 mid-body rows, smooth dorsal scales, ventral scales run fully across the belly, the nostrils are usually lateral and the head is covered with large symmetrical shields, undivided anal, divided subcaudals and a loreal on each side of the head.

These snakes are long and thin in build and have a laterally compressed body, the degree of these traits varying on the species.

All are oviparous.

Distribution: The genus ranges through most of southern Asia, from eastern Iran, across Indonesia and into north and east Australia.

GENUS *DORISIOUS* GEN. NOV.

Type species: *Dipsas dendrophila* Boie, 1827.

(Known in most contemporary texts as *Boiga dendrophila*)

Diagnosis: Separated from all other snakes in the genus *Boiga* by the following suite of characters: While it is a relatively long thin snake with a laterally compressed body, sharp vertebral ridge and enlarged head, the snake is more stout and heavily bodied than most other *Boiga* and so is a heavier animal at a given length. In line with the relatively stout build is a lower ventral count of 209-239 ventrals versus 240 or more for other *Boiga* species (and *Mulvanyus* gen. nov.).

In *Dorisious* gen. nov. there are 78-110, subcaudals versus over 112 for *Boiga* species (and *Mulvanyus* gen. nov.).

These snakes are unmistakable by their black body with thin, incomplete yellow bands, being orangeish on juveniles, the head is black, supralabials yellow with black etching.

The snake attains a maximum total length of about 2.5 metres.

In line with other *Boiga*, the snake retains large eyes, smooth dorsal scales, single anal, all divided subcaudals and has an enlarged vertebral row of scales.

This genus is presently monotypic for the species *Boiga dendrophila* including recognized subspecies, however some of the currently recognized subspecies may ultimately prove to be full species.

Distribution: Found in southern Thailand through peninsula Malaysia to Singapore and Sumatra, as well as the Philippines, Natuna Archipelago, Borneo, Java and Sulawesi.

Common name: Mangrove Snake, in reference to its preferred habitat, namely mangrove swamps.

Etymology: Named in honor of Morrie Dorisio, of Bulleen, Victoria, Australia for many to date unrecognized services to herpetology. Of relevance to reptile keepers in Australia and elsewhere, is that in February 1994, after all my computer equipment and files were taken and destroyed by corrupt Victorian police trying to stop the publication of what was ultimately three books about Victorian Police Corruption (Hoser 1995, Hoser 1999a, Hoser 1999b), Morrie Dorisio came to the rescue and spent countless days and hours teaching me how to use more modern computers to enable these books and more importantly another book, *Smuggled-2: Wildlife Trafficking, Crime and Corruption in Australia*, (Hoser 1996) to be published.

Without Morrie's efforts, for which he never sought or got any reward, that 1996 book would never have been published.

It was only as a result of the sequence of events arising from the publication of that book which caused the laws in Australia get changed by governments in Australia to allow private citizens in most parts of Australia to be allowed to keep reptiles as pets for the first time in over 20 years.

As this journal goes to print, those rights are under threat yet again and as I am now over 50 years old, I will probably not be able spend another 20 years fighting a ban on private reptile ownership if and when one is re-imposed in Australia.

All herpetologists in Australia owe Morrie Dorisio a debt in gratitude and it is fitting that he should be honored with a genus of snakes named after him.

One hopes that "new generation" reptile keepers in Australia think of Morrie in particular every time they handle the pet snake that his good work allowed them to keep without fear of a dawn raid and jail!

GENUS *MULVANYUS* GEN. NOV.

Type species: *Dipsas drapiezii* Boie, 1827

(Known in most contemporary texts as *Boiga drapiezii*)

Diagnosis: These are a long vine-like snake with strongly laterally compressed body shape vertebral ridge, large head shields and vertical pupils.

Mulvanyus gen. nov. are separated from snakes of the genus *Boiga* and *Mulvanyus* gen. nov. by their greatly enlarged and blunt triangular head (distinctly blunt snout) as well as their unusually large and bulbous eyes (even when compared to other *Boiga* species).

There are 19 smooth dorsal mid-body scale rows, 250-285 ventrals, 114-168 divided subcaudals, and a single anal. The body comes in various colors depending on locality and species.

Most specimens are reddish or brownish with some sort of transverse bands not contacting the ventrals often with irregularly shaped white ventrolateral blotches occurring along the length of the body and tail, and with a brownish head.

Distribution: From southern Thailand, south and east through Indonesia through Sumatra, Java and Borneo and possibly

Hoser 2012 - Australasian Journal of Herpetology 12:65-76.

islands further east as well as the Philippines.

Etymology: Named in honor of Paul Mulvany of Blackburn, Victoria, Australia. He is the unseen handyman who kept all the Snakebusters cages in tip-top shape and our reptiles in immaculate health over many years.

He deserves recognition for his generally unpaid efforts towards improving the welfare of our captive reptiles used for the invaluable public education of millions of Australians.

CONTENT OF GENUS *MULVANYUS* GEN. NOV.

Mulvanyus drapiezii (Boie, 1827) (Type species)

Mulvanyus angulata (Peters, 1861)

Mulvanyus philippina (Peters, 1867)

Mulvanyus schultzei (Taylor, 1923)

SPECIES REMAINING WITHIN BOIGA

Boiga andamanensis (Wall, 1909)

Boiga barnesii (Günther, 1869)

Boiga beddomei (Wall, 1909)

Boiga bengkuluensis Orlov, Kudryavtzev, Ryabov and Shumakov, 2003

Boiga bourreti Tillack, Ziegler and Khac Quyet, 2004

Boiga ceylonensis (Günther, 1858)

Boiga cyanea (Duméril, Bibron and Duméril, 1854)

Boiga cynodon (Boie, 1827)

Boiga dightoni (Boulenger, 1894)

Boiga forsteni (Duméril, Bibron and Duméril, 1854)

Boiga gokool (Gray, 1835)

Boiga guangxiensis Wen, 1998

Boiga hoeseli Ramadhan, Iskandar and Subasri, 2010

Boiga irregularis (Bechstein, 1802)

Boiga jaspidea (Duméril, Bibron and Duméril, 1854)

Boiga kraepelini Stejneger, 1902

Boiga multifasciata (Blyth, 1861)

Boiga multomaculata (Boie, 1827)

Boiga nigriceps (Günther, 1863)

Boiga nuchalis (Günther, 1875)

Boiga ochracea (Günther, 1868)

Boiga quincunciata (Wall, 1908)

Boiga saengsomi Nutaphand, 1985

Boiga schultzei Taylor, 1923

Boiga siamensis Nutaphand, 1971

Boiga tanahjampeana Orlov and Ryabov, 2002

Boiga trigonata (Schneider, 1802)

Boiga wallachi Das, 1998

REFERENCES CITED

Alcala, A. C. 1986. *Guide to Philippine flora and fauna. Vol. X. Amphibians and reptiles*. Manila, Natural Resources Management Center, Ministry of Natural Resources, University of the Philippines:i-xiv+1-195.

Ahl, E. 1933. Ergebnisse der Celebes und Halmahera Expedition Heinrich 1930-32. Reptilien und Amphibien. *Mit. zool. Mus. Berlin* 19:577-583.

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.

Bauer, A. M. and Günther, R. 1992. A preliminary report on the reptile fauna of the Kingdom of Bhutan with the description of a new species of scincid lizard (Reptilia: Scincidae). *Asiatic herpetol. Res.* 4:23-36.

Bergman, R. A. M. 1955. *Dendrophis pictus*. *Proc. Kon. Ned. Akad. Wet. Amsterdam*, C58:206-218.

Blake, P. A. 1995. Notes on the garden snake (*Natrix vittata*). *Herptile*:*Journal of the International Herpetological Society* 20(4):182-183.

Blyth, E. 1863. Report of the curator, zoological department. *J. Asiatic Soc. Bengal*, Calcutta, 32(1):73-90.

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. 1891. Description of new oriental reptiles and batrachians. *Ann. Mag. Nat. Hist.* (7)6:279-283.

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 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, George 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.

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.

Brongersma, L. D. 1934. Contribution to Indo-Australian herpetology. *Zool. Meded. Leiden*, 17(3-4):161-251.

Bulian, J. 2000. Anmerkungen zur Giftwirkung und zum Beutefangverhalten einer *Boiga dendrophila melanota* (Boulenger 1896). *Sauria* 22(2):45-46.

Captain, A. and Patel, A. 1998. *Sinonatrix*, a new genus for India. *Hamadryad* 22(2):114-115.

Chanard, T., Grossmann, W., Gumprecht, A. and Schulz, K. D. 1999. *Amphibians and reptiles of peninsular Malaysia and Thailand - an illustrated checklist* [bilingual English and German]. Bushmaster Publications, Würselen, Gemany:240 pp.

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..., Elsevier: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.

Dutt, K. 1970. Chromosome Variation in Two Populations of *Xenochrophis piscator* Schneider from North and South India (Serpentes, Colubridae). *Cytologia* 35:455-464.

Even, E. 2009. Neuer Nachweis für drei Schlangenarten für die Togian-Inseln, Sulawesi. *Elaphe* 17(1):56-59.

Ferner, J. W., Brown, R , Sison, R. V. and Kennedy, R. S. 2000. The amphibians and reptiles of Panay Island, Philippines. *Asiatic Herpetological Research* 9:1-37.

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).

Geissler, P., Nguyen, T. Q., Poyarkov, N. A. and Böhme, W. 2011. New records of snakes from Cat Tien National Park, Dong Nai and Lam Dong provinces, southern Vietnam. *Bonn Zoological Bulletin* 60(1):9-16.

Glässer-Trobisch and Trobisch, D. 2011. Titelbild / Das Porträt: *Xenochrophis vittatus* (Linnaeus, 1758). *Sauria* 33(3):1-2.

Gmelin, J. F. 1789. *Caroli a Linné Systema naturae*. 13. ed., Tom 1 Pars 3. G. E. Beer, Lipsiae. pp:1033-1516.

Gravenhorst, J. L. C. 1807. *Vergleichende Übersicht des Linneischen und einiger neueren zoologischen Systeme, nebst dem eingeschalteten Verzeichnisse der zoologischen Sammlung des Verfassers und den Beschreibungen neuer Thierarten, die in derselben vorhanden sind*. Heinrich Dietrich, Göttingen: i-xvi + 1-476.

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.

Greene, H. W. 1989. Ecological, evolutionary, and conservation implications of feeding biology in Old World cat snakes, genus *Boiga* (Colubridae). *Proc. Cal. Acad. Sci.* (4)46(8):193-207.

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.

Groen, J. 2006. *Boiga dendrophila*. *Lacerta* 64 (2):55-63.

Groen, J. 2008. Het *Boiga*-genus. *Lacerta* 66 (1-3):64-79.

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

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.

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.

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.

Joseph, P., Mathew, J. P. and Thomas, V. C. 2005. Morphological variables and osteology of vertebrae and ribs in *Natrix piscator* (Schneider), *Naja naja* (Linnaeus) and *Eryx johnii* (Russell). *Uttar Pradesh Journal of Zoology* 25(2):183-194.

Hoser, R. T. 1989. *Australian Reptiles and Frogs*. Pierson and Co., Mosman, NSW, 240 pp.

Hoser, R. T. 1991. *Endangered Animals of Australia*. Pierson and Co., Mosman, NSW, 240 pp.

Hoser, R. T. 1993. *Smuggled: The Underground Trade in*

Hoser 2012 - Australasian Journal of Herpetology 12:65-76.

Australia's Wildlife. Apollo Publishing, Moss Vale, NSW. 160 pp.

Hoser, R. T. 1995. *The Hoser Files: The fight against entrenched official corruption*. Kotabi Publishing, Doncaster, Victoria, Australia:320 pp.

Hoser, R. T. 1996. *Smuggled-2: Wildlife Trafficking, Crime and Corruption in Australia*. Kotabi Publishing, Doncaster, Victoria, 3108, Australia:280 pp.

Hoser, R. T. 1999a. *Victoria Police Corruption*:726 pp.

Hoser, R. T. 1999b. *Victoria Police Corruption-2*:800 pp.

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.

How, R. A. and Kitchner, D. J. 1997. Biogeography of Indonesian snakes. *Journal of Biogeography* 24:725-735.

Hughes, B. 2000. Polymorphism, sex, size and other aspects of the African snake, *Boiga blandingi* (Hallowell, 1844). *Herpetological Bulletin* (74):8-12.

I.C.Z.N., 1986. Opinion 1374.

Janzen, P., Klaas, P. and Ziesmann, S. 2007. Sri Lankas Schlangenfauna. *Draco* 7(30):56-64.

Khan, M. A. R. 1988. An updated list of snakes of Bangladesh. *Hamadryad*, 13(1):5-7.

Khan, M. S. 2002. *Die Schlangen Pakistans* [English edition as "*A Guide to the snakes of Pakistan*"]. Edition Chimaira (Frankfurt am Main):265 pp.

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.

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.

Kuhl, H. 1820. *Beiträge zur Zoologie und vergleichenden Anatomie*. Hermannsche Buchhandlung, Frankfurt:152 pp.

Kusuma, K. I, Eprilurahman, R. and Vogel, G. 2010. First record of *Xenochrophis melanzostus* (Gravenhorst, 1807) on Bali Island, Indonesia. *Hamadryad* 35(1):113-115.

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.

Leong, T. M., Lim, K. K. P. and Baker, N. 2009. Rediscovery of the white-spotted cat snake *Boiga drapezii* in Singapore (Reptilia:Serpentes:Colubridae). *Nature in Singapore* 2:487-493.

Leviton, A. E. 1968. Contributions to a review of Philippine snakes, XI. The snakes of the genus *Boiga. Philippine J. Sci*. 97(3):291-314.

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.

Linnaeus, C. 1758. *Systema naturæ per regna tria naturæ, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis. Tomus I. Editio decima, reformata.* Laurentii Salvii, Holmiæ. 10th Edition:824 pp.

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.

Longman, H. A. 1915. Reptiles from Queensland and the Northern Territory. *Memoirs of the Queensland Museum* 3:30-34.

Longman, H. A. 1918. Notes on some Queensland and Papuan reptiles. *Memoirs of the Queensland Museum* 6:37-44.

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.

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.

Malnate, E. V. 1960. Systematic division and evolution of the colubrid snake genus *Natrix*, with comments on the subfamily Natricinae. *Proceedings Acad. Nat. Sci. Phil.* 112(3):47-71.

Malnate, E. V., and Minton, S. A. 1965. A redescription of the natricine snake *Xenochrophis cerasogaster*, with comments on its taxonomic states. *Proc. Acad. Nat. Sci. Philadelphia* 117:19-41.

Malnate, E. V. and Underwood, G. 1988. Australasian natricine snakes of the genus *Tropidonophis*. Proceedings of the Academy of natural Sciences of Philadelphia 140(1):59-201.

Manamendra-Arachchi, K. and Pethiyagoda, R. 2007. *Boiga rawanawei*, a junior synonym of *Boiga beddomei*. *Zeylanica* 7(1):123-124.

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.

Meirte, D. 1992. Clés de détermination des serpents d'Afrique. Museum Royal d'Adrique Centrale, Tervuren Belgique *Annual Series Octavo Science Zoologique* 267:1-152.

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.

Mertens, R. 1961. Was ist "*Naja celebensis* Ahl" in Wirklichkeit? *Senckenbergiana biologica* 42:419-420.

Minton, S. A., Dunson, W. A. 1978. Observations on the Palawan mangrove snake, *Boiga dendrophila multicincta* (Reptilia, Serpentes, Colubridae). *Journal of Herpetology* 12(1):107-108.

Mohapatra, P. P., Dutta, S. K. and Parida, S. P. 2010. Report of *Xenochrophis schnurrenbergeri* Kramer, 1977 (Serpentes: Natricidae) from Orissa, India. *Russian Journal of Herpetology* 17(2):94-96.

Neier, K. W. 1981. Erfahrungen mit der Mangroven-Nachtbaumnatter oder Ulaburong (*Boiga dendrophila*). *Herpetofauna* (Germany) 3(12):19-20.

Nguyen, V. S., Nguyen, H. T. C. and Truong, Q. 2009. *Herpetofauna of Vietnam*. Chimaira, Frankfurt:768 pp.

Obst, F. J. 1977. Die herpetologische Sammlung des Staatlichen Museums für Tierkunde Dresden und ihre Typusexemplare. *Zool. Abh. Mus. Tierk. Dresden* 34:171-186.

Orlov, N. L. and Ryabov, S. A. 2002. A new species of the genus *Boiga* (Serpentes, Colubridae, Colubrinae) from Tanahjampea Island and description of "black form" of *Boiga cynodon* Complex from Sumatra (Indonesia). *Russ. J. Herpet.* 9(1):33-56.

Orlov, N. L., Kudryavtzev, S. V. Ryabov, and Shumakov, O. V. 2003. A New species of genus *Boiga* (Serpentes: Colubridae: Colubrinae) and color atlas of Boigas from Bengkulu Province (Sumatra, Indonesia). *Russian Journal of Herpetology* 10(1):31-52.

Pauwels, O. S. G. and Vogel, G. 2011. Ein Fall von Thanatose (Totstellreflex) bei *Boiga blandingii* (Squamata, Serpentes, Colubridae) in Gabun. *Elaphe* 19(4):24-25.

Pauwels, O. S. G., David, P., Nutphand, W. and Chimsunchart, C. 2001. First record of *Xenochrophis punctulatus* (Günther, 1858) (Serpentes: Colubridae: Natricinae) from Thailand. *Hamadryad* 26(2):247-252.

Pauwels, O. S. G., David, P., Chanholme, L., Vogel, G., Chanard, T. and Orlov, N. L., 2005. On the status of *Boiga ocellata* Kroon, 1973, with the designation of a neotype for *Boiga siamensis* Nootpand, 1971 (Serpentes, Colubridae). *Russ. J. of Herpet.*, 12(2):102-106.

Peters, W. C. H. 1867. Herpetologische Notizen. *Monatsber. königl. Akad. Wiss.* Berlin. 1867 (Januar):13-37.

Pratyush, P. M., Dutta, S. K. and Parida, S. P. 2010. Report of *Xenochrophis schnurrenbergeri* Kramer, 1977 (Serpentes:Natricidae) from Orissa, India. *Russian Journal of Herpetology* 17(2):94-96.

Purkayastha, J., Das, M., Sengupta, S. and Dutta, S. K. 2010. Notes on *Xenochrophis schnurrenbergeri* Kramer, 1977 (Serpentes: Colubridae) from Assam, India with some comments on its morphology and distribution. *Herpetology Notes* 3:175-180.

Pyron, R. A., et al. 2011. The phylogeny of advanced snakes (Colubroidea), with discovery of a new subfamily and comparison of support methods for likelihood trees**.** *Mol. Phyl. Evol.* 58:329-342.

Ramadhan, G., Iskandar, D. T. and Subasri, D. R. 2010. New Species of Cat Snake (Serpentes: Colubridae) Morphologically Similar to *Boiga cynodon* from the Nusa Tenggara Islands, Indonesia. *Asian Herpetological Research* 1(1):22-30.

Richards, B. D. 1918. Note on the Habits of the Checkered Water Snake (*Tropidonotus piscator*). *J. Bombay Nat. Hist. Soc.* 25:150.

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").

Rodda, G. H. and Fritts, T. H. 1992. The Impact of the Introduction of the Colubrid Snake *Boiga irregularis* on Guam's Lizards. *Journal of Herpetology* 26(2):166-174.

Sharma, R. C. 2004. *Handbook Indian Snakes*. Akhil Books, New Delhi:292 pp.

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

Schmidt, K. P. 1932. Reptiles and Amphibians from the Solomon Islands. *Field Mus. Nat. Hist. Zool. Ser.* 18(9):175-190.

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.

Sourav, S. H. and Purkayastha, J. 2011. *Xenochrophis cerasogaster* (Cantor, 1839) (Serpentes: Colubridae): Distribution extension in Bangladesh. *Check List* 7(3):352-353.

Stejneger, L. 1933. The ophidian generic names *Ahaetulla* and *Dendrophis. Copeia* 1933(4):199-203.

Sudasinghe, H. 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. 1923. Additions to the herpetological fauna of the Philippine Islands, III. *Philippine Journal of Science* 22:515-557.

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.

Thompson, C. and Thompson, T. 2008. *First contact in the Greater Mekong - new species discoveries.* WWF:40 pp.

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. 2004. Einige Beobachtungen zur terrestrischen Schlangenfauna auf der Halbinsel Santubong, Sarawak, Ost-Malaysia. *Sauria* 26(4):19-28.

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 Herp.* 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 He, 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. 1994. *Boiga multitemporalis* Bourret, 1935 - ein Junior-Synonym von *Boiga kraepelini* Stejneger, 1902 (Serpentes: Colubridae). *Sauria* 16(1):5-20.

Vogel, G. 1995. *Dendrelaphis striatus* (Cohn) neu für die Fauna Borneos (Serpentes: Colubridae). *Mitt. Zool. Mus. Berlin* 71:147-149.

Vogel, G., 2000. Zur Bestimmung der Unterarten von *Boiga dendrophila* (Boie, 1827) nebst einigen Neuigkeiten zu *Boiga dendrophila gemmicincta* (Duméril, Bibron and Duméril, 1854). *Sauria* 22(1):27-43.

Vogel, G. 2010. Zur Systematik der Schlangen der orientalischen Region: Forschungsdefizite fu¨hren zur Unterscha¨tzung der Artenvielfalt. *Ophidia* 4(2):18-26.

Vogel, G. and David, P. 2006. On the taxonomy of the *Xenochrophis piscator* complex (serpentes: Natricidae). In *Proceedings of the thirteenth Congress of the Soc. Eur. Herpetol*:241-246.

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 Herp.* 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. 1905a. Notes on some Bangalore Snakes. *J. Bombay Nat. Hist. Soc.* 16:389-394.

Wall, F. 1905b. Notes on Snakes collected in Cannanore from 5th November 1903 to 5th August 1904. *J. Bombay Nat. Hist. Soc.* 16:292.

Wall, F. 1907. Notes on Snakes collected in Fyzabad. *J. Bombay nat. Hist. Soc.* 18:101-129.

Wall, F. 1908a. Notes on a collection of snakes from the Khasi Hills, *Assam. J. Bombay nat. Hist. Soc.* 18:312-337.

Wall, F. 1908b. Two new snakes from Assam. *J. Bombay Nat. Hist. Soc.* 18:272-274.

Wall, F. 1908c. A Popular Treatise on the Common Indian Snakes, Part VII. The Saw-scaled Viper or Echis (*Echis carinata*) and the Gamma or Common Brown Tree-Snake (*Dipsadomorphus trigonatus*). *J. Bombay Nat. Hist. Soc.* 18:525-554.

Wall, F., 1909. Remarks on some forms of *Dipsadonomorphus. Rec. Ind. Mus.*, 3:151-155.

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. (HR. Cottle, gov. 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.

Wen, Y. 1998. Description of a new species of the genus *Boiga* (Serpentes: Colubridae) from China. [in Chinese]. *Sichuan Journal of Zoology* 17(2):51-52.

Whitaker, R. and Captain, A. 2004. *Snakes of India*. Draco Books:500 pp.

Werner, F. 1893. Herpetologische Nova (1). *Zool. Anz.* 16(414):81-84.

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. 1899. Beiträge zur Herpetologie der pacifischen Inselwelt und von Kleinasien. I. Bemerkungen über einige Reptilien aus Neu-Guinea und Polynesien. II. Über einige Reptilien und Batrachier aus Kleinasien. *Zool. Anz*. 22: 371-375, 375-378.

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. 2002. *Die Amphibien und Reptilien eines Tieflandfeuchtwald-Schutzgebietes in Vietnam.* Natur und Tier Verlag (Münster):342 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.

Zhao, E. and Adler, K. 1993. *Herpetology of China*. SSAR, Oxford/Ohio:522 pp.

Zug, G. R., Blackburn III, J. H. and Kyi, S. W. 2006. Checkered Keelbacks (*Xenochrophis* - Reptilia: Serpentes: Natricidae) at the Moyingyi Wetland Bird Sanctuary, Myanmar. *Hamadryad* 30(1 and 2):157-166.

Australasian Journal of Herpetology

Publishes original research in printed form in relation to reptiles, other fauna and related matters.

It is a peer reviewed printed journal for permenant public scientific record, with a sizeable print run and has a global audience.

Full details at: 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.

Issue 12 - 30 April 2012