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### ***Australasian Journal of Herpetology***

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**Tidying up the taxonomy of the extant Booidea, including the erection and naming of two new families, the description of *Acrantophis sloppi* sp. nov., a new species of Ground Boa from Madagascar and *Candoia aspera iansimpsoni*, subsp. nov., a new subspecies of Boa from Papua New Guinea.**

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**ABSTRACT**

In the wake of numerous recent studies cited within this paper, the phylogeny of extant true boas has been significantly clarified. The six main clades within Booidea warrant being placed into named and defined families according to the Zoological Code as done herein. Two are formally named for the first time. The same applies to the two obviously divergent subfamilies, meaning in effect the creation of four subfamilies, two of which are by definition, new, although these have pre-existing and available names. For completeness, two new tribes are also formally named according to the Zoological Code.

Furthermore, the well-known but as yet unnamed species of Ground Boa from the southern half of Madagascar, closely related to the species *Acrantophis dumerili* Jan, 1860, and with which it has long been confused, is formally described herein as a new species, namely *Acrantophis sloppi*.

Of note, the genus *Candoia* Gray, 1842 is herein regarded as consisting at the very lowest level, three subgenera, for which there are already available names. McDowell (1979) provided ample evidence that these three groups should in fact be treated as separate genera.

The genus *Pseudogonylophis* Tokar, 1989, originally described as a subgenus, is herein recognized as a full genus, based on further confirmation by molecular studies.

The regionally variable taxon recognized as *Candoia aspera* (Günther, 1877) has a third subspecies formally named for the first time, namely *Candoia (Erebophis) aspera iansimpsoni*.

**Keywords:** Superfamily; Booidea; Family; Boidae; Calabariidae; Erycidae; Ungaliophiidae; New Families; Candoiidae; Acrantophidae; Subfamily; Chariniinae; Corallinae; New tribes; Candoidiini; Acrantophiini; Genus; *Acrantophis*; *Candoia*; *Pseudogonylophis*; resurrected subgenera; *Tropidoboa*; *Erebophis*; species; *dumerili*; *madagascariensis*; *aspera*; new species; *sloppi*; new subspecies; *iansimpsoni*.

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**INTRODUCTION**

A recent audit of the world's Booidea revealed that several molecular studies including that of Noonan and Chippindale (2006) and Vidal and Hedges (2009) had confirmed a number of earlier studies (cited within the preceding paper) in showing that there were five well defined clades of Boas. These groups were well defined by both distribution and physical attributes with the component genera sharing key traits. Molecular studies, such as that of Noonan and Chippindale (2006) and Weins *et al.* (2012), effectively confirmed the results and conclusions of relevant key

studies on these reptiles and related or relevant fauna. These studies were based on morphology and/or other relevant factors, such as those outlined in the papers of Albino (1993, 1996, 2000), Austin (2000), Bauer (1993), Burbrink (2005), Campbell (1997), Kluge (1991, 1993a and 1993b), Underwood (1976), Underwood and Stimson (1990), Vences, *et al.* (2001), Vidal and Hedges (2002, 2004, 2009), Werner (1921) and Wilcox, *et al.* (2002).

As a result each of the clades are defined and described as families with four being named using available names. The fifth

clade is named as new, (*Fam. nov.*) as required according to the Zoological Code (Ride *et al.* (1999) in order to bring the classification of the entire group into line with that of most other advanced snakes and in particular the Pythoninae as defined by Hoser (2012) and outlined by others at the family level, including for example Vidal and Hedges (2009), see in particular p. 135, fig 4, at top of the page.

Essentially, this paper brings the classification of the world's boas as popularly defined into line with that of the pythons as popularly defined. Three divergent groups within these boa families are further defined as subfamilies, in effect creating six new and defined subfamilies, five of which have available names and one of which is named for the first time according to the Zoological Code.

Again, I mention that this brings the classification of the Booidea at the (super) family level into line with that of the Pythonidea as defined by Hoser (2012).

This classification at the family level essentially reflects that of Vidal and Hedges (2009) and others, in recognizing the superfamily Booidea as including five well-defined families reflecting geographical clades, and then three divergent groups as subfamilies.

I should note here that three other families of uncertain status, namely, Family Aniliidae (Pipe Snakes), Family Bolyeriidae (Round Island Boas) and Family Tropidhiidae (Dwarf Boas) are ignored for the purposes of this paper. However I should note that recognition of each family is not in doubt.

While most of the world's boas are well-known to science and have been scientifically named, one species has been omitted. This is one of two well-known variants in the Madagascan species known as the Dumeril's boa. The southernmost of the two variants was described by Jan in 1860 as *Acrantophis dumerili* and this has since been the name assigned by most authors since to both forms, even though the unnamed more northern race is more prevalent in captivity.

Several recent studies including those of Vences and Glaw (2004) and Nagy *et al.* (2012) have identified that the more widespread variant is in fact an unnamed taxon, but no one has yet formally named it or announced an intention of doing so.

In view of the intense ongoing habitat destruction in Madagascar and the prominence of the taxon, it is critical that the species be formally named according to the Zoological Code. This is done in the latter part of this paper.

A similar species, namely *A. madagascariensis*, described as *Pelophilus Madagascariensis* by Duméril and Bibron in 1844, was later transferred to Jan's genus *Acrantophis*, with *dumerili* being the type species.

The genus *Sanzinia* Gray, 1849 is not relevant to this paper. However in passing, I mention that the taxon described by Vences and Glaw in 2004 as a subspecies of *madagascariensis*, namely, *volontany*, is in my opinion a full species, based on inspection of live specimens in the United States and my interpretation of the data presented by Vences and Glaw in 2004.

This gives that genus two species, not one.

Papers of relevance in relation to *Acrantophis dumerili*, including the species described herein as *A. sloppi sp. nov.* include Andersson (1910), Barbour (1918), Borer (2009), Boulenger (1893), D'Cruze *et al.* (2009), Glaw and Glaw (2004), Glaw and Vences (1994), Huff (1984), Riesenschlangen (2000), Jan (1860), Kluge (1991), McDiarmid *et al.* (1999), Philippen (2012), Van Beest (2004), Vences and Glaw (2004), Vences *et al.* (2001), Wallach and Glaw (2009) and Wengler (1996).

An unnamed clade of boas needing recognition at the family level are the Pacific Boas, genus *Candoia*. Molecular studies have confirmed their distant relationship to all other extant true boas. As a result there is no alternative but to recognize the group at the family level as done here for the first time.

There are three distinct species groups within the genus *Candoia* Gray, 1842 as presently recognized, with molecular data strongly supporting the division of the genus as currently recognized three ways.

Taking the conservative position, I herein resurrect two available names to accommodate the relevant two new subgenera, for the *asper* and *bibroni* groups, with the more speciose *carinata* group retaining the *Candoia* name at the subgenus level.

For these subgenera, I provide a brief summary of content species below.

McDowell, 1979, provides a key by which one can separate the three species groups corresponding with the subgenera, copied and paraphrased as part of the diagnosis of the new subspecies of *Candoia aspera* below.

There are a number of relevant publications in terms of both *Candoia* and *Candoia aspera* in particular, including: Boulenger (1893), Colvée and Martín (2005), Colvée and Weffer (2004), de Rooij (1917), Forcart (1951), Günther (1877), Kahl *et al.* (1980), McCoy (2000, 2006), McDiarmid *et al.* (1999), McDowell (1979), Parker (2012), Stimson (1969), Stull (1932), Underwood (2002), Werner (1899a, 1899b) and sources cited therein.

The regionally variable taxon recognized as *Candoia aspera* (Günther <[http://en.wikipedia.org/wiki/Albert\\_C.\\_L.\\_G.\\_G%C3%BCnther](http://en.wikipedia.org/wiki/Albert_C._L._G._G%C3%BCnther)>, 1877) has been extensively surveyed throughout its known range. Two subspecies are currently recognized, being the forms from the north of New Guinea and that from New Britain. While it has been long known that those from south of the main New Guinea cordillera are different to those from elsewhere, they have not been taxonomically recognized, possibly due to the far smaller number of specimens from this region in the major North American Museums. Molecular evidence provided by Austin (2000), supports the position of these snakes being formally named at the subspecies level as done herein. In fact he even states this fact in his discussion.

Rather than redefine species and other groups previously named according to the Zoological Codes, this paper seeks to rely on these descriptions from the literature as cited herein, including for example McDowell (1979) who provides a detailed key to separate and identify all extant Booidea genera.

Generic names seen within this paper, not used in McDowell's paper of 1979, have been resurrected from synonymy by myself, the relevant data being reproduced in McDiarmid *et al.* 1999, including the original source publications citations.

Instead of and rather than to rehash McDowell's and McDiarmid *et al.*'s data, this paper merely lays out the taxonomic position with formal descriptions of new taxa as required under the current Zoological Code (Ride *et al.* 1999).

#### SUPERFAMILY BOOIDEA (TRUE BOAS)

##### FAMILY BOIDAE GRAY, 1825

**Terminal taxon:** *Boa constrictor* Linnaeus, 1758

**Content:** *Boa* Linnaeus, 1758; *Chilabothrus* Dumeril and Bibron, 1844; *Corallus* Daudin 1803; *Epicrates* Wagler, 1830; *Euneptes* Wagler, 1830; *Xenoboa* Hoge, 1953.

##### SUBFAMILY BOINAE GRAY, 1825

**Terminal taxon:** *Boa constrictor* Linnaeus, 1758

**Content:** *Boa* Linnaeus, 1758.

##### SUBFAMILY CORALLINAE McDOWELL, 1979

**Terminal taxon:** *Coluber hortulanus* Linnaeus, 1758 (now known as *Corallus hortulanus*)

**Content:** *Corallus* Daudin 1803; *Chilabothrus* Dumeril and Bibron, 1844; *Epicrates* Wagler, 1830; *Euneptes* Wagler, 1830; *Xenoboa* Hoge, 1953.

##### FAMILY CALABARIIDAE GRAY, 1858

**Terminal taxon:** *Eryx reinhardtii* Schlegel, 1848 (Now known as *Calabaria reinhardtii*)

**Diagnosis:** No palatal teeth are present and, unlike other



pythons and boas, the compact skull includes a prefrontal bone. There are no visible thermoreceptive labial pits. Adapted to burrowing, the body is cylindrical with a blunt head and a blunt tail. The head is covered with enlarged shields. As mentioned, the shape of the tail closely resembles that of the head which may be a defensive adaptation, meant to confuse an attacker. The body is muscular and strong. The eyes are relatively small and usually a dark reddish-brown color. The pupil is round. Adults are less than a metre long in total length.

The color pattern consists of a dark brown or black ground color speckled with red, yellow and/or grayish spots. The tail may be ringed or have a partial ring of bright white scales. This ring of scales are assumed to exist to confuse attackers and draw attention away from its head. The smooth dorsal scales are arranged in 29 to 32 midbody rows. There are 221-239 ventrals. The anal plate is single. The subcaudals are 20-28, also all single.

**Distribution:** They are found in west and central Africa.

**Content:** *Calabaria* Gray, 1858

#### FAMILY ERYCIDAE BONAPARTE, 1831

**Terminal Taxon:** *Anguis jaculus* Linnaeus, 1758 (now known as *Eryx jaculus*)

**Content:** *Eryx* Daudin, 1803; *Pseudogongylophis* Tokar, 1989.

#### FAMILY UNGALIOPHIIDAE WILCOX ET AL. 2002

**Terminal taxon:** *Ungaliophis continentalis* Müller, 1880

**Content:** *Ungaliophis* Müller, 1880; *Exilioboa* Bogert, 1968; *Lichanura* Cope, 1861; *Charina* Gray, 1849.

#### SUBFAMILY UNGALIOPHIINAE WILCOX ET AL. 2002

**Terminal taxon:** *Ungaliophis continentalis* Müller, 1880

**Content:** *Ungaliophis* Müller, 1880; *Exilioboa* Bogert, 1968.

#### SUBFAMILY CHARININAE COPE, 1900

**Terminal taxon:** *Tortrix bottae* Blainville, 1835 (now known as *Charina bottae*).

**Content:** *Charina* Gray, 1849; *Lichanura* Cope, 1861.

#### NEW FAMILY CANDOIDAE FAM. NOV.

**Terminal taxon:** *Boa carinata* Merrem, 1820 (Now known as *Candoia carinata*)

**Diagnosis:** As for the genus *Candoia*.

In all Booidea the supraorbital (postfrontal) bone is absent (a ligament taking the place of the lateral edge of the supraorbital bone of Pythonoidea); the medial process of the maxilla is connected to the anterior end of the pterygoid in the relaxed position of the jaws except in the Madagascar genus *Acrantophis*. All Booidea are live-bearers, as opposed to egg laying in the pythons.

The family Candoiidae is separated from all other boas by the peculiar flat rostral that gives the snout an angular profile. The folds that divide each lobe of the hemipenis into a sulcal and an absulcal field are another unique (in Booidea) feature. The overlap of the nasals upon the frontal bones separates this family from the subfamily Corallinae.

Also diagnostic of the *Candoiidae* among the Booidea are the strongly keeled dorsal scales.

McDowell (1979) gives a detailed description of the three species groups, including numerous diagnostic characters, that conform to the subgenera listed below, although he did not recognize them as subgenera or genera. The resurrection of the available names to recognize these subgenera is a conservative position. McDowell (1979) wrote: "*Candoia* contains three species, all strongly defined both internally and externally (the characters separating the species of *Candoia* are perhaps more clear-cut than those separating the genera of Pythoninae)."

**Distribution:** The general region of the tropical West Pacific.

**Content:** *Candoia* Gray, 1842.

**Comments:** The genus *Candoia* includes the subgenera *Candoia* Gray, 1842 for the *carinata* group of three species,

namely *Candoia carinata* (type species *Candoia*) (two subspecies recognized), *Candoia paulsoni* (Stull, 1956) (6 subspecies), *Candoia superciliosa* (Günther, 1863) (2 subspecies); *Tropidoboa* Hombron and Jaquinot, 1842 for the *bibroni* group of one species (including two subspecies) and *Erebophis* Günther, 1877 for the *aspera* group of one species and three subspecies including that formally described within this paper as *Candoia aspera iansimpsoni* sp. nov.).

#### NEW TRIBE CANDOIDIINI TRIBE NOV.

**Terminal taxon:** *Boa carinata* Merrem, 1820 (Now known as *Candoia carinata*)

**Diagnosis:** As for the genus *Candoia*.

In all Booidea the supraorbital (postfrontal) bone is absent (a ligament taking the place of the lateral edge of the supraorbital bone of Pythonoidea); the medial process of the maxilla is connected to the anterior end of the pterygoid in the relaxed position of the jaws except in the Madagascar genus *Acrantophis*. All Booidea are live-bearers, as opposed to egg laying in the pythons.

The family Candoiidae and the tribe Candoiini are separated from all other boas by the peculiar flat rostral that gives the snout an angular profile. The folds that divide each lobe of the hemipenis into a sulcal and an absulcal field are another unique (in Booidea) feature. The overlap of the nasals upon the frontal bones separates this family from the subfamily Corallinae.

Also diagnostic of the *Candoiidae* among the Booidea are the strongly keeled dorsal scales.

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While it may be deemed premature to erect a monotypic tribe, in the event that *Candoia* as presently recognized is ultimately split by others into three genera, the tribe designation will serve to unite them all to reflect their relationship to one another.

#### NEW FAMILY ACRANTOPHIIDAE FAM. NOV.

**Terminal taxon:** *Acrantophis dumerili* Jan, 1860.

**Diagnosis:** Physically and superficially, species within this family appear much like other Booidea.

Males in this family are readily separated by their unique hemipenal morphology, not seen in other Booidea families. The hemipenis in the genus *Sanzinia* Gray, 1849 extends for 7 to 9 subcaudals, is forked for 2-3 subcaudals and has the sulcus forked for one third to half its length; the ornamentation is formed entirely of calyces, with numerous small rhombic calyces distally, but with the proximal calyces enlarged and their longitudinal wall reduced, thus forming transverse flounces. In *Acrantophis* Jan, 1860 the hemipenis is similar, but with some flap-shaped papillae adjacent to the sulcus distal to its furcation, and all the calyces are so coarse as to be flounce-like.

In all species in this family, the lower jaw is constructed much as

is seen in the Pythonidae, except that is in other Booidea the Meckelian cartilage is confined to its channel in the dentary and does not extend freely onto the skin of the mental region; the angular and coronoid articulate with the posterior edge of the spenal.

Both genera within the family Acrantophiidae have a chromosome count of 34, versus 36 in all other Booidea.

**Distribution:** Madagascar.

**Content:** *Acrantophis* Jan, 1860; *Sanzinia* Gray, 1849.

**TRIBE ACRANTOPHIINI TRIBE NOV.**

**Terminal taxon:** *Acrantophis dumerili* Jan, 1860.

**Diagnosis:** The tribe diagnosis is the same as for the family. Physically and superficially, species within this family appear much like other Booidea.

Males in this tribe and family are readily separated by their unique hemipenial morphology, not seen in other Booidea families. The hemipenis in the genus *Sanzinia* Gray, 1849 extends for 7 to 9 subcaudals, is forked for 2-3 subcaudals and has the sulcus forked for one third to half its length; the ornamentation is formed entirely of calyces, with numerous small rhombic calyces distally, but with the proximal calyces enlarged and their longitudinal wall reduced, thus forming transverse flounces. In *Acrantophis* Jan, 1860 the hemipenis is similar, but with some flap-shaped papillae adjacent to the sulcus distal to its furcation, and all the calyces are so coarse as to be flounce-like.

In all species in this family, the lower jaw is constructed much as is seen in the Pythonidae, except that is in other Booidea the Meckelian cartilage is confined to its channel in the dentary and does not extend freely onto the skin of the mental region; the angular and coronoid articulate with the posterior edge of the spenal.

Both genera within the tribe Acrantophiini have a chromosome count of 34, versus 36 in all other Booidea.

**Distribution:** Madagascar.

**Content:** *Acrantophis* Jan, 1860; *Sanzinia* Gray, 1849.

**ACRANTOPHIS SLOPPI SP. NOV.**

**Holotype:** A specimen at the Field Museum of Natural History (FMNH), 1400 S Lake Shore Dr Chicago, IL 60605, United States, specimen number: 109900 from Toliara (Formerly Tulear), Madagascar, 23.3500° S, 43.6667° E, collected by Harry Hoogstraal and R. Alison on 30 October 1948. This is a government owned facility that allows access to researchers.

**Diagnosis:** Formerly regarded as the more northern race of the species *Acrantophis dumerili* from which it is separated by several characteristics.

*Acrantophis dumerili* Jan, 1860 is separated from all other species of boa by the following suite of characters. The snout is slightly prominent. The rostral is a little broader than deep and not visible from above. Symphyial is longer than broad; upper surface of head is covered with small scales which are not larger than those on the body; 11-16 scales across the forehead, from eye to eye and usually as many around the eye; praecocular large; several slightly enlarged loreals; 17-19 upper labials. Scales in 59-65 rows. Ventrals 225-236; anal single, 20-33 subcaudals. The colour is usually a pale grey above, with two longitudinal series of black spots emitting a transverse process above, a hoop-shaped figure below; these markings may be disposed regularly in pairs and unite by their transverse processes, or alternately; two or three black streaks on each side behind the eye, the lower continued in front of the eye to the nostril; a black cross line or ring on the forehead between the eyes; lower parts whitish, uniform or spotted with brown. Never exceeds 2 metres in total length, with a tail not in excess of 110 mm.

*Acrantophis sloppi* sp. nov. is most readily separated from *A. dumerili* by the following characteristics: *Acrantophis sloppi* sp. nov. is considerably darker in colouration as compared to *A.*

*dumerili*. In *A. dumerili* the lighter regions are considerably greater than the darker along the mid dorsal line. In *A. sloppi* sp. nov. the lighter colouration is roughly equal to the dark, usually being only slightly more than half, this being due to a distinct darkening of the main parts of the lighter areas. In *A. dumerili* the lighter areas dorsally only have slight dark speckling on the scales.

*A. sloppi* is perhaps best separated from *A. dumerili* (as diagnosed above) by the less distinct head markings. The distinctive thick black line, running from the tip of the snout, across the bottom of the eye and to the back of the head in *A. dumerili* is not seen in *A. sloppi*. In *A. sloppi*, there is no distinct line running from the snout through the eye, although there is sometimes some noticeable and patchy darkening of some scales in this general area, although not forming a line. Behind the eye, the line is thin, before thickening towards the back of the head. By contrast in *A. dumerili* this line is of relatively even thickness and very distinct from the eye to the back of the head. *Acrantophis sloppi* sp. nov. has at least some upper labials with black spots so large as to occupy the entire scale. While there may be dark spots on upper labials in *A. dumerili*, they do not reach the same size as in *A. sloppi* and do not ever cover a full labial.

*Acrantophis sloppi* sp. nov. grows considerably larger than *A. dumerili*, with specimens exceeding 2.7 metres total length known, and of considerably greater bulk and mass than seen in *A. dumerili*. It is the largest of the Ground Boa species in Madagascar, also exceeding *A. madagascariensis* in adult size.

The species *A. madagascariensis* from northern Madagascar is most readily separated from *A. sloppi* and *A. dumerili* by the presence of enlarged head shields at the front of the head (size range being small/medium and large), a trait not seen in either of the other species. Both *Acrantophis sloppi* sp. nov. and *A. dumerili* have small, often irregular head shields at the front of the head.

**Distribution:** *Acrantophis sloppi* is found in most of the southern half of Madagascar, except for the far south, in the general region of Ambovombe, Berenty and Taolagnaro, where it is replaced by the species *A. dumerili*. The type locality is on the south-west coast of Madagascar.

**Etymology:** Named in honour of the Raymond Hoser family pet Great Dane, named Slop, in recognition of his role in protecting the home and facility of Snakebusters from criminal attacks by animal hating individuals, including corrupt government wildlife officers, hiding behind a government protective umbrella to commit criminal acts for their own financial benefit. The attacks on our facility have several sources, including a desire to silence and discredit the Hoser family, after the publication of books detailing this corrupt activity over a period spanning decades.

In response to troll posts from the animal hating morbidly obese Al Coritz of the United States of America and the little angry man Mark O'Shea from the UK, both being best known for attacking innocuous snakes with metal tongs, I make no apologies for being an animal lover or for naming a species of snake in honour of an animal of a different taxon, who happens to share the same delicate planet with us.

**CANDOIA (EREBOPHIS) ASPERA IANSIMPSONI SUBSP. NOV.**

**Holotype:** A specimen in the Australian Museum of Sydney, NSW, Australia (AMS), specimen number R122352 from the southern highlands of New Guinea. The Australian Museum is a government owned facility that allows scientists access to their collections.

**Paratypes:** Number one: A specimen in the Australian Museum of Sydney, NSW, Australia (AMS), specimen number R122353 from the southern highlands of New Guinea. The Australian Museum is a government owned facility that allows scientists access to their collections.

Number 2: A female, specimen number 59078 from Matsika,



Central Province, New Guinea, at the American Museum of Natural History (AMNH). The American Museum of Natural History is a government owned facility that allows scientists access to their collections.

Number 3: A female, specimen number 59079 from Matsika, Central Province, New Guinea, at the American Museum of Natural History (AMNH). The American Museum of Natural History is a government owned facility that allows scientists access to their collections.

**Diagnosis:** Until now, *Candoia aspera iansimpsoni* subsp. nov. has been identified as a variant of *Candoia aspera* Günther, 1877.

*Candoia aspera* is separated from all other *Candoia* species by the following suite of characters: The tail is less than twice as long as the head (usually less than its length), and it is incapable for forming a full circle when coiled in a level plane; on at least the anterior two thirds of the body the keels of the scales form curved diagonal ridges along the sides extending backwards and downwards towards the belly; 137-150 ventrals; 11-22 subcaudals; no specially enlarged preocular; supralabials are excluded from the eye; canthus rostralis is angular.

By contrast all other *Candoia* have a tail more than twice as long as the head and capable of more than one complete circle of coiling when coiled in a level plane; keels of scales forming lengthwise ridges along the back and sides parallel to the body axis; over 160 ventrals; 35 or more subcaudals and a differentiated preocular.

In the *bibrioni* species group (*Tropidoboa* Hombron and Jaquinot, 1842), the supralabials are excluded from the eye; canthus rostralis is rounded, 203-266 ventrals and 44-67 subcaudals. In the *carinata* species group (*Candoia* Gray, 1842), there are usually two, but sometimes one or three supralabials entering the eye, canthus rostralis is angulate, 160-202 ventrals and 35-60 subcaudals.

*Candoia aspera iansimpsoni* subsp. nov. is separated from other *Candoia aspera* by the following suite of characters: 12-17 infralabials, none of which reach the mental groove. A dorsal colouration consisting of one of either extreme; a series of lateral dark spots, tending to form vertical bars, which may be separated from dorsal blotches, or by the dorsal blotches fusing over all or most of the body to form dorsal cross-bands. A dark perocular streak extends forward from the side of the neck to the eye, with pale ventral edging but no dorsal edging; in darker headed specimens the perocular streak merges with the ground colour but the pale ventral edge is usually distinguishable as a white mark near the corner of the mouth. There is also an additional dark spot or stripe on the parietal region between the nuchal occipital blotch and the perocular streak. The lips usually have inconspicuous spotting.

The subspecies *Candoia aspera schmidtii* (Stull, 1932) is separated from *Candoia aspera iansimpsoni* subsp. nov. by colouration with the dorsal pattern of blotches appearing as saddles in *Candoia aspera schmidtii* (Stull, 1932) rather than cross-bands as seen in *Candoia aspera iansimpsoni* subsp. nov.

The subspecies *Candoia aspera aspera* Günther, 1877 is separated from both other subspecies (*Candoia aspera schmidtii* (Stull, 1932) and *Candoia aspera iansimpsoni* subsp. nov.) by scale counts. *Candoia aspera aspera* has 37-41 mid body rows, versus 34-37 in the other two subspecies, 149-150 ventrals versus 137-148 in the other two subspecies.

**Distribution:** The three subspecies have mutually exclusive ranges. *Candoia aspera iansimpsoni* subsp. nov. is known only from the region of Island New Guinea south of the main central cordillera in the region including the Western, Gulf and Central Provinces. *Candoia aspera schmidtii* occurs in the region of island New Guinea north of the main central cordillera, while *Candoia aspera aspera* is found in New Ireland, to the north of New Guinea. The exact boundaries separating each of the subspecies is not known.

**Etymology:** Named in honour of British scientist Ian Simpson in recognition of his valuable work with venomous snakes in third world countries, and the treatment of venomous snake bites.

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**CONFLICT OF INTEREST**

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

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# Further division of the genera *Boiga* Fitzinger, 1826 and *Chrysopelea* Boie, 1826, with the creation of a new tribe, a new genus and a new subgenus.

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## ABSTRACT

For many years, the genus *Boiga* Fitzinger, 1826 has been regarded as a catch-all for similar and obviously related snakes, some quite morphologically different from one another and also at times widely separated by distribution.

Meirte (1992) divided *Boiga sensu lato* by removing the African species and placing them in the resurrected genus *Toxicodryas* Hallowell, 1857. Hoser 2012 followed this move and created new genera for two distinctive Asiatic groups, namely *Dorisius* Hoser, 2012 and *Mulvanyus* Hoser, 2012, also resurrecting the genus *Dipsadomorphus*, Fitzinger, 1843.

This paper follows on from the earlier ones and removes the species *Boiga kraepelini* Stejneger, 1902 from *Boiga* and places it within a monotypic genus, namely *Slopboiga* gen. nov.

All species formerly placed within the genus *Boiga sensu lato*, are herein placed within a new tribe to accommodate the component genera, now numbering six.

The most divergent member of the Flying snake genus *Chrysopelea* Boie, 1826, namely *Chrysopelea taprobanica* Smith, 1943, is herein placed in a new subgenus.

**Keywords:** Taxonomy; *Boiga*; *Chrysopelea*; new tribe; Boigaiini; new genus; *Slopboiga*; new subgenus; *Wellsserpens*.

## INTRODUCTION

Hoser (2012) established that *Boiga* was a clearly composite genus in urgent need of major taxonomic review.

This paper continues the somewhat piecemeal review process of the genus.

This was most recently commenced by herpetologists such as Meirte (1992).

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 sensu 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* as it was known in 2011 (now *Dorisius*

*dendrophila*), is not the type species of the genus *Boiga*, it was safe to infer a similar result would have been obtained by Pyron *et al.* if they had tested Australian *Boiga irregularis* against African *Boiga pulverulenta*.

What had not yet been determined by molecular means was the differences between the Asiatic and Australian species groups within *Boiga* or for that matter differences between the various Asiatic groups.

Hoser (2012) noted that what's left of *Boiga* after the two *Toxicodryas* were removed was 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.

As a result, Hoser (2012) removed two well defined species groups and placed them within their own new genera.

The species *Boiga dendrophila* was placed in a monotypic genus *Dorisius* gen. nov.

The highly divergent so-called *Boiga drapiezii* group, including species both described and undescribed were placed in the genus *Mulvanyus gen. nov.*

The taxonomic position of the remainder remains generally unclear due to 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 genera created by Hoser (2012) 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 now identified.

*Coluber irregularis* Bechstein, 1802, now widely known as *Boiga irregularis* is the type species of the genus *Boiga* Fitzinger. The name *Ibiba* Gray, 1825, was suppressed under the plenary powers in ICZN Opinion 1374, and has been placed on the Official Index of Rejected and Invalid Generic Names in Zoology.

Hoser 2012 stated the obvious when he wrote: "Genus *Dipsadomorphus* Fitzinger, 1843 appears to be a valid name for the type species *Coluber trigonatus* Schneider, 1802, now known widely as *Boiga trigonatus*."

This statement has in fact been further validated by a more recent molecular study by Pyron *et al.* published in 2013 (Pyron *et al.* 2013).

Hoser 2012 noted that "*Boiga trigonatus*" as then known was divergent from other members of *Boiga sensu lato*, including the type species for *Boiga*, namely *B. irregularis*.

This statement has also been further validated by the recent molecular study by Pyron *et al.* published in 2013 (Pyron *et al.* 2013).

One species shown as divergent in molecular studies (Pyron *et al.* 2013) is the Taiwanese taxon, *Boiga kraepelini* Stejneger, 1902.

Reference to live and dead specimens of the species also shows it to be sufficiently divergent from the rest of *Boiga* morphologically to warrant being placed within its own monotypic genus.

As a result, this taxon is placed in a new genus *Slopboiga gen. nov.* named according to the Zoological Code (Ride *et al.* 1999).

While the genus *Boiga sensu 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), Das and De Silva (2005), 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 (2012a), Smith (1943), Taylor (1923, 1965), Tillack (2006b), Tillack *et al.* (2004), van Rooijen and van Rooijen (2004), Vidal *et al.* (2007), Vogel (1994, 2000), Wall (1908b, 1909, 1921a, 1921b), Wen (1998), Werner (1899a, 1899b) Whittaker and Captain (2004) and Zhao and Adler (1993).

The so-called Flying Snakes, of the genus *Chrysopelea* Boie, 1826 are well known throughout wetter parts of southern Asia. Within the group of five described species, four form a natural grouping.

The fifth is quite morphologically different, with obvious differences in that species *Chrysopelea taprobanica* Smith, 1943 including a distinct keeling in the dorsal scales, consistent colour pattern differences and consistent differences in scalation.

In combination these are substantial and warrant taxonomic recognition above the level of species.

As a result, *Chrysopelea taprobanica* Smith, 1943 is herein (below) placed in a new subgenus, described in accordance with the Zoological Code (Ride *et al.* 1999).

Relevant papers in terms of species within *Chrysopelea* Boie, 1826 include: Auliya (2006), Boie (1827), Boistel *et al.* (2001), Bong Heang (1987), Boulenger (1890, 1894), Brongersma (1933), Brown *et al.* (1996), Bulian (1997), Chanard *et al.* (1999), Cox *et al.* (1998), David and Vogel (1996), de Lang and Vogel (2005), Devan-Song and Brown (2012), Dowling and Jenner (1998), Duméril *et al.* (1854), Ferner *et al.* (2000), Fischer (1880), Gaulke (1986, 1994, 2011, 2012), Geissler *et al.* (2001), Grismer, *et al.* (2002, 2007, 2008, 2010), Grossmann and Schäfer (2001), Grossmann and Tillack (2001a, 2001b, 2004), Ingle (2010), Iskander and Erdelen (2006), Kannan (2006), Karunarathna Suranjan and Thasun Amarasinghe (2011), Kopstein (1926), Leviton (1964), Lim and Ng (1999), Linnaeus (1758), Mahony *et al.* (2009), Malkmus (1985), Malkmus *et al.* (2002), Manthey and Grossmann (1997), Murthy (2010), Pauwels *et al.* (2000, 2003), Purkayastha *et al.* (2011), Pyron *et al.* (2011, 2013), Quah *et al.* (2011), Sang *et al.* (2009), Schmidt (2012b), Sharma (2004), Shaw (1802), Smith (1943), Stuart and Emmett (2006), Taylor (1965), Teo and Rajathurai (1997), Thompson (1913), Tillack (2006a), Tweedie (1950, 1954), van Rooijen and van Rooijen (2007), Vyas (2007), Wall (1907, 1908a, 1921) Wanger *et al.* (2011), Werner (1925), Whitaker and Captain (2004), Zhao and Adler (1993), Ziegler *et al.* (2007) and Zug *et al.* (1998).

#### NEW TRIBE BOIGAIINI TRIBE NOV.

(Terminal taxon: *Coluber irregularis* Bechstein, 1802)

**Diagnosis:** The tribe *Boigaiini* is defined herein as 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, 19-27 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, except for those species within the genus *Slopboiga gen. nov.* (described herein), 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 with the species.

All are oviparous.

The genus *Slopboiga gen. nov.* described below and within this tribe, conforms to the above description save for the following traits: having a divided anal and a scarcely enlarged vertebral scale series, as well as very short posterior chin shields and numerous small temporals.

**Distribution:** Africa, southern Asia and through nearby islands to include Australasia.

**Content:** *Boiga* Fitzinger, 1826, *Dipsadomorphus* Fitzinger, 1843; *Dorisius* Hoser, 2012; *Mulvanyus* Hoser, 2012; *Slopboiga gen. nov.* (this paper); *Toxicodryas* Hallowell, 1857.



**NEW GENUS SLOPBOIGA GEN. NOV.****Type species:** *Boiga kraepelini* Stejneger, 1902.

**Diagnosis:** *Slopboiga gen. nov.* is readily separated from species within the genus *Boiga* Fitzinger, 1826 as defined herein by having a divided anal and a scarcely enlarged vertebral scale series, as well as very short posterior chin shields and numerous small temporals.

The monotypic genus is further defined by the following suite of characters: Anterior palatine teeth enlarged; diameter of eye equals its distance from anterior border of nostril; upper preocular extending to upper surface of head but separated widely from frontal; scales in 21 midbody rows, median row scarcely enlarged; ventrals 232-245; anal plate divided; subcaudals 142-143 all divided; posterior chin-shields much shorter than the anterior; temporals 4-5, scale-like, irregular.

*Boiga* Fitzinger, 1826 is defined herein as 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 between the species. All are oviparous.

I also diagnose the similar genera *Dorisious* Hoser, 2012 and *Mulvanyus* Hoser, 2012 within noting these were formerly placed within *Boiga* and would be included in that genus on the basis of the diagnosis above, in the absence of further information given herein below: *Dorisious* Hoser, 2012 is 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* Hoser, 2012).

In *Dorisious* there are 78-110, subcaudals versus over 112 for *Boiga* species (and *Mulvanyus*).

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*, *Dorisious* retains large eyes, smooth dorsal scales, single anal, all divided subcaudals and has an enlarged vertebral row of scales.

This genus *Dorisious* is presently monotypic for the species *Dorisious dendrophila* (Boie, 1827) including recognized subspecies, however some of the currently recognized subspecies may ultimately prove to be full species.

*Mulvanyus* Hoser, 2012 are a long vine-like snake with strongly laterally compressed body shape vertebral ridge, large head shields and vertical pupils.

*Mulvanyus* are separated from snakes of the genus *Boiga* and *Dorisious* 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 of *Mulvanyus* 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:** Taiwan, as well as China (incl. Hainan. westward to Sichuan and Guizhou), North Vietnam and Laos.

**Etiology:** Named in honor of our Great Dane named "Slop", who has guarded the research facility at Snakebusters, Victoria, Australia from thieves and trolls.

**CHRYSOPELEA BOIE, 1826.**

**Type species:** *Coluber Ornatus* Shaw, 1802

**Diagnosis:** The so-called flying snakes from southern Asia are a distinctive group of usually brightly coloured snakes. An individual snake will glide by using its ridge scales along its belly, pushing against rough bark surfaces of tree trunks, allowing it to move vertically up a tree. Upon reaching the end of a tree's branch, the snake continues moving until its tail dangles from the branch's end. It then makes a J-shape bend, leans forward to select the level of inclination it wishes to travel to control its flight path, as well as selecting a desired landing area. Once it decides on a destination, it propels itself by thrusting its body up and away from the tree, sucking in its stomach, flaring out its ribs to turn its body in a "pseudo concave wing" while simultaneously making a continual swaying movement of lateral undulation more-or-less parallel to the ground to stabilize its direction in midair flight so as to safely land. The combination of sucking in its stomach and making a motion of lateral undulation in the air allows the snake to glide in the air, where it also manages to save energy compared to travel by crawling on the ground and to potentially avoid terrestrial predators. The concave wing that a snake creates in sucking its stomach, flattens its body to up to twice its width from back of the head to the anal vent, which is close to the end of the snake's tail, causes the cross section of the snake's body to resemble the cross section of a flying disc. The cross sectional concavity causes increased air resistance under the centre of the snake, causing lift for the snake to glide (or "fly"). The snake continuously moves in lateral undulation to create an enhanced effect of increased air pressure underneath its arched body to glide. While the ultimate destination of the snake is best predicted by ballistics they do have some control over where they go and land, determined by in air movement.

These snakes are mildly venomous colubrids, not regarded as dangerous to humans.

Five species from the genus have been described, although one of these is only known from a single specimen.

The snakes in this genus are diagnosed as follows:

All are long and slender in build, head wider than the neck. The head shape is spatulate and with a depressed snout. The eyes are large and the pupil is round. There are 9 supralabials with the fourth, fifth and sixth touching the eyes. There are 17 mid-body scale rows and the dorsal scales are smooth, except in the species *taprobanica* where they are keeled (see below). There are 198-234 ventrals, 107-138 subcaudals and the ventral and subcaudal scales have distinctive lateral keels. 20-22 maxillary teeth, 3 and 4 being partly grooved.

**Distribution:** Southern Asia.

**SUBGENUS WELLSSERPENS SUBGEN. NOV.**

**Type species:** *Chrysopelea taprobanica* Smith, 1943.

**Diagnosis:** This is a monotypic subgenus for the type species. It is similar in most respects to the others in the genus.

However *Wellsserpens subgen. nov.* are most easily separated from other *Chrysopelea* by having the last ventral shield undivided. In all other *Chrysopelea* the last ventral shield is divided.

The species *Wellsserpens taprobanica* has noticeably keeled dorsal scales, unlike in the other species of *Chrysopelea*, where keeling at best is only slight.

*Wellsserpens subgen. nov.* lack orange or red rosettes, which is diagnostic for all other *Chrysopelea* meaning it does not usually present as such an attractive snake.

The coloration of the species *taprobanica* is unlike that of other *Chrysopelea*. In *Wellserspens* the color is light olive-brown above, with narrow, wavy, black cross-bars; a black spot on each ventral shield outside the lateral keel; subcaudals are not spotted below.

The head is much the same colour as seen in all other *Chrysopelea*.

**Distribution:** Sri Lanka.

**Etymology:** Named in honour of Australian taxonomist, Richard Wells, formerly of Cowra, NSW and now of Lismore, NSW, Australia.

**Content:** *Chrysopelea (Wellserspens) taprobanica* Smith, 1943.

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#### CONFLICT OF INTEREST

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



# Making sense of the mess ... A new and workable sea-snake taxonomy with nomenclature to match!

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## ABSTRACT

The taxonomy of the sea snakes (Hydrophiinae) has been unstable since the Linnaean system of classification started.

Notwithstanding the advent of new molecular methods of analysis and many of the relationships between species being accurately resolved, the taxonomy and nomenclature of the group has remained in heated dispute. In the wake of this, at one extreme has been the erection of new genera and even families to accommodate morphologically divergent forms (Wells 2007).

At the other end of the spectrum has been a mass merging of genera as a result of recently published phylogenies that consistently show a very recent radiation of often morphologically distinct species (e.g. Sanders *et al.* 2008, Ukuwela *et al.* 2012).

Seeking consistency of taxonomy and nomenclature, the majority of herpetologists have in most recent years reclassified the sea snakes along phylogenetic lines. The result is the merging of the majority of genera, most notably a broad group consisting most species into the single genus *Hydrophis* Latreille, 1801.

While agreeing that the taxonomy should reflect the phylogeny, morphological affinities can in the majority of cases still be reflected by the use of subgroups within the newly enlarged genera and employing suitable nomenclature.

I hereby offer a sensible solution for dealing with the problem and in compliance with the Zoological Code (Ride *et al.* 1999).

To that end I propose the recognition of these morphologically divergent groups at subgenus level when the phylogenies allow this.

As a result, I also formally name a new subgenus for a highly divergent lineage within the major sea-snake genus *Hydrophis* Latreille, 1801.

**Keywords:** Taxonomy; nomenclature; sea snakes; *Hydrophis*; new; subgenus; *Crottyhydrophis*; species; *donaldi*.

## INTRODUCTION

The taxonomy of the sea snakes (Hydrophiinae) has been unstable since the Linnaean system of classification started.

Notwithstanding the advent of new molecular methods of analysis and many of the relationships between species being accurately resolved, the taxonomy and nomenclature of the group has remained in heated dispute.

In the wake of this, at one extreme has been the erection of new genera and even families to accommodate morphologically divergent forms (Wells 2007).

At the other end of the spectrum has been a mass merging of genera as a result of recently published phylogenies that consistently show a very recent radiation of often morphologically distinct species (e.g. Sanders *et al.* 2008, Ukuwela *et al.* 2012).

As of 2013, the backlash against division of larger genera has at times become irrational, even when the molecular evidence supports such splits. One small group of so-called herpetologists have even seen fit to step outside the zoological code (Ride *et al.* 1999) and demand a mass-boycott of valid names (Kaiser 2012a, 2012b, Kaiser *et al.* 2013), their claims and ideas being totally discredited by Hoser (2012a).

Seeking consistency of taxonomy and nomenclature, the majority of herpetologists have reclassified the sea snakes in the past decade along phylogenetic lines. The result is the merging the majority of genera, most notably a broad group consisting most species into the single genus *Hydrophis* Latreille, 1801.

Notable exceptions to this trend have been Kharin (2004) and Wells (2007).

While agreeing that the taxonomy should reflect the phylogeny,

morphological affinities can in the majority of cases still be reflected by the use of subgroups within the newly enlarged genera and employing suitable nomenclature.

I hereby offer a sensible solution for dealing with the problem and in compliance with the Zoological Code (Ride *et al.* 1999). To that end I propose the recognition of these morphologically divergent groups at subgenus level when the phylogenies allow this.

Kharin (2004) and in other papers has actually taken steps in this regard, but his taxonomic actions have been largely ignored by others.

Wells (2007) has published a reclassification based effectively entirely on morphological differences between the living sea snakes and with no apparent regard for the known phylogenies between the given species as confirmed by molecular means.

As a result, I don't agree with the taxonomic and nomenclatural proposals of Wells (2007), a point I stress herein. This is done noting the repeated allegations by a pseudo-taxonomist Mr Wolfgang Wüster, that I have an "uncritical acceptance of the arrangements of Wells" (Wüster 2001, Wüster *et al.* 2001a).

Another problem facing taxonomists dealing with Sea Snakes in particular has been the massive number of generic names proposed for the various species and species groups.

As a result, and when allowing for known phylogeny, there are clearly many groups for which numerous subgeneric names are available.

Cogger *et al.* (1983) list most of the Australian synonyms available for these various groups, while most of the rest are detailed by Uetz (2013).

In terms of the most speciose genus *Hydrophis*, a number of authors have described it as 'a taxonomic parking place for species whose relationships are not yet understood' (Greer, 1997, Lukoschek and Scott Keogh 2006).

However in light of the more recent evidence of Sanders *et al.* (2008), that shows that the entirety of *Hydrophis sensu lato* diverged from the land-dwelling elapid genera of Australia less than 10 million years before present, the case for retaining *Hydrophis* as a single genus is strong.

To do so would maintain taxonomic and nomenclatural consistency across snake groups, noting a general reluctance to create new genera for species groups with less than a 10 million year divergence.

I do note however that there is no "official" time frame given for diagnosing of genera, with more primitive snakes (e.g. Typhlopids) generally having genera defined at considerably older divergence dates (Hoser 2012b).

However there seems to be no well-established criteria for establishing and using subgenera in terms of divergence dates. The only criteria it seems for separating subgenera is that of splitting apart separate but like species and groups from one another, as in species-groups not sufficiently divergent to warrant being placed in separate genera.

On this basis, it makes eminent sense to continue to recognize *Hydrophis sensu lato* as a single genus, while at the same time dividing *Hydrophis* into subgenera when there are obvious species groups (of which there are many).

Within the known *Hydrophis* subgroups, is one recently described and highly divergent lineage that does not have any genus or subgenus name available. This is the species *Hydrophis donaldi* Ukuwela, Sanders and Fry, 2012, shown by their published phylogeny, to be the most divergent species within the expanded genus *Hydrophis sensu lato* (see their fig 3).

This molecular divergence is also corroborated by morphological divergence making it a highly derived taxon and a candidate for placement into a new subgenus.

As a result, I also formally name a new subgenus for this highly divergent lineage in compliance with the Zoological Code (Ride

*et al.* 1999).

There are many important taxonomic papers of note on sea snakes, including the extensive list published by Wells (2007), not republished here.

However some key publications include the following: Boulenger (1996), Burger and Natsuno (1974), Cadle and Gorman (1981), Cadle and Gorman (1981), Cogger (1975, 2000), Cogger *et al.* (1983), Golay (1985), Gopalakrishnakone and Kochva (1990), Greer (1997), Heatwole (1999), Heatwole and Cogger (1994), Hutchinson (1990), Mao *et al.* (1983), McCarthy (1985, 1986), McCosker (1975), McDowell (1969, 1970, 1972, 1974), Minton (1975), Minton and da Costa (1975), Nock (2001), Rasmussen (1994-1997, 2002), Sanders and Lee (2008), Sanders *et al.* (2008), Schwaner *et al.* (1985), Scott Keogh (1998), Scott Keogh *et al.* (1998, 2000, 2005), Shine (1991), Slowinski and Scott Keogh (2000), Slowinski *et al.* (1997), Smith (1926), Smith *et al.* (1977), Ukuwela *et al.* (2012), Voris (1966, 1972, 1977) Voris and Voris (1983) and Wells (2007).

#### **CROTTYHYDROPHIS SUBGEN. NOV.**

**Type species:** *Hydrophis donaldi* Ukuwela, Sanders and Fry, 2012.

**Diagnosis:** The diagnosis for the monotypic subgenus is as for the species.

*Hydrophis donaldi* Ukuwela, Sanders and Fry, 2012 is distinguished from all other *Hydrophis* species except *H. coggeri*, *H. sibauensis* and *H. torquatus diadema* by the following combination of characters: ventrals not divided by a longitudinal furrow, 29-30 costal scale rows around neck, 33-35 costal scales around body, 6-7 maxillary teeth behind fang on each side, 246-288 ventrals (Rasmussen *et al.* 2001, Smith 1926). The new species differs from *H. coggeri* by having 47-56 (versus 30-42) bands on the body and tail, strongly spinous (versus feebly carinate) body scales, 246-288 (versus 280-360) ventrals, relatively larger and rounded (versus smaller, elongate) head, and anterior part of the maxilla not arched upwards and the tip of the fang projecting below the level of the maxillary teeth (see also Fig 1D Ukuwela *et al.* 2012) (versus anterior part of the maxilla arched upwards and tip of fang not projecting below the level of the maxillary teeth) (Cogger 2000). *Hydrophis donaldi* Ukuwela, Sanders and Fry, 2012 differs from *H. sibauensis* by a higher number of scale rows around the neck 29-30 (versus 25-26 in *H. sibauensis*) and strongly spinous (versus feebly carinate) body scales (Rasmussen *et al.* 2001). *Hydrophis donaldi* Ukuwela, Sanders and Fry, 2012 differs from *H. torquatus diadema* by a lower midbody scale count (33-35 versus 35-42 in *H. torquatus diadema*) and strongly spinous (versus feebly carinate) body scales (Smith 1926) (Ukuwela *et al.* 2012).

*Hydrophis donaldi* can be assigned to the genus *Hydrophis* (Smith 1926; McDowell 1972; Cogger 2000) based on the following characters: fewer than 73 scale rows around body, single rostral shield, nasals not separated from internasals, more than four supralabials, ventrals small and not broader anteriorly than posteriorly, mental shield broader than long, shorter head without a bill like snout, shorter gape, ventrals entire, no spines on head shields, preocular scales present, maxillary bone not extending forward beyond the palatine, fang followed by a diastema (see also Fig 1D Ukuwela *et al.* 2012), ventrals distinct throughout the body and not enlarged compared to the dorsal scale rows, ventral scales not broader than twice the adjacent body scales and more than 24 scales around the thickest part of the body (Ukuwela *et al.* 2012).

**Distribution:** Currently only known from the Weipa area, on the Gulf of Carpentaria, Queensland, Australia. The only specimens known, consisting of the type series were collected from shallow (less than 10 m deep) estuarine habitats (with shale, mud and sea-grass on the bottom) at the mouths of the Mission River and Hey Creek where they connect to Albatross Bay in Weipa, Queensland (Ukuwela *et al.* 2012).



**Etymology:** Named in honour of a former pet dog of myself, named Crotty as an abbreviation of the full name "Crotalus" being named after a well-known Pitviper genus from North America. The loyal dog successfully guarded the facility of the author for nearly 13 years allowing myself to continue to undertake taxonomic research and publications.

**Content:** Monotypic for the species, *Hydrophis (Crottyhydrophis) donaldi* Ukuwela, Sanders and Fry, 2012.

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#### CONFLICT OF INTEREST

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

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# The taxonomy of the snake genus *Broghammerus* Hoser, 2004 revisited, including the creation of a new subgenus for *Broghammerus timoriensis* (Peters, 1876).

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## ABSTRACT

The placement of the so-called Timor Python (species *timoriensis* Peters, 1876) into the genus *Broghammerus* Hoser, 2004 has been generally accepted since the publication of a molecular phylogeny by Rawlings *et al.* in 2008.

The phylogenetic evidence suggests a divergence between the species *Broghammerus reticulatus* (Schneider, 1801) and *B. timoriensis* in excess of 20 million years. Combined with well-defined morphological differences, this paper adopts the compelling view for separating the two species at the genus level. Taking an extremely conservative position, this paper defines and names a new subgenus for the species *B. timoriensis* in accordance with the Zoological Code.

Furthermore, subspecies of *B. reticulatus* are defined and named according to the Zoological Code.

**Keywords:** Taxonomy; Nomenclature; Zoological Code; Subgenus; *Wellspython*; Subspecies; *dalegibbonsi*; *euanedwardsi*; *haydnmacphieii*; *neilsonnemani*; *patrickcouperi*; *stuartbigmorei*.

## INTRODUCTION

The taxonomy of the extant pythons (Family Pythonidae) has been far from stable.

Numerous taxonomic papers have been published over the last century with new forms being described as recently as 2011 (Zug *et al.*) and 2012 (Hoser 2012b).

Numerous papers by this author, namely, Hoser 2000, 2003, 2003/4, 2009 and 2012b, have been major steps towards the stabilization of the taxonomy and nomenclature of the extant pythons as was that of Harvey *et al.* (2000).

A molecular phylogeny of Rawlings *et al.* (2008) confirmed the major taxonomic judgments of Hoser 2000 and 2003/4 at the genus level for the extant pythons, with papers of Hoser (2009 and 2012b) incorporating the data of Rawlings *et al.* (2008) and Harvey *et al.* (2000) to make further modifications and refinements to the taxonomy and nomenclature of the pythons.

Rawlings *et al.* (2003 and 2008) have also resolved taxonomic issues in terms of the pythons.

Austin *et al.* (2010) confirmed the Hoser position of not giving formal taxonomic recognition to outlier populations of *Lenhoserus boeleni* (Brongersma, 1953) in contrast to the situation for the species within the genus *Chondropython* Meyer, 1874, noting Hoser (2003 (and 2003/4) and Hoser 2009 (and 2012) had named two outlier populations of *Chondropython viridis* as subspecies.

As a result of the above, the taxonomy and nomenclature of Hoser (2012b) broadly and accurately reflects both the morphological differences between the extant pythons and the molecular data as published.

While adoption of the genus name *Broghammerus* for the species *reticulatus* (Schneider, 1801) and *timoriensis*, Peters, 1876 has been near universal among herpetologists since the publication of Rawlings *et al.* (2008), this has not been the case for other genera named by Hoser in Hoser (2000) and Hoser (2003/4) or the earlier genera named by Wells and Wellington in 1983 and/or 1985, even though all these described genera are better supported by the molecular data than the better-known and commonly used *Leiopython* Hubrecht, 1879.

*Apodora* Kluge, 1993 remains in common usage in spite of being rebutted by Hoser (2000 and later papers) on the basis of morphological and geological evidence, as well as the molecular evidence of Rawlings *et al.* (2008). As a genus *Apodora* has no sound basis whatsoever.

I remain of the view that *Apodora* should be treated as a junior synonym of *Liasis*.

Instability of nomenclature of the pythons has been largely driven by the activities of a group identifying themselves as the "Truth Haters", including Wolfgang Wüster, Mark O'Shea, David Williams, Hinrich Kaiser, Wulf Schleip and Darren Naish all of whom have published numerous papers and online blogs advising people not to use "Hoser names" citing an almost limitless array of dubious reasons and excuses, invariably on the alleged basis of false claims made within their papers and blogs.

A notable example of one of their so-called papers include the fraudulent series of papers known and cited as Williams and Starkey 1999 (versions 1-3)(noting herein that Brian Starkey was listed as a co-author even though he did not write the paper and had views opposite to it, see Starkey 2008). That paper sought

to attack my elapid taxonomy, in the form of the description of a new species named *Pailsus pailsei* Hoser, 1998.

That Williams had breached all scientific ethics and morals in tacking on another person as coauthor to peddle views that were opposite to what he had published and knowing himself that the information was fraudulent was a low point in herpetology globally.

The motivation to add an author name is to lend weight and credibility to what would otherwise have been ludicrous claims that would have been immediately dismissed as that. The same process was fraudulently used by other Truth Haters in later years (see below).

While the papers set out to deny that the Hoser-named elapid taxon *Pailsus pailsei* Hoser, 1998 was a validly described new species, attempting to declare it as synonymous with "*Pseudechis australis*", both men knew that the opposite was the case.

Subsequent to this, Starkey (2008) wrote of the Williams (and Starkey) online papers:

"I had absolutely nothing to do with time alteration and the reposting on web.

If fact I was in two minds about the whole paper, without even seeing a specimen of pailus. I didn't want to pass judgement until I had got out there and looked for myself. I did four trips asap to the area and found a couple of specimens 40-50 km from Cloncurry. I knew as soon as I saw my first DOR, that you were right!

When I showed David a few pic's and close ups he knew too! Then I got a live specimen

amongst a small group of rocks, so fast I nearly lost it. I have probably seen about 3 live and 4-5 DOR specimens in 9 or more trips. I wish we didn't jump the gun.

But David wrote the paper and added my name. I never actually wrote a word, although he may have quoted things I said during phone conversations.

And that's the truth."

Even the United States based Society for the Study of Amphibians and Reptiles (SSAR) a peak body of herpetologists, in their own code of ethics as published online as of 1 August 2012, at:

<http://www.ssarherps.org/pages/ethics.php>  
states:

"*Authorship.* Researchers will only claim authorship of papers on which they have made substantial contributions, including conceiving the study, obtaining funding, designing the work, executing the research, analyzing and interpreting the data, or writing the manuscript. Authors may not be added or removed without their agreement, nor be named on a manuscript unless they have approved the final version of the manuscript."

This effectively confirms the totally unethical and morally repugnant actions of David Williams in terms of his inclusion of Starkey as listed co-author for his paper.

Following the first paper by myself involving python taxonomy published in 2000 (see Hoser 2000), Wüster and the others rushed online to condemn the new nomenclature for what had long been recognized as unnamed taxa, a good example being the species now generally recognized as *Leiopython hoserae* Hoser, 2000. Wüster then posted on the web on Jeff Barringer's Kingsnake dot com on January 22, 2001 at 11:29:07 a so-called paper he had written complaining about my work.

As Williams had done before him, Wüster did the morally reprehensible act of shopping his same "paper" to friends to get them to sign on as co-authors, even though they played no significant role in authorship, to lend "weight" to the "paper" which in fact happened.

The same paper gained several new listed authors.

Wüster shopped the exact same "paper" to various journal

editors before finding a friendly one in the form of the editor of the Dutch journal *Litteratura Serpentina* whom he posted the same piece to on 5 May 2001 where a fraudulent collection of lies was published as Wüster *et al.* (2001), the *et al.* being the newly added authors, who were added in breach of basic scientific ethics even though none had anything whatsoever to do with the final manuscript other than a general agreement with the contents and axe to grind against myself.

Numerous other ethical breaches and fraudulent acts by Wüster and Williams are detailed in Hoser 2012a.

In 2012, Wüster's close friend Hinrich Kaiser again breached basic (SSAR) ethics (as quoted above) by shopping a hate article (Kaiser 2012b) as an attached e-mail file to others attacking Hoser taxonomy via a SPAM email (Kaiser 2012a) disseminated to thousands of herpetologists globally.

In his covering e-mail of 5 June 2012 he wrote:

**"We therefore plan to submit the attached manuscript as a Point of View to *Herpetological Review*, and we wish to do so with the broadest possible support from the herpetological community. To achieve this end, we hope you will take the time to read our manuscript, send us your comments, and let us know whether we may include your name as a supporter (in Appendix 2) or even as a co-author, should the journal feel that broader authorship can lend our article greater weight with the scientific community."**

Notable is that *Herpetological Review* is published by the SSAR (quoted above), and hence this submission was in direct breach of SSAR's own published ethics statement!

This hate rant was in fact published in *Herpetological Review*, in breach of the SSAR's own ethics statement on or about 19 March 2013 (Kaiser *et al.* 2013).

Other ridiculous and scandalous attacks on the Hoser taxonomy and nomenclature in direct breach of the rules of the ICZN included Williams *et al.* (2006, 2008) and Schleip (2008), with dozens of other publications by the Truth Haters listed in Hoser (2001), Hoser (2009) and Hoser (2012a), noting all the Truth Haters publications, including online posts were designed to create nomenclatural instability and taxonomic confusion.

These various claims and reasons not to use Hoser names include the bizarre claim that the Hoser descriptions comply with the Zoological Code and therefore the Zoological Code itself should be changed to enable the Truth Haters the right to rename the same taxa by themselves and in honor of their own friends and relatives (see Kaiser 2012).

This was changed in 2013 to be an all-out attack on the Zoological Code, with a call to ignore it and rename all Hoser-named taxa (Kaiser *et al.* 2013).

I do note however that the group involved in the 2013 attempt to go outside the code to rename species and genera, went further and have sought to rename taxa formally named by myself (Hoser), and the great taxonomists, Wells and Fitzinger.

In 2000, Wüster and others approached journal editors not to publish Hoser taxonomic papers to enable them time to steal naming rights on the same taxa. They then approached the same editors to publish retractions of the same papers in order that they could then rename the same taxa (see for example van Aken 2001a, 2001b or Newman 2000).

In 2001, David Williams sent an e-mail to the editor of *Boydii*, seeking a recall of all published issues in order to invalidate the description of three elapid subspecies under the Zoological Code. To the credit of all editors referred to above, none buckled to the immense pressure applied to them by truth haters Wüster and Williams.

As recently as 2010, Schleip and O'Shea published a paper (Schleip and O'Shea 2010) encouraging people not to use taxa described by Hoser in earlier papers, invoking warped and distorted interpretations of the Zoological Code (Ride *et al.*) to allege that the Hoser-named taxa were not validly described



according to the Zoological Code.

These claims applied to the various subspecies of *Chondropython viridis* (Schlegel, 1872), described by Hoser as well as the various subspecies of *Broghammerus reticulatus* described by Hoser.

While I do not agree with the claims of Schleip and O'Shea, or their interpretation of the Zoological Code, to argue the matter and gain acceptance of the nomenclature in the face of ongoing false claims by the pair, will destabilize the taxonomy and nomenclature for years. This is of course the reckless intent of the pair, Schleip and O'Shea.

The main part of the problem involving Schleip, O'Shea, Wüster and the other Truth Haters is their ability to make "noise" to create a veneer of something that is in fact not real. This was seen in the attempt by these people to fraudulently get convicted wildlife smuggler David Williams nominated as an unsung hero in a competition where the first prize was worth a huge sum of money.

The plan failed after Williams scored thousands of votes from a single IP address, but not after they generated many more thousands of "votes" for Williams. See Hoser (2009) for the details.

Arguing fact with the Truth Haters gets nowhere in terms of solving the taxonomic and nomenclatural problems that they have deliberately created.

So instead a different strategy, not involving arguing about past papers is required to deal with the problem they have created.

In order to stabilize the taxonomy and nomenclature of the relevant *Broghammerus* pythons, all subspecies are herein described as new taxa and without reference to earlier published material.

This will enable others to use the names with the full confidence that they are valid, validly published, described in accordance with the letter of the Zoological Rules and in accordance with the strictest possible interpretation and totally comply with the current Zoological Code (Ride *et al.* 1999) and for the relevant subspecies taxa.

It is of course critical that subspecies be recognized taxonomically for conservation reasons as failure to do so may result in specimens of different subspecies being released into wrong locations and perhaps damaging the integrity of gene pools.

Of course, should subspecies be recognized after release of other forms into the same locations, damage could be irreparable.

The Kaiser (2012) claims against the Hoser papers, the main claim being that they comply with the code of Zoology and therefore it should be changed, have been invoked as a reason to not use the Hoser *Broghammerus* subspecies names, as these men do not like Raymond Hoser.

This is in direct conflict with the assertions of Schleip and O'Shea (2010) to the effect that the descriptions are not valid under the same code.

Notwithstanding these conflicting claims by the "Truth Haters", I have decided the best way to deal with the *Broghammerus* subspecies is to describe them herein as new for the purposes of stability.

I note herein that Glen Shea of Australia noted in an e-mail of 2013, that Kaiser's (2012b) allegations, claims and plot against the rules of Zoological Nomenclature were "clearly ridiculous and unworkable" (Shea 2013).

In terms of the subspecies of *Chondropython viridis* (Schlegel, 1872) described by Hoser (2009) allegedly not published by Hoser, according to Schleip and O'Shea in 2010, this statement by Schleip and O'Shea was shown to be false by Hoser (2012a).

Notwithstanding this, the same taxon was described by Hoser (2012b) thereby stabilizing the taxonomy and nomenclature of the subspecies, allowing the name to be used with confidence

by later herpetologists and secure in the knowledge it has been validly described and named on two separate occasions, namely 2009 and again in 2012.

Also of note here is the "creation" of three species of *Leiopython* by Schleip (2008), shown to be fraudulent and in the absence of molecular data (as alleged in the published abstract), as detailed by Hoser (2009), who had read the entire paper and noted the absence of the cited molecular data.

Schleip later admitted on an internet chat forum that he lacked such data, confirming the fraud.

As a result, the three taxa named by Schleip 2008 are not generally recognized in herpetology (see for example Natusch and Lyons 2011, who were unable to tell the alleged forms apart), and while the Schleip named taxa appear on various online databases and the like, this is mainly as a result of direct pressure by Schleip on the webmasters and the like as opposed to an evidence-based taxonomic decision by a disinterested third party.

The same applies in terms of listing of the three species on the website "Wikipedia" at:

<http://en.wikipedia.org/wiki/Leiopython>, (Various authors 2012), directly edited by Schleip himself, complete with a series of self-congratulating posts, noting that Wikipedia falsely claims to allow material to be written only from the "neutral" perspective.

However, in the continuing absence of molecular and morphological evidence to support any division of *L. albertisi* at the species level in terms of Schleip's alleged taxa, I suggest they remain unrecognized and all treated as *L. albertisi* (Peters and Doria, 1878).

Of note as well is that the paper Schleip (2008) was published in *Journal of Herpetology*, which also happens to be published by the SSAR.

I note further that Schleip himself is listed as an editor of SSAR publications on their own website.

Nowhere however is this conflict of interest noted in terms of the publications Schleip (2008) or Kaiser *et al.* (2013).

The SSAR's own code of ethics already partially quoted above (Anonymous 2012), reads as follows:

"*Veracity.* Members will not commit scientific fraud (e.g., through fabricating or falsifying data, suppress results, or deliberately misrepresent findings). All statements made regarding methods used and data collected will be factually correct. All interpretations made in the Introduction and Discussion will be truthful representations of the author's understanding. Relevant literature and data not compatible with the conclusions must not be intentionally omitted. Error does not constitute scientific misconduct but must be promptly reported to the Editor."

In other words Schleip's unethical and fraudulent paper somehow managed to slip through that journal's alleged "peer review" or editorial review.

In an e-mail dated 9 March 2013, *Herp Review* chief editor, Robert W. Hansen wrote:

"we do not reveal the identity of peer reviewers, as in most cases they remain anonymous (to authors), as is standard practice in science journal publishing."

Leaving the logical next questions as: Is there really peer review at *Herp Review*? and: Why have you (Hansen) ignored your own published ethics statement?

The close friendship of Schleip and Hansen is played out on their exchanges on their own private "Facebook" wall posts, as was their pre-determined plan to bypass proper peer review for their article Schleip out his name to (Kaiser *et al.* 2013) to enable it to be published as a matter of haste and urgency in order to destabilize established taxonomy and nomenclature as much as possible.

In 2012, the same group, this time with co-author of Kaiser *et al.* (2013), Brian Crother, published a rant in an SSAR publication

quoting Wallach, Wuster and Broadley (2009), telling readers not to use the proper Hoser names for recently described Rattlesnake taxa.

Brian Crother's earlier reckless and unethical misconduct in terms of zoology, taxonomy and nomenclature had come under attack for similar statements he made in another SSAR publication without proper peer review in 2008 (Crother *et al.* 2008) in 2009 (Pauly *et al.* 2009).

There are numerous other unethical and dishonest actions by the Truth Haters, but these shall be dealt with at another time and place. Suffice to say, any claims they make against the taxonomy and nomenclature within this paper should be treated with the skepticism they deserve.

#### GENUS BROGHAMMERUS HOSER, 2004

**Type species:** *Boa reticulata* Schneider, 1801

**Currently generally known as:** *Broghammerus reticulatus* (Schneider, 1801)

**Diagnosis:** (Adopted from Rawlings *et al.* 2008 in turn adopted from Hoser 2003/4 and sources cited within): A genus of pythonine snakes, of large to gigantic size (adult total length reportedly to nearly 10 metres). Differentiated from the genus *Python* (*sensu stricto*) by having the supralabial thermoreceptive pits less well defined than the infralabial pits (converse arrangement in *Python*); by infralabial pits set in a longitudinal groove defined ventrally by a longitudinal fold; colour pattern of the suborbital supralabial region similar to the rest of the supralabials, compared with *Python*, in which there is a dark suborbital patch; elongate medial anterior process of the ectopterygoid, which extends much further anteriorly than the lateral anterior process, compared with subequal processes in *Python* (excluding *P. curtus*); and by hemipenial morphology (McDowell *et al.*, 1975); not known for *timoriensis*). Otherwise most similar to species within the tribe Moreliini (see Hoser 2012b) from which it can be differentiated (along with species of *Python*) by having the suborbital portion of the maxilla without any lateral flare or projection; the mandibular foramen of the compound bone lying below the posterior end of the dentary tooth row, rather than fully posterior to it; a large medially divided frontal; high midbody scale count (54 or more).

#### SUBGENUS WELLSPYTHON SUBGEN. NOV.

**Type species:** *Liasis amethystinus* var. *timoriensis* Peters, 1876

**Currently generally known as:** *Broghammerus timoriensis* (Peters, 1876)

**Diagnosis:** The subgenus *Wellspython subgen. nov.* is separated from the nominate subgenus *Broghammerus* by the following suite of characters: Yellow to red-brown dorsal ground colour, versus beige to brown and iridescent in subgenus *Broghammerus*; a dorsal reticulate pattern of large patches of dark scales, versus large black-bordered, yellow or brown blotches in *Broghammerus*; a grayish eye-colour, versus bright orange in *Broghammerus*; 5-6 loreal scales versus 3-5 in *Broghammerus*. *Wellspython subgen. nov.* is also differentiated from *Broghammerus* by the following traits: 55-63 mid-body rows versus 68-78 in *Broghammerus*, 287-289 ventrals, versus 304-325 in *Broghammerus*.

The subgenus *Wellspython subgen. nov.* is known only from Lombok, Flores, Solor, Adonara, Lomblen and Pantar in the Lesser Sunda Island Group of Indonesia.

The subgenus is currently monotypic for the species *Broghammerus timoriensis* (Peters, 1876).

**Etymology:** Named in honour of Richard Wells of NSW, Australia in recognition for his various major taxonomic papers of the 1980's (coauthored with C. Ross Wellington) and others in the years postdating this period. It is noted that his decision to erect three genera to accommodate Australian species of pythons in the 1980's has been effectively confirmed as correct on the basis of the molecular evidence provided by Rawlings *et al.* (2008).

#### SUBGENUS BROGHAMMERUS HOSER, 2004

**Type species:** *Boa reticulata* Schneider, 1801

**Currently generally known as:** *Broghammerus reticulatus* (Schneider, 1801)

The subgenus *Broghammerus* is separated from *Wellspython subgen. nov.* by the following suite of characters: Beige to brown and iridescent above versus yellow to red-brown dorsally in *Wellspython subgen. nov.*; a dorsal reticulate pattern of large black-bordered, yellow or brown blotches versus large patches of dark scales in *Wellspython subgen. nov.*; a bright orange eye colour, versus grayish eye-colour in *Wellspython subgen. nov.*; 3-5 loreal scales versus 5-6 in *Wellspython subgen. nov.*

*Wellspython subgen. nov.* is also differentiated from *Broghammerus* by the following traits: 55-63 mid-body rows versus 68-78 in *Broghammerus*, 287-289 ventrals, versus 304-325 in *Broghammerus*.

**Distribution:** (Taken from Hoser 2003/4): According to the internet site at:

<http://www.nature-conservation.or.id/pythonidae.html>

put together by Ed Colijn the distribution for *Broghammerus* is listed as including:

India (including Nicobar Islands north of Sumatra), Bangladesh, Myanmar, Cambodia, Laos, Vietnam, Thailand, Peninsular Malaysia, Singapore, Weh, Simeulue, Babi, Nias, Banyak, Mentawai, Riau, Natuna and Anambas Islands, Sumatra, Enggano, Bangka, Belitung, Krakatau Islands, Kalimantan, Sarawak, Sabah, Brunei, Java, Nusa Barung, Lombok, Sumbawa, Flores, Alor, Pantar, Lomblen, Sumba, Timor, Wetar, Leti, Romang, Banda and Tanimbar Islands, Selayar, Kayadi, Tanah Jamepa, Sulawesi, Buton, Sula Islands, Bacan, Ternate, Halmahera, Obi, Buru, Seram, Ambon, Boano, Haruku, Saparua and Philippines

This information cited here as Colijn (2002) is believed to be accurate, although obviously many of the islands within this general ambit that have this genus are inadvertently omitted.

Similar information appears in regional herpetology guides (e.g. David and Vogel 1996) and is reflected in the databases of 26 Museums in North America and several others in Europe and South-east Asia.

The subgenus is currently monotypic for the species *Broghammerus reticulatus* (Schneider, 1801).

#### BROGHAMMERUS RETICULATUS DALEGIBBONSI SUBSP. NOV.

##### HOLOTYPE

A specimen at the Field Museum of Natural History, 1400 S. Lake Shore Drive, Chicago, IL 60605-2496. The specimen, number: 142320 is from Ambon Island in the Moluccas in Indonesia, Lat. 3° S, Long. 128° E. It was collected in 1963 by A.M.R. Wegner.

The Field Museum of Natural History is a publicly accessible collection that makes specimens available to researchers.

##### PARATYPE

A specimen at the Field Museum of Natural History, 1400 S. Lake Shore Drive, Chicago, IL 60605-2496. The specimen, number: 142093 is from Ambon Island in the Moluccas in Indonesia, Lat. 3° S, Long. 128° E. It was collected in 1963 by A.M.R. Wegner.

The Field Museum of Natural History is a publicly accessible collection that makes specimens available to researchers.

##### DIAGNOSIS

It appears that this is a generally smaller race of *Broghammerus* than the typical race from further west in South-east Asia. Size and colouration as a trend separate this form from the nominate race *reticulatus*.

Their colouration is also often darker than those from further west typically with very sharp and contrasting body markings, even when the specimen is aged. It rarely has a head lighter

than the body as in some other variants of *Broghammerus*, such as those from Bali or parts of Thailand (see *Broghammerus reticulatus euanedwardsi* subsp. nov. below). This race generally has a pugnacious disposition in captive settings.

*Broghammerus reticulatus dalegibbonsi* subsp. nov. is definitively separated from all other *Broghammerus* by colouration of the head. In *Broghammerus reticulatus dalegibbonsi* subsp. nov. there is a distinct midline stripe on the head and neck, black in colour that is approximately 2/3 of a scale width, and the rest of the dorsal surface of the head is brownish in colour, with a darkening of the region of scales towards the snout. At the rear of the skull and dorsally are two well-spaced black dots about one scale wide, the first about one scale from the mid-dorsal line and the second about 4 scales further across the head. There are dark markings on the side of the head in the form of a stripe from the rear of the eye to the lower part of the head.

In this subspecies and the Timor subspecies, this stripe is noticeably irregular in thickness.

This subspecies is only definitively known from Ambon at this stage, although it is safe to say that the *Broghammerus reticulatus* from nearby Ceram are probably assignable to this subspecies.

This subspecies is also able to be separated from all other *Broghammerus* by DNA analysis and/or accurate distribution information.

The subspecies co-exists with *Australiasis clastolepis*.

#### ETYMOLOGY

Named after Australian herpetologist Dale Gibbons, formerly of Bendigo, Victoria, Australia, now of Thailand for various contributions to wildlife conservation in the Australian state of Victoria.

#### ***BROGHAMMERUS RETICULATUS EUANEDWARDSI* SUBSP. NOV.**

#### HOLOTYPE

A specimen at the Field Museum of Natural History, 1400 S. Lake Shore Drive, Chicago, IL 60605-2496. The specimen, number: 180232 is from Nakhon Ratchasima, Central Thailand. Lat. 14° 58' N, Long. 102° 07' E. It was collected on 10 August 1969 by W. Ronald Heyer.

The Field Museum of Natural History is a publicly accessible collection that makes specimens available to researchers.

#### PARATYPE

A specimen at the Field Museum of Natural History, 1400 S. Lake Shore Drive, Chicago, IL 60605-2496. The specimen, number: 178660 is from Khorat, Central Thailand. Lat. 14° 58' N, Long. 102° 7' E. It was collected in October 1957.

The Field Museum of Natural History is a publicly accessible collection that makes specimens available to researchers.

#### DIAGNOSIS

This is a large race of *Broghammerus reticulatus*, with specimens known to exceed 6 metres. Although it is touted as a yellow-headed and docile variant, not all specimens of this subspecies have this trait. However as general trends, these factors separate this subspecies from the nominate race.

This subspecies is separated from all other *Broghammerus* by the following suite of characters: The mid-dorsal line running from the snout to the rear of the head does not commence on the rostral. It has a break at the rear of the frontal shield and again at the back of the head. The lines running from the back of the eye, downwards to the back of the head are one third as thick as the eye.

Colouration of this subspecies taxon is distinct in that there are large white or creamish blotches along the mid-line of each side of the snake's body, bounded completely by black, in an irregular pattern, being thickest above and below the blotches and minimal at the ends (when viewed side on to the snake).

Additionally, specimens are often docile in temperament, especially as adults and make good pets, provided one makes sure that they don't handle them after cleaning out rat or rabbit cages.

This subspecies is known only from parts of Thailand, but probably occurs elsewhere including the westernmost parts of the *Broghammerus reticulatus* range.

It is also separated from other *Broghammerus reticulatus* by either good locality information and/or DNA analysis.

#### ETYMOLOGY

Named in honour of Australian herpetologist Euan Edwards, currently living on the Gold Coast, Queensland and having spent considerable time in the United States, Madagascar and other parts of the world.

#### ***BROGHAMMERUS RETICULATUS HAYDNMACPHIEI* SUBSP. NOV.**

#### HOLOTYPE

A specimen at the Field Museum of Natural History, 1400 S. Lake Shore Drive, Chicago, IL 60605-2496. The specimen, number: 148968 is from, the Kapit District, Sarawak, (Borneo), Malaysia. It was collected by F. Wayne King on 9 August 1963.

The Field Museum of Natural History is a publicly accessible collection that makes specimens available to researchers.

#### PARATYPE

A specimen at the Field Museum of Natural History, 1400 S. Lake Shore Drive, Chicago, IL 60605-2496. The specimen, number: 67265 is from Sarawak, (Borneo), Malaysia.

It was collected by Tom Harrisson on 16 Jun 1951.

The Field Museum of Natural History is a publicly accessible collection that makes specimens available to researchers.

#### DIAGNOSIS

This is a large race of *Broghammerus reticulatus*, with specimens known to exceed 6 metres. It is restricted to the Island of Borneo, although similar specimens have been seen from parts of Sulawesi and may ultimately be referable to this taxa.

Specimens are often snappy in temperament, even as adults and do not necessarily make good captives.

As a generalization, larger average adult size is typical for this subspecies. Yellow-headed specimens do occur, but are not generally common.

The subspecies *haydnmacphiei* is separated from all other *Broghammerus reticulatus* by the following suite of characters: the mid-dorsal line on the head is distinct and of even thickness from the tip of the snout to the top of the neck, where it terminates in a rectangular shaped blotch. White (or occasionally light cream) markings are located on the mid-flanks (when viewed from side on) and noticeably triangular in shape as opposed to more-or-less rectangular (with slight bumps top and bottom) in all other subspecies.

Furthermore, in the subspecies *haydnmacphiei* specimens commonly lack a line running from the back of the eye to the lower part of the rear of the head, although this particular trait is not universal for the subspecies.

It may also be separated from other *Broghammerus reticulatus* by either good locality information and/or DNA analysis.

#### ETYMOLOGY

Named in honour of Victorian (Australia) herpetologist Hayden McPhie, of Mirboo North, Victoria for various contributions to wildlife conservation.

#### ***BROGHAMMERUS RETICULATUS NEILSONNEMANI* SUBSP. NOV.**

#### HOLOTYPE

A specimen at the Field Museum of Natural History, 1400 S. Lake Shore Drive, Chicago, IL 60605-2496. The specimen,



number: 53272 is from Davao Province, Mindanao Island, the Phillipine Islands. Lat. 7°04' N, Long. 125° 40' E. It was collected by Donald Heyneman on 27 September 1946.

The Field Museum of Natural History is a publicly accessible collection that makes specimens available to researchers.

#### PARATYPES

A specimen at the Field Museum of Natural History, 1400 S. Lake Shore Drive, Chicago, IL 60605-2496. The specimen, number: 53281 is from Davao Province, Mindanao Island, the Phillipine Islands. Lat. 7°04' N, Long. 125° 40' E. It was collected by a local Philippine native on 14 January 1947.

A specimen at the Field Museum of Natural History, 1400 S. Lake Shore Drive, Chicago, IL 60605-2496. The specimen, number: 53287 is from Davao Province, Mindanao Island, the Phillipine Islands. Lat. 7°04' N, Long. 125° 40' E. It was collected by a local Philippine native on 24 November 1946.

A specimen at the Field Museum of Natural History, 1400 S. Lake Shore Drive, Chicago, IL 60605-2496. The specimen, number: 53273 is from Davao Province, Mindanao Island, the Phillipine Islands. Lat. 7°04' N, Long. 125° 40' E. It was collected by a local Philippine native on 9 October 1946.

A specimen at the Field Museum of Natural History, 1400 S. Lake Shore Drive, Chicago, IL 60605-2496. The specimen, number: 53283 is from Davao Province, Mindanao Island, the Phillipine Islands. Lat. 7°04' N, Long. 125° 40' E. It was collected by Harry Hoogstraal on 17 January 1947.

The Field Museum of Natural History is a publicly accessible collection that makes specimens available to researchers.

#### DIAGNOSIS

It appears that this is a large and generally aggressive race *Brogammerus*. Quiet and easily tamed specimens are relatively unusual.

It rarely has a head lighter than the body as in some other variants of *Brogammerus*, such as those from Bali or parts of Thailand, although light-headed specimens are known.

The subspecies is separated from all other *Brogammerus* by the combination of a complete absence of white markings on the dorsal surface and a dorsal pattern of large mid dorsal light blotches, often ovoid anteriorly and noticeably small and irregular posteriorly, bounded by a continuous black zone. On the anterior half of the body, the lower flanks have irregular, but more or less rectangular, dark creamish blotches. These blotches are well below the midline on either side of the body if viewed side-on from the ground, in contrast to all other *Brogammerus reticulatus*. In the subspecies *Brogammerus reticulatus euanedwardsi* subsp. nov. from Thailand, the same blotches are located slightly dorsal to the midline on either side if viewed side on from the ground.

This subspecies is only definitively known from Mindanao and adjacent Philippine Islands.

They can also be separated from all other *Brogammerus* by comparative DNA analysis and/or accurate distribution information.

#### ETYMOLOGY

Named in honour of the long-term reptile breeder, Neil Sonneman, from Murrumbidgee, in Northern Victoria, Australia, also noted for his many publications on successfully breeding what were previously little-bred Australian species of pythons.

#### ***BROGHAMMERUS RETICULATUS PATRICKCOUPERI* SUBSP. NOV.**

#### HOLOTYPE

A specimen at the Museum of Comparative Zoology at Harvard, Cambridge, Massachusetts, USA, MCZ number: R-25266. It was collected in 1924 at "Djamplong", South Timor, Lat. 4° S, 125° E. The person who collected the specimen in 1924 was M. Smith.

The Museum of Comparative Zoology at Harvard, Cambridge,

Massachusetts, USA, is a publicly accessible collection that makes specimens available to researchers.

#### DIAGNOSIS

This is believed to be the only *Brogammerus* found on Timor.

It is a smaller than average race (believed to attain an average size of under 3 meters at maturity) and is of variable temperament.

*Brogammerus reticulatus patrickcouperi* subsp. nov. is readily separated from all other *Brogammerus* by the following traits: the mid-dorsal stripe on the head is relatively thick, unbroken and starts just anterior of the eyes, and the lighter oval blotches on the body running more-or-less along the mid-dorsal line of the body remain of this nature to the rear end of the snake, which is not the case in other *Brogammerus*. While the shape of the blotches does tend towards irregular as in other *Brogammerus*, these blotches remain large and of similar size throughout the length of the snake, as opposed to noticeably reducing in size at the posterior end of the snake.

The subspecies is also distinguished by the stripe running from the rear of the eye to the back of the head being noticeably irregular in thickness, in contrast to other *Brogammerus*, except for the Ambon subspecies (*Brogammerus reticulatus dalegibbonsi* subsp. nov.), with which it shares this trait in terms of this stripe.

*Brogammerus reticulatus patrickcouperi* subsp. nov. is usually a brightly coloured subspecies, with relatively sharp markings and a reduced thickness of black markings (black pigment) on the dorsal surface.

The subspecies can also be separated from other *Brogammerus reticulatus* subspecies by DNA properties and/or accurate locality information.

It is a little-known and rarely kept subspecies.

It had been thought that the taxon co-exists on Timor with *Brogammerus timoriensis*, but this may not in fact be the case. No *B. timoriensis* have been reported from Timor in recent years and old records may in fact have erroneous locality data.

#### ETYMOLOGY

Named after Queensland-based herpetologist Patrick Couper for his contribution to herpetology, mainly through his time working at the Brisbane, Queensland Museum.

#### ***BROGHAMMERUS RETICULATUS STUARTBIGMOREI* SUBSP. NOV.**

#### HOLOTYPE

A specimen at the Museum of Comparative Zoology at Harvard, Cambridge, Massachusetts, USA, MCZ number: R-8003. It was collected in 1906 from Buitenzore, Java, Indonesia, Lat. 3°4'S, Long. 128°12'E. It was collected by T. Barbour in December 1906.

The Museum of Comparative Zoology at Harvard, Cambridge, Massachusetts, USA, is a publicly accessible collection that makes specimens available to researchers.

#### DIAGNOSIS

This is a subspecies which usually has an exaggerated yellowish hue all over its dorsal surface as compared to other *Brogammerus reticulatus*.

It is of variable size (but generally largish) and within the constraints of being yellowish all over has several distinct colour variations, even in a single group of young.

The subspecies *Brogammerus reticulatus stuartbigmorei* subsp. nov. is differentiated from all other *Brogammerus reticulatus* by the dark black pigment on the dorsal surface. Lighter parts of the body often have individual black scales, giving a distinctive flecked appearance, not seen in any other subspecies.

Furthermore, it is separated from other *Brogammerus reticulatus* by the following suite of characteristics: white blotches along the sides of the body, a relative lack of head

markings on a light brown or yellowish head, however the head does invariably have a thin mid-dorsal line (unbroken) commencing beyond the rostral and is distinct in that it terminates in a triangle on the neck.

Additionally, the black line seen in most *Broghammerus reticulatus* that usually runs from the temple to the eye, usually fails to reach the eye in this subspecies and is thinner than seen in other *Broghammerus reticulatus*. They also usually have a relatively light coloured eye.

*Broghammerus reticulatus stuartbigmorei* is readily distinguished from *Broghammerus reticulatus* from Sumatra and Borneo, indicating that the population has been separated for quite some time.

This same subspecies is believed to occur on the island of Bali. The subspecies *stuartbigmorei* is also able to be separated from others by distribution and/or DNA properties.

#### ETYMOLOGY

Named after Stuart Bigmore of Victoria, Australia for his contributions to herpetology over two or more decades, in particular varanid taxonomy as well as his role in reptile education through the Victorian Association of Amateur Herpetologists (VAAH) in Geelong, where as an active committee member he performed many valuable tasks over many years.

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#### CONFLICT OF INTEREST

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

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# *Adelynhoserserpenae wellsi*, a new species of Jumping Pitviper from Mexico (Serpentes: Viperidae).

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## ABSTRACT

The northern population of two disjunct populations of snakes, formerly regarded as *Adelynhoserserpenae occiduus* (Hoge, 1966) is herein classified as a new species and named according to the Zoological Code. The reclassification is based on previously published morphological and molecular studies that have been robustly tested.

**Keywords:** Taxonomic revision; new species; Viperidae; Crotalinae; *Atropoides*; *Adelynhoserserpenae*; Hoser; snake; new species; *occiduus*; *wellsi*; pitviper.

## INTRODUCTION

The so-called Jumping Pitvipers genus *Adelynhoserserpenae* Hoser, 2012 are native to Middle America. They have gained their name due to their alleged ability to jump at a potential attacker. While this aspect of their behavior and ability may be exaggerated, they are known to strike at birds flying in the air at close range.

All of these snakes are extremely thick-bodied, with the species taxon *A. nummifer* being the most stout.

The genus *Adelynhoserserpenae* Hoser, 2012 was created by the removal of all species from the genus *Atropoides* except for the type species, namely *Atropoides picadoi* on the basis of morphological and molecular data.

This totaled five recognized species for *Adelynhoserserpenae*, namely:

*Adelynhoserserpenae indomitus* (Smith and Ferrari-Castro, 2008)

*Adelynhoserserpenae mexicanus* (Duméril, Bibron and Duméril, 1854)

*Adelynhoserserpenae nummifer* (Rüppell 1845) (Type species for genus)

*Adelynhoserserpenae occiduus* (Hoge, 1966)

*Adelynhoserserpenae olmec* (Perez-Higareda, Smith and Julia-Zertuche, 1985)

The species remaining within the genus *Atropoides* Werman, 1992 namely *Atropoides picadoi* is quite morphologically different from those members of *Adelynhoserserpenae* in general build, being more slender and with other significant morphological differences as detailed in Campbell and Lamar (2004).

Numerous aspects of the snakes of the genera *Atropoides* and *Adelynhoserserpenae* have been studied by various authors including, Burger (1950), Castoe *et al.* (2003), Castoe and Parkinson (2006), Dunn (1939), March (1929), McCranie (2011),

Parkinson (1999), Porras and Solórzano (2006) and Werman (1984, 1992).

There have been a number of studies into the so-called Jumping Pitvipers with a view to resolving the taxonomy of the group with the genus *Atropoides* being created by Werman in 1992, by removal from the larger genus *Porthidium* Cope, 1871.

Werman's placement has been supported by most authors since 1992, including, Campbell and Lamar (2004), Castoe, *et al.* (2003) and others.

In their study of the molecular systematics of the then recognized *Atropoides* group Castoe *et al.* (2003) found that *A. picadoi* was divergent from all the other then described taxa within the genus *Atropoides* as defined by Werman in 1992.

The other species tested were, *Adelynhoserserpenae nummifer*, *A. mexicanus*, *A. occiduus* and *A. olmec*, all of which clustered as a group, while *Atropoides picadoi* showed closer affinities to *Cerrophidion godmani*.

Refer to fig 2, in Castoe *et al.* 2003 (all four diagrams) for the exact result.

The authors deferred making any taxonomic changes pending further research into the group of snakes.

Pyron *et al.* (2011) did a broad-ranging study into the phylogeny of the advanced snakes (Colubroidea) which included analysis of four of six known species then placed in the genus *Atropoides*.

The excluded species were *indomitus* and *mexicanus*.

The species *mexicanus* is essentially similar to *nummifer* and showed up as extremely close to this taxa in the 2003 results of Castoe *et al.*

The taxon *indomitus* was formally described by Smith and Ferrari-Castro in 2008. Using mitochondrial gene sequence data, the authors found the new species *indomitus* to represent

the sister species of *Adelynhoserserpenae occiduus*, with 5.7 % sequence divergence separating the two taxa.

Both *A. occiduus* and *A. nummifer* were well-placed in the cluster strongly divergent from *A. picadoi* in the results of Castoe *et al.* 2003, so a similar position for *indomitus* is easily inferred.

Pyron *et al.*'s results of 2011, while restricted to four nominal taxa within the then nominal genus *Atropoides*, effectively mirrored and confirmed the results of Castoe *et al.* (2003), again showing that *picadoi* was significantly divergent from the other taxa as to be placed in a separate genus.

As it was the taxon *A. picadoi* that was the type species for the genus *Atropoides*, it was all the other recognized species that therefore were placed in the new genus *Adelynhoserserpenae* Hoser, 2012.

The diagnosis of that new genus as done by Hoser, 2012 was as follows:

**GENUS *Adelynhoserserpenae* HOSER, 2012**

**Type species: *Atropos nummifer* Rüppell 1845**

**(Currently recognised in most contemporary texts as *Atropoides nummifer*)**

**Diagnosis:** *Adelynhoserserpenae* Hoser, 2012 is easily separated from the genus *Atropoides* by scalation. In *Adelynhoserserpenae* males have 104-136 ventrals, versus 138-155 in *Atropoides* (Campbell and Lamar 2004), females have 103-138 ventrals, versus 143-145 in *Atropoides* (Campbell and Lamar 2004).

This difference reflects the physical reality that *Atropoides* is a much longer and slender animal than all species in *Adelynhoserserpenae* Hoser, 2012.

In *Adelynhoserserpenae* nasorostrals are often present, (as opposed to always absent in *Atropoides*), there is a single row of subfoveals separating prelacunal from supralabials (versus 1-3 rows of subfoveals separating prelacunal from supralabials in *Atropoides*).

*Atropoides* is defined above in this diagnosis as only including the species taxon *A. picadoi*.

*A. picadoi* is a relatively thinly bodied species, versus the thick-set body form of *Adelynhoserserpenae*.

Character states such as intersupraoculars, supralabials, infalabials, dorsal mid-body scale rows and lateral body blotches are highly variable both between and within species and are not helpful in separating the genera.

However *Atropoides picadoi* has considerably smaller shields at the back of the head than all species of *Adelynhoserserpenae*. In *Atropoides* these shields would be defined as small, whereas in *Adelynhoserserpenae* they'd be defined as medium (refer also to fig. 91 in Campbell and Lamar 2004).

The genus *Adelynhoserserpenae* is found from northeastern Mexico southward through Central America to central Panama. They are usually forest dwellers.

For a detailed description of the snakes in the genus *Atropoides* as defined until 2012 (which would act to diagnose this new genus *Adelynhoserserpenae* Hoser, 2012 in conjunction with the information above), refer to pages 274-290 of Campbell and Lamar (2004).

The very thickset build of *Adelynhoserserpenae* easily separates them from other pitvipers.

Campbell and Lamar (2004), page 275, detailed minor hemipenial differences between the species *mexicanus* and *picadoi*, which was further investigated by Jadin *et al.* (2010) who found little significant differences between the various species in both genera.

However investigation of venom composition and toxicity is required, as so far it has been shown that in *Adelynhoserserpenae* it seems to be considerably less toxic to humans than for *Atropoides picadoi* (Campbell and Lamar 2004).

**Etymology:** Named in honor of the author's eldest daughter, Adelyn Hoser, who by age 13 had more expertise with snakes than most people many times her age.

She had been handling the world's deadliest snakes since she was a baby and with complete safety as they were all venomoid (Hoser 2004), giving her unrivalled knowledge of the inner workings of venomous snakes. Hence it's fitting that she should be recognized by having a genus of venomous snakes named in her honor.

I also note the disgusting and reprehensible behavior of Mark O'Shea, Wolfgang Wüster, Wulf Schleip, Hinrich Kaiser, Brian Crother and others (Kaiser *et al.* 2013), who in that paper and elsewhere have found reason to attack myself for daring to name genera after family members who have made huge contributions to herpetology and wildlife conservation in general, even though Wüster and some of the others have themselves engaged in the allowable practice of assigning patronyms to reptile taxa they have named.

The intense hate campaign by these men, that has included many false statements and many thousands of hate posts on numerous internet sites, chat forums, Facebook, Twitter and the like has been despicable and a serious breach of the ethics of the Zoological Code (Ride *et al.* 1999).

**THE ADELYNHOSERSERPENAE OCCIDUUS SPECIES GROUP.**

The snakes generally assigned to the species *Adelynhoserserpenae occiduus* until now, are known from two disjunct populations ranging from El Salvador to Mexico, with the bulk of known specimens, including the holotype coming from an area near Guatemala City in Guatemala.

Two publications of roughly the same date provided evidence to show differences between both the Mexican and more southern populations of the snakes assigned to this species. Castoe *et al.* 2003 gave molecular evidence to support the contention that there may be two separate species involved.

Widely divergent genotypes conformed with the geographically divergent groups.

Campbell and Lamar gave detailed morphological differences between the two populations, but not in any way considering the possibility that they may be different at the species level.

However a merging of the data of Castoe *et al.* (2003) and Campbell and Lamar (2004), leads to the inescapable conclusion that the northern population from south-west Mexico must be a separate, albeit closely related species taxon.

As a result it is formally described and named according to the Zoological Code below.

**ADELYNHOSERSERPENAE WELLSI SP. NOV.**

**Holotype:** A specimen at the Carnegie Museum, Pittsburgh, Pennsylvania, USA, specimen number: CM 51749, from near Motozintla, Mexico, 15.3708° N, 92.2483° W.

The Carnegie Museum, Pittsburgh, Pennsylvania, USA is a publicly accessible facility that allows access to its specimens for bonafide researchers.

**Diagnosis:** Until now the species *Adelynhoserserpenae wellsi* sp. nov. would have been identified as *Adelynhoserserpenae occiduus* (Hoge, 1966), with which it is most superficially similar.

The diagnosis for the species *Adelynhoserserpenae occiduus* (Hoge, 1966), in Campbell and Lamar (2004) does in fact in effect contain a diagnosis for this species, in that the authors correctly identify consistent differences between the two populations of snakes they refer to the species *Adelynhoserserpenae occiduus* (Hoge, 1966), written in their book as *Atropoides occiduus* (Hoge, 1966).

All *Adelynhoserserpenae wellsi* sp. nov. have 1-3 large nasorostrils on one or both sides. In the species *Adelynhoserserpenae occiduus* (Hoge, 1966) there are no nasorostrils on one or both sides and in the rare cases that one or more are present (less than 30% of the time), these are

clearly very small and reduced in size, which is not a condition seen in *Adelynhoserserpenae wellsii sp. nov.*

In all specimens of *Adelynhoserserpenae occiduus* (Hoge, 1966) every individual exhibits broad contact between the rostral and prenasal and the apex of the rostral is broadly rounded, extending to the canthal ridge.

*Adelynhoserserpenae wellsii sp. nov.* is a very stout ground dwelling pitviper. Adults are typically between 35-60 cm in total length, although sizes larger than this are known.

The species *Adelynhoserserpenae mexicanus* attains a far larger size and girth.

The dorsum of the head in *Adelynhoserserpenae wellsii sp. nov.* is medium to dark brown, with or without darker markings. A dark brown postocular stripe extends from behind the eye to the angle of the jaw. The postocular stripe is broad, involving all of the second temporal scale row, most or all of the first temporal scale row; and some or all of the third temporal scale row and may also include some or all of the adjacent portion of the fourth temporal scale row. The upper and lower edges of the postocular stripe are dark. The posterior extent of the postocular stripe is variable, but it usually curves downward and behind the rictus and is broadly rounded at its posterior end. A large, blackish brown subocular spot extends from the edge of the orbit well onto the supralabials but does not reach the lip margin. A small but distinctive dark blotch is almost always present just below the pit, extending from the prelacunal and/or sublacunal across supralabials 2 and 3 to the lip margin. The rostral often has a dark spot, and a series of irregular dark spots is usually present along the lateral margin of the lower jaw. A pair of dark brown nape blotches are frequently fused posteriorly.

Some individuals may have a bold subocular spot that does not reach the orbit.

A series of dark brown rhomboidal dorsal blotches extends the length of the body and onto the tail. Sometimes the dorsal blotches are separate on the anterior part of the body, but they invariably become joined posteriorly, forming a wide zig-zag band. The 27-38 lateral blotches are usually roundish and separate from the dorsal blotches.

Most brown markings including the dorsal and lateral blotches are narrowly outlined in black or dark brown. The ground color is generally pale brown or burgundy brown, although snakes may be pinkish brown, reddish brown, or purplish brown.

The venter ranges from having a few dark spots or an irregular checkerboard pattern to being heavily mottled with brown. Small dark ventrolateral blotches alternate with the lateral blotches and are present on the first dorsal scale row and the lateral edges of the ventrals. The subcaudals are mostly dark except for irregular pale markings and the distal subcaudals may be mostly pale.

There are 7-12 intersupraoculars and the supraoculars are never fragmented. There are 8-10 supralabials, 9-12 infralabials, 21-27 mid-body scale rows, 125-137 ventrals, 24-36 undivided subcaudals. The scales on the mid dorsal surface are strongly keeled, but they do not approach the hatchetlike, tubercular scales of *Adelynhoserserpenae mexicanus*.

**Distribution:** Known only from the far south-west of Mexico, namely the Chiapas area.

**Etymology:** Named after well-known Australian reptile taxonomist Richard Wells, currently of Lismore, NSW., in recognition of his seminal taxonomic works that he coauthored with taxonomist Cliff Ross Wellington, now of Woy Woy, NSW, published in 1983 and 1985 (Wells and Wellington 1983, 1985).

There was an attempt to formally suppress their 1983 and 1985 works at the ICZN which refused to do so in a ruling in 1991.

This attempt to suppress their work was based on totally false claim that it lacked scientific merit, although the real agenda of the people seeking to suppress the work was to fraudulently rename the same species and genera themselves and as they pleased.

Notwithstanding the formal ruling by the ICZN, a number of so-called herpetologists have in fact sought to fraudulently and in violation of the rules of Zoological Nomenclature (Article 23. Principle of Priority) to rename validly named Wells and Wellington species and genera of snakes, including Smith (1985), where he renamed the species *Antaresia saxacola* Wells and Wellington, 1985, "*Liasis stimsoni*" and Van Wallach (2006), who renamed *Sivadictus* Wells and Wellington, 1985, "*Austrotyphlops*".

More recently a group of nine renegade so-called herpetologists, led by Hinrich Kaiser, Wulf Schleip, Mark O'Shea, Brian Crother and Wolfgang Wüster have sought to illegally steal all the scientific work of Wells in the post 2000 period and claim it as their own!

(Kaiser *et al.* 2013)

Kaiser *et al.* (Kaiser *et al.* 2013) seek to break and destroy the rules of Zoological Nomenclature (Ride *et al.* 1999) including the three critical rules of:

- 1/ Homonymy (Principal 5, Article 52 and elsewhere),
  - 2/ Priority (Principal 3, Article 23 and elsewhere),
  - 3/ Stability (Principal 4, Articles 23, 65 and elsewhere),
- as well as the ethics of the Code (Appendix A).

They seek to do this in the first instance by boycotting established nomenclature and the established rules in a war plan that must by their own account run for decades (Kaiser *et al.* 2013, p. 20). They first seek to boycott all Wells's names proposed in the post 2000 period.

They then seek coin their own names for hundreds of taxa already properly named by Wells and others including myself (Hoser) and even Fitzinger (Leopold Joseph Franz Johann Fitzinger, the acclaimed taxonomist who lived from April 13, 1802 to September 20, 1884) and attempting to take credit for the research work of the earlier authors. This will create unprecedented taxonomic instability and confusion.

Their actions will effectively:

- 1/ Freeze the progress of herpetological taxonomy and if copied, perhaps all of zoology;
- 2/ Put lives at risk;
- 3/ Increase the likelihood of extinctions of rarer taxa.

#### ACKNOWLEDGEMENTS

Numerous herpetologists and others have assisted in various capacities.

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## Divisions within the snake genera *Cylindrophis* Wagler, 1828 (Cylindrophiidae Fitzinger, 1843) and *Anomochilus* Berg, 1901 (Anomochilidae Cundall, Wallach and Rossman, 1993).

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### ABSTRACT

This paper revisits the southern Asian fossorial snake genera *Cylindrophis* Wagler, 1828 (Cylindrophiidae Fitzinger, 1843) and *Anomochilus* Berg, 1901 (Anomochilidae Cundall, Wallach and Rossman, 1993) and their current taxonomy.

In the case of *Cylindrophis*, one new genus and two new subgenera are erected.

A new species is also described.

For *Anomochilus* a subgenus is erected and a new species described.

Both newly described species have been known as valid taxa within the literature for some time and are formally described herein to comply with the Zoological Code (Ride *et al.* 1999).

**Keywords:** Taxonomy; *Cylindrophis*; *Anomochilus*; new; genus; *Manserpens*; *Ernieswileus*; subgenus; *Macgoldrichea*; *Motteramus*; species; *wilsoni*; *marleneswileae*.

### INTRODUCTION

Not since the major revision by McDowell (1975) of east Indonesian *Cylindrophis* Wagler, 1828 (Cylindrophiidae Fitzinger, 1843) has anyone looked at the taxonomy of the genus.

While most recognized species were formally named more than a century ago, it is likely that there remain a number of unnamed forms bearing in mind the secretive nature of the snakes and the relative lack of specimens collected to date.

The genus as currently recognized has always been monotypic for the family and contains just ten currently recognized and named species.

Besides two species formally described in the 1990's, none have been named since 1920.

McDowell (1975) referred to a population on Baber Islands, Indonesia of indeterminate character, also referred to by others as being an undescribed species

Smith and Sidik (1998) wrote: "Iskandar also suggests that the species on Babar Island, previously assigned to *C. boulengeri* is an undescribed species."

However as of 2013 no one has formally named this taxon.

As a result this is done herein according to the Zoological Code (Ride *et al.* 1999).

At the level between the family and species, no one it seems has bothered to revisit the Cylindrophiidae, with the placement of all species within a single genus being accepted without question.

Notwithstanding this, the eleven known species do conform to four well-defined species groups worthy of taxonomic recognition.

Two are herein accorded subgenus status, while the third

monotypic group is elevated to a new genus.

As a result both Cylindrophiidae and the component genera are formally redefined herein.

Key references in terms of the Cylindrophiidae and the relevant taxonomy include, Adler *et al.* (1992), Ahl (1933), Auliya (2006), Bachman (1985), Bergman (1953), Bezuijen (2009), Blanford (1881), Botejue *et al.* (2012), Boulenger (1896, 1897, 1920), Cox *et al.* (1998), Brongersma (1933), Das and De Silva (2005), Das and Yaakob (2007), David and Vogel (1996, de Lang and Vogel (2005), de Rooij (1917), De Silva (1998), Dowling and Jenner (1988), Duméril and Bibron (1844), Frith and Frith (1978), Geissler *et al.* (2001), Gray (1849), Grossmann and Tillack (2001), Hakim (2012), Inger and Voris (2001), Jan (1865), Janzen *et al.* (2007), Karns *et al.* (2005), Laurenti (1768), Linnaeus (1758), Malkmus *et al.* (2002), Manthey and Grossmann (1997), McDiarmid *et al.* (1999), McDowell (1975), Mertens (1930), Meyer (1887), Müller (1985), Pauwels *et al.* (2000, 2003), Pyron *et al.* (2011, 2013), Roux (1911), Sang *et al.* (2009), Schlegel (1839), Seong Hoon (2012), Smedley (1931), Smith (1927, 1943), Smith and Sidik (1998), Stuebing (1991, 1994), Stuebing and Goh (1993), Stuebing and Inger (1999), Taylor (1965), Underwood (2002), Voris (2006), Wagler (1830), Wall (1921), Wanger *et al.* (2011), Winchell (2003a, 2003b), Zhao and Adler (1993), Zug *et al.* (1998) and sources cited therein.

The taxonomy of the the genus *Anomochilus* Berg, 1901 has in some ways had a similar history to that of the Cylindrophiidae Fitzinger, 1843, notwithstanding the name change for the genus after it was found *Anomalochilus* was pre-occupied.

The genus *Anomalochilus* was first established by van Lidth de Jeude (1890) for *Anomalochilus*

*weberi* van Lidth de Jeude, 1890 (type locality: "Sumatra: Kaju tanam" [5 Kajutanam, Sumatera Province, western Indonesia]).

However Berg (1901) showed that the generic name is preoccupied by *Anomalochilus* Blanchard, 1850: Coleoptera (Williams and Wallach, 1989), and provided the replacement name, *Anomochilus*. McDowell (1975) placed the genus under Cylindrophidae, but more recently, it was allocated to the Anomochilidae (Cundall *et al.*, 1993), with molecular data showing its relationships with some but not other members of the Cylindrophidae, rendering the latter possibly paraphyletic (Gower *et al.* 2005, Das *et al.* 2008).

Two further species have been described (Das *et al.* 2008) and yet no one has bothered to look at whether the three species put within the genus as currently recognized are appropriately placed.

That the snake described by Das *et al.* was a member of the family Anomochilidae is not in dispute. However a re-evaluation of the species itself described as *Anomochilus monticola* Das, Lakim, Lim and Hui, 2008 shows that it is quite divergent from the other two described members of the genus both in form and habit.

Therefore it should be placed in a new genus.

This is defined herein according to the Zoological Code (Ride *et al.* 1999).

The species *Anomalochilus leonardi* Smith, 1940 was described from a specimen from Sumatra, Indonesia. It remains known from just two specimens.

More recently a third specimen attributed to this species was found on the island of Borneo.

However a revisiting of the specimen shows that it is in fact of a different species level taxon McDiarmid *et al.* (1999).

It is therefore described below according to the Zoological Code (Ride *et al.* 1999).

While the literature on the genus *Anomochilus* treated generally as one and the same as the Anomochilidae by most authors is relatively sparse, the key references in terms of taxonomy include, Berg (1901), Boulenger (1893), Brongersma and Helle (1951), Cundall *et al.* (1993), Das and Yaakob (2007), Das *et al.* (2008) de Rooij (1917), Gower *et al.* (2005), de Juede and Van (1890), Malkmus *et al.* (2002), Manthey and Grossmann (1997), McDiarmid *et al.* (1999), McDowell (1975), Smith (1940), Stuebing and Goh (1993), Tweedie (1983), Williams and Wallach (1989), Yaakob (2003) and sources cited therein.

#### FAMILY CYLINDROPHIDAE

(Terminal taxon: *Cylindrophis resplendens* Wagler, 1828).

Widely known as of 2013 as *Cylindrophis ruffus* (Laurenti, 1768).

**Diagnosis:** The diagnosis for the family has until now been the same as for the genus *Cylindrophis*, as the family has been treated as monotypic for the genus.

This is now not the case.

Notwithstanding this, the family diagnosis remains unchanged.

The family Cylindrophidae is herein defined as snakes with the following suite of characters: small head not distinct from neck, covered with large symmetrical shields; the nostril in a single nasal, which forms a suture with its fellow behind the rostral, with no loreal or preocular scale; a small postocular, a mental groove present; tail short and blunt (De Rooij, 1917).

Teeth are moderate and subequal, with 9-13 in each maxillary and none in the premaxillary. Eyes are small with round or vertically subelliptical pupil that is distinct from the neighbouring shields.

Body is cylindrical with smooth scales in 17-23 rows, depending on the species. Tail is short and blunt.

In the most speciose genus *Cylindrophis* (10 recognized species) the ventrals are feebly enlarged, excluding the species

*wilsoni* sp. nov. which has ventrals the same size as the adjoining lateral scales. In the other genus *Manserpens* gen. nov. (this paper) (one species only), this is not the case.

*Manserpens* is separated from *wilsoni* sp. nov. by having 17 mid body rows (unique to this genus).

It is also separated by colour pattern and distribution (as outlined in the descriptions of each species and genus below).

Superficially similar-looking species in the family Anomochilidae, Cundall, Wallach and Rossman, 1993 are separated most easily by the absence of a mental groove.

**Distribution:** Southern Asia, including outer islands of the Asian Plate, as far east as Tanimbar Islands (Yamdena Island).

**Content:** *Cylindrophis* Wagler, 1828; *Manserpens* gen. nov. (this paper).

#### GENUS CYLINDROPHIS WAGLER, 1828

**Type species:** *Cylindrophis resplendens* Wagler, 1828.

**Generally known as** *Cylindrophis ruffus* (Laurenti, 1768).

**Diagnosis:** The genus *Cylindrophis* is defined by the following suite of characters: small head not distinct from neck, covered with large symmetrical shields; the nostril in a single nasal, which forms a suture with its fellow behind the rostral, with no loreal or preocular scale; a small postocular, a mental groove present; tail short and blunt (De Rooij, 1917).

Teeth are moderate and subequal, with 9-13 in each maxillary and none in the premaxillary. Eyes are small with round or vertically subelliptical pupil that is distinct from the neighbouring shields.

Body is cylindrical with smooth scales in 19-23 rows, depending on the species. Tail is short and blunt.

In the most speciose genus *Cylindrophis* (10 recognized species) the ventrals are feebly enlarged, excluding the species *wilsoni* sp. nov. which has ventrals the same size as the adjoining lateral scales. In the other genus *Manserpens* gen. nov. (this paper) (one species only), this is not the case.

*Manserpens* is separated from *wilsoni* sp. nov. by having 17 mid body rows (unique to this genus).

It is also separated by colour pattern and distribution (as outlined in the descriptions of each species and genus below).

Superficially similar-looking species in the family Anomochilidae, Cundall, Wallach and Rossman, 1993 are separated most easily by the absence of a mental groove.

The genus *Manserpens* gen. nov. (monotypic for the species originally described as *Cylindrophis engkariensis* Steubing, 1994) is differentiated from all species within *Cylindrophis* in the number of mid-body scale rows, being 17 versus 19-23 in the *Cylindrophis*.

Furthermore, unlike species of *Cylindrophis*, the ventrals of *Manserpens* gen. nov. are indistinguishable in width from the dorsals.

*Manserpens* gen. nov. also possesses a unique colour pattern of small, white, irregularly shaped paravertebral spots, and the tail dark (black) dorsally, and lighter ventrally with dark mottling. In contrast, *Cylindrophis rufus* is characterised by orange bands partially encircling a black body; an incomplete orange ring encircling the posterior portion of the head, and a broad orange band encircling the tail.

Equally contrasting with the pattern of *M. engkariensis* is *Cylindrophis lineatus*, which has (in alcohol) a yellowish head with a faint dark rostral spot, alternating dark and yellow bands along the sides, an irregular dark longitudinal stripe along the side, running the length of the body, two light paravertebral stripes and a middorsal dark stripe.

The subgenera *Macgoldrichea* subgen. nov. and *Motteramus* subgen. nov. within *Cylindrophis* are separated from the nominate subgenus by the fact that the diameter of the eye is one third to one fourth its distance from the nostril, versus about half its distance from the nostril in *Cylindrophis*.



*Macgoldrichea gen. nov.* and *Motteramus subgen. nov.* are further separated from *Cylindrophis* by having the interocular width equal to the length of the snout, versus the interocular width being more the length of the snout in *Cylindrophis*.

The subgenus *Macgoldrichea subgen. nov.* is separated from subgenus *Cylindrophis* and *Motteramus subgen. nov.* by having the frontal being smaller than the supraocular or parietal, versus being as large as or larger than the supraocular and larger than the parietals in both other subgenera.

*Macgoldrichea subgen. nov.* is further separated from all other *Cylindrophidae* by the following suite of characters: Diameter of the eye is one third to one fourth its distance from the nostril; the distance between the eyes equals the length of the snout; frontal usually a little smaller than the supraocular or the parietal; six upper labials; third and fourth entering the eye; 19-21 mid-body rows; ventrals are not twice as large as the contiguous scales; 189-212 ventrals; anal divided, 4-6 subcaudals; colour above is with a black network enclosing two series of large reddish-brown spots along the back; lower parts white and variegated with black.

The subgenus *Motteramus subgen. nov.* is separated from the nominate subgenus and *Macgoldrichea subgen. nov.* by color pattern. Unlike the others, *Motteramus subgen. nov.* either:

lacks a pale collar, has no pale transverse bars on the dorsum, although sometimes with light brown longitudinal bands, has a pale head with dark spotting, sometimes with the entire crown behind the tip of the muzzle dark as well and has a dark anal region, or:

has a pattern of alternating dark and yellow bands along the sides, an irregular dark longitudinal stripe along the side, running the length of the body, two light paravertebral stripes and a middorsal dark stripe.

The subgenus *Cylindrophis* is separated from the *Motteramus subgen. nov.* by hemipenial morphology. In *Cylindrophis* the sulcus extends posteriorly (as seen by dissection of the inverted organ) straight to the tip of the organ, with the prominent folds that form the lips of the sulcus tapered and gradually diminishing distally. By contrast in *Motteramus subgen. nov.* the sulcus runs distad as a deep groove to the end short of the tip of the organ, then to be continued by a shallower depression extending diagonally across the tip of the organ (perhaps forming a terminal cup when the organ is everted); the lips of the sulcus become enlarged distally and form very large frills bordering on the terminal depression.

**Content:** *Cylindrophis (Cylindrophis) ruffus* (Laurenti, 1768) (type species); *C. (Cylindrophis) aruensis* Boulenger, 1920; *C. (Cylindrophis) boulengeri* Roux, 1911; *C. (Cylindrophis) yamdena* Smith and Sidik, 1998; *Cylindrophis (Macgoldrichea) maculatus* (Linnaeus, 1754); *C. (Motteramus) melanotus* (Wagler, 1830); *C. (Motteramus) isolepis* (Boulenger, 1896); *C. (Motteramus) opisthorhodus* (Boulenger, 1897); *C. (Motteramus) lineatus* (Blanford, 1881); *C. (Motteramus) wilsoni sp. nov.* (this paper).

#### NEW SUBGENUS MACGOLDRICHEA SUBGEN. NOV.

**Type species:** *Anguis maculata* Linnaeus, 1754.

**Currently known by most authors as** *Cylindrophis maculatus* (Linnaeus, 1754).

**Diagnosis:** The subgenera *Macgoldrichea subgen. nov.* and *Motteramus subgen. nov.* within *Cylindrophis* are separated from the nominate subgenus by the fact that the diameter of the eye is one third to one fourth its distance from the nostril, versus about half its distance from the nostril in *Cylindrophis*.

*Macgoldrichea gen. nov.* and *Motteramus subgen. nov.* are further separated from *Cylindrophis* by having the interocular width equal to the length of the snout, versus the interocular width being more the length of the snout in *Cylindrophis*.

The subgenus *Macgoldrichea subgen. nov.* is separated from subgenus *Cylindrophis* and *Motteramus subgen. nov.* by having the frontal being smaller than the supraocular or parietal, versus

being as large as or larger than the supraocular and larger than the parietals in both other subgenera.

*Macgoldrichea subgen. nov.* is further separated from all other *Cylindrophidae* by the following suite of characters: Diameter of the eye is one third to one fourth its distance from the nostril; the distance between the eyes equals the length of the snout; frontal usually a little smaller than the supraocular or the parietal; six upper labials; third and fourth entering the eye; 19-21 mid-body rows; ventrals are not twice as large as the contiguous scales; 189-212 ventrals; anal divided, 4-6 subcaudals; colour above is with a black network enclosing two series of large reddish-brown spots along the back; lower parts white and variegated with black.

The subgenus *Motteramus subgen. nov.* is separated from the nominate subgenus and *Macgoldrichea subgen. nov.* by color pattern. Unlike the others, *Motteramus subgen. nov.* either: lacks a pale collar, has no pale transverse bars on the dorsum, although sometimes with light brown longitudinal bands, has a pale head with dark spotting, sometimes with the entire crown behind the tip of the muzzle dark as well and has a dark anal region, or:

has a pattern of alternating dark and yellow bands along the sides, an irregular dark longitudinal stripe along the side, running the length of the body, two light paravertebral stripes and a middorsal dark stripe.

The subgenus *Cylindrophis* is separated from the *Motteramus subgen. nov.* by hemipenial morphology. In *Cylindrophis* the sulcus extends posteriorly (as seen by dissection of the inverted organ) straight to the tip of the organ, with the prominent folds that form the lips of the sulcus tapered and gradually diminishing distally. By contrast in *Motteramus subgen. nov.* the sulcus runs distad as a deep groove to the end short of the tip of the organ, then to be continued by a shallower depression extending diagonally across the tip of the organ (perhaps forming a terminal cup when the organ is everted); the lips of the sulcus become enlarged distally and form very large frills bordering on the terminal depression.

The genus *Cylindrophis* is defined by the following suite of characters: small head not distinct from neck, covered with large symmetrical shields; the nostril in a single nasal, which forms a suture with its fellow behind the rostral, with no loreal or preocular scale; a small postocular, a mental groove present; tail short and blunt (De Rooij, 1917).

Teeth are moderate and subequal, with 9-13 in each maxillary and none in the premaxillary. Eyes are small with round or vertically subelliptical pupil that is distinct from the neighbouring shields.

Body is cylindrical with smooth scales in 19-23 rows, depending on the species. Tail is short and blunt.

In the most speciose genus *Cylindrophis* (10 recognized species) the ventrals are feebly enlarged, excluding the species *wilsoni sp. nov.* which has ventrals the same size as the adjoining lateral scales. In the other genus *Manserpens gen. nov.* (this paper) (one species only), this is not the case.

*Manserpens* is separated from *wilsoni sp. nov.* by having 17 mid body rows (unique to this genus).

It is also separated by colour pattern and distribution (as outlined in the descriptions of each species and genus below).

Superficially similar-looking species in the family Anomochilidae, Cundall, Wallach and Rossman, 1993 are separated most easily by the absence of a mental groove.

The genus *Manserpens gen. nov.* (monotypic for the species originally described as *Cylindrophis engkariensis* Steubing, 1994) is differentiated from all species within *Cylindrophis* in the number of mid-body scale rows, being 17 versus 19-23 in the *Cylindrophis*.

Furthermore, unlike species of *Cylindrophis*, the ventrals of *Manserpens gen. nov.* are indistinguishable in width from the dorsals.

*Manserpens gen. nov.* also possesses a unique colour pattern of small, white, irregularly shaped paravertebral spots, and the tail dark (black) dorsally, and lighter ventrally with dark mottling. In contrast, *Cylindrophis rufus* is characterised by orange bands partially encircling a black body; an incomplete orange ring encircling the posterior portion of the head, and a broad orange band encircling the tail.

Equally contrasting with the pattern of *M. engkariensis* is *Cylindrophis lineatus*, which has (in alcohol) a yellowish head with a faint dark rostral spot, alternating dark and yellow bands along the sides, an irregular dark longitudinal stripe along the side, running the length of the body, two light paravertebral stripes and a middorsal dark stripe.

**Distribution:** Sri Lanka, from sea level to about 1,200 metres.

**Etymology:** Named in honour of Louise McGoldrich of East Ringwood, Victoria, Australia, for services to conservation and wildlife education, including her excellent work with the Snakebusters reptile education company.

**Content:** *Cylindrophis (Macgoldrichea) maculatus* (Linnaeus, 1754) (type species).

#### NEW SUBGENUS MOTTERAMUS SUBGEN. NOV.

**Type species:** *Cylindrophis melanoto* Wagler, 1828.

**Currently widely known as** *Cylindrophis melanotus* Wagler, 1828.

**Diagnosis:** The subgenera *Macgoldrichea subgen. nov.* and *Motteramus subgen. nov.* within *Cylindrophis* are separated from the nominate subgenus by the fact that the diameter of the eye is one third to one fourth its distance from the nostril, versus about half its distance from the nostril in *Cylindrophis*.

*Macgoldrichea gen. nov.* and *Motteramus subgen. nov.* are further separated from *Cylindrophis* by having the interocular width equal to the length of the snout, versus the interocular width being more the length of the snout in *Cylindrophis*.

The subgenus *Macgoldrichea subgen. nov.* is separated from subgenus *Cylindrophis* and *Motteramus subgen. nov.* by having the frontal being smaller than the supraocular or parietal, versus being as large as or larger than the supraocular and larger than the parietals in both other subgenera.

*Macgoldrichea subgen. nov.* is further separated from all other *Cylindrophidae* by the following suite of characters: Diameter of the eye is one third to one fourth its distance from the nostril; the distance between the eyes equals the length of the snout; frontal usually a little smaller than the supraocular or the parietal; six upper labials; third and fourth entering the eye; 19-21 mid-body rows; ventrals are not twice as large as the contiguous scales; 189-212 ventrals; anal divided, 4-6 subcaudals; colour above is with a black network enclosing two series of large reddish-brown spots along the back; lower parts white and variegated with black.

The subgenus *Motteramus subgen. nov.* is separated from the nominate subgenus and *Macgoldrichea subgen. nov.* by color pattern. Unlike the others, *Motteramus subgen. nov.* either: lacks a pale collar, has no pale transverse bars on the dorsum, although sometimes with light brown longitudinal bands, has a pale head with dark spotting, sometimes with the entire crown behind the tip of the muzzle dark as well and has a dark anal region, or:

has a pattern of alternating dark and yellow bands along the sides, an irregular dark longitudinal stripe along the side, running the length of the body, two light paravertebral stripes and a middorsal dark stripe.

The subgenus *Cylindrophis* is separated from the *Motteramus subgen. nov.* by hemipenal morphology. In *Cylindrophis* the sulcus extends posteriorly (as seen by dissection of the inverted organ) straight to the tip of the organ, with the prominent folds that form the lips of the sulcus tapered and gradually diminishing distally. By contrast in *Motteramus subgen. nov.* the sulcus runs distad as a deep groove to the end short of the tip of the organ,

then to be continued by a shallower depression extending diagonally across the tip of the organ (perhaps forming a terminal cup when the organ is everted); the lips of the sulcus become enlarged distally and form very large frills bordering on the terminal depression.

The genus *Cylindrophis* is defined by the following suite of characters: small head not distinct from neck, covered with large symmetrical shields; the nostril in a single nasal, which forms a suture with its fellow behind the rostral, with no loreal or preocular scale; a small postocular, a mental groove present; tail short and blunt (De Rooij, 1917).

Teeth are moderate and subequal, with 9-13 in each maxillary and none in the premaxillary. Eyes are small with round or vertically subelliptical pupil that is distinct from the neighbouring shields.

Body is cylindrical with smooth scales in 19-23 rows, depending on the species. Tail is short and blunt.

In the most speciose genus *Cylindrophis* (10 recognized species) the ventrals are feebly enlarged, excluding the species *wilsoni sp. nov.* which has ventrals the same size as the adjoining lateral scales. In the other genus *Manserpens gen. nov.* (this paper) (one species only), this is not the case.

*Manserpens* is separated from *wilsoni sp. nov.* by having 17 mid body rows (unique to this genus).

It is also separated by colour pattern and distribution (as outlined in the descriptions of each species and genus below).

Superficially similar-looking species in the family Anomochilidae, Cundall, Wallach and Rossman, 1993 are separated most easily by the absence of a mental groove.

The genus *Manserpens gen. nov.* (monotypic for the species originally described as *Cylindrophis engkariensis* Steubing, 1994) is differentiated from all species within *Cylindrophis* in the number of mid-body scale rows, being 17 versus 19-23 in the *Cylindrophis*.

Furthermore, unlike species of *Cylindrophis*, the ventrals of *Manserpens gen. nov.*

are indistinguishable in width from the dorsals.

*Manserpens gen. nov.* also possesses a unique colour pattern of small, white, irregularly shaped paravertebral spots, and the tail dark (black) dorsally, and lighter ventrally with dark mottling. In contrast, *Cylindrophis rufus* is characterised by orange bands partially encircling a black body; an incomplete orange ring encircling the posterior portion of the head, and a broad orange band encircling the tail.

Equally contrasting with the pattern of *M. engkariensis* is *Cylindrophis lineatus*, which has (in alcohol) a yellowish head with a faint dark rostral spot, alternating dark and yellow bands along the sides, an irregular dark longitudinal stripe along the side, running the length of the body, two light paravertebral stripes and a middorsal dark stripe.

**Distribution:** Indonesian region.

**Content:** *Cylindrophis (Motteramus) melanotus* (Wagler, 1830) (type species); *C. (Motteramus) isolepis* (Boulenger, 1896); *C. (Motteramus) opisthorhodus* (Boulenger, 1897); *C. (Motteramus) lineatus* (Blanford, 1881); *C. (Motteramus) wilsoni sp. nov.* (this paper).

#### NEW SPECIES CYLINDROPHIS (MOTTERAMUS) WILSONI SP. NOV.

**Holotype:** A specimen collected from the Babber Islands (Pulau Babar), originally held at the Rijks Museum van Natuurlijke Historie, Leiden, specimen number: 5542, since transferred to Naturalis Biodiversity Center, Holland.

This is a government controlled facility that allows researchers access to its collection.

**Holotype description:** Scales in 21:19:19 rows, 187 ventrals (including gulars) and ventrals of the same size as the adjacent scale rows; 7 subcaudals and a terminal scute. The frontal is just as long as broad. The diameter of the eye equals one fourth

of its distance from the nostril. 12 left maxillary teeth, 9 left palatine teeth, 10 left pterygoid teeth, 14 left dentary teeth. The yellow spots on the nape are nearly confluent. Vertical yellow spots on body; pale prefrontal spots; anterior subcaudals yellow, posterior ones black.

**Diagnosis:** Separated from all other *Cylindrophis* (including within all subgenera) and *Manserpens gen. nov.* by the following pair of characters: 19 midbody scale rows and ventrals of the same size as the adjacent scale rows.

The specimen was formerly diagnosed erroneously as *C. boulengeri*, from which it is readily separated by its colouration as described herein. The colouration of: yellow spots on the nape nearly confluent; Vertical yellow spots on body; pale prefrontal spots; anterior subcaudals yellow, posterior ones black, actually resembles *C. ruffus*.

Notwithstanding this, *C. (Motteramus) wilsoni sp. nov.* is separated from both *C. boulengeri* and *C. ruffus* by its far smaller eye (see subgenus diagnosis, as it applies to all in that subgenus). The species *C. (Motteramus) aruensis* is separated from *C. (Motteramus) wilsoni sp. nov.* by having 23 rather than 19 mid-body rows.

*C. (Motteramus) wilsoni sp. nov.* is separated from *C. (Motteramus) melanotus* and *C. (Motteramus) lineatus* by its lower ventral count 187, versus 224-245 in *C. (Motteramus) melanotus* and 210-215 in *C. (Motteramus) lineatus*.

*C. (Motteramus) wilsoni sp. nov.* is separated from *C. (Motteramus) opisthorhodus* by having 19 midbody rows as opposed to 23 in *C. (Motteramus) opisthorhodus*.

*C. (Motteramus) wilsoni sp. nov.* is separated from *C. (Motteramus) isolepis* by having 19 midbody rows as opposed to 21 midbody rows and 187 ventrals as opposed to 221 in *C. (Motteramus) isolepis*.

**Distribution:** Pulau Babar, Indonesia.

**Etymology:** The name is in honour of Rowville Wilson, of Burwood, Victoria, Australia, for his work in helping conserve Australian wildlife, including logistical support for the Snakebusters wildlife education enterprise.

#### NEW SUBGENUS *CYLINDROPHIS* WAGLER, 1828.

**Type species:** *Cylindrophis resplendens* Wagler, 1828.

**Generally known as** *Cylindrophis ruffus* (Laurenti, 1768).

**Diagnosis:** See as for genus (above) and then cross reference with diagnoses for the other subgenera.

**Distribution:** South-east Asia.

**Content:** *Cylindrophis (Cylindrophis) ruffus* (Laurenti, 1768) (type species); *C. (Cylindrophis) aruensis* Boulenger, 1920; *C. (Cylindrophis) boulengeri* Roux, 1911; *C. (Cylindrophis) yamdena* Smith and Sidik, 1998.

#### NEW GENUS *MANSERPENS* GEN. NOV.

**Type species:** *Cylindrophis engkariensis* Stuebing 1994

**Diagnosis:** The genus *Manserpens gen. nov.* (monotypic for the species originally described as *Cylindrophis engkariensis* Stuebing, 1994) is differentiated from all species within *Cylindrophis* in the number of mid-body scale rows, being 17 versus 19-23 in the genus *Cylindrophis*.

Furthermore, unlike species of *Cylindrophis*, the ventrals of *Manserpens gen. nov.*

are indistinguishable in width from the dorsals.

*Manserpens gen. nov.* also possesses a unique colour pattern of small, white, irregularly shaped paravertebral spots, and the tail dark (black) dorsally, and lighter ventrally with dark mottling. In contrast, *Cylindrophis rufus* is characterised by orange bands partially encircling a black body; an incomplete orange ring encircling the posterior portion of the head, and a broad orange band encircling the tail.

Equally contrasting with the pattern of *M. engkariensis* is *Cylindrophis lineatus*, which has (in alcohol) a yellowish head with a faint dark rostral spot, alternating dark and yellow bands

along the sides, an irregular dark longitudinal stripe along the side, running the length of the body, two light paravertebral stripes and a middorsal dark stripe.

The subgenera *Macgoldrichea subgen. nov.* and *Motteramus subgen. nov.* within *Cylindrophis* are separated from the nominate subgenus by the fact that the diameter of the eye is one third to one fourth its distance from the nostril, versus about half its distance from the nostril in *Cylindrophis*.

*Macgoldrichea gen. nov.* and *Motteramus subgen. nov.* are further separated from *Cylindrophis* by having the interocular width equal to the length of the snout, versus the interocular width being more the length of the snout in *Cylindrophis*.

The subgenus *Macgoldrichea subgen. nov.* is separated from subgenus *Cylindrophis* and *Motteramus subgen. nov.* by having the frontal being smaller than the supraocular or parietal, versus being as large as or larger than the supraocular and larger than the parietals in both other subgenera.

*Macgoldrichea subgen. nov.* is further separated from all other *Cylindrophidae* by the following suite of characters: Diameter of the eye is one third to one fourth its distance from the nostril; the distance between the eyes equals the length of the snout; frontal usually a little smaller than the supraocular or the parietal; six upper labials; third and fourth entering the eye; 19-21 mid-body rows; ventrals are not twice as large as the contiguous scales; 189-212 ventrals; anal divided, 4-6 subcaudals; colour above is with a black network enclosing two series of large reddish-brown spots along the back; lower parts white and variegated with black.

The subgenus *Motteramus subgen. nov.* is separated from the nominate subgenus and *Macgoldrichea subgen. nov.* by color pattern. Unlike the others, *Motteramus subgen. nov.* either: lacks a pale collar, has no pale transverse bars on the dorsum, although sometimes with light brown longitudinal bands, has a pale head with dark spotting, sometimes with the entire crown behind the tip of the muzzle dark as well and has a dark anal region, or:

has a pattern of alternating dark and yellow bands along the sides, an irregular dark longitudinal stripe along the side, running the length of the body, two light paravertebral stripes and a middorsal dark stripe.

The subgenus *Cylindrophis* is separated from the *Motteramus subgen. nov.* by hemipenial morphology. In *Cylindrophis* the sulcus extends posteriorly (as seen by dissection of the inverted organ) straight to the tip of the organ, with the prominent folds that form the lips of the sulcus tapered and gradually diminishing distally. By contrast in *Motteramus subgen. nov.* the sulcus runs distad as a deep groove to the end short of the tip of the organ, then to be continued by a shallower depression extending diagonally across the tip of the organ (perhaps forming a terminal cup when the organ is everted); the lips of the sulcus become enlarged distally and form very large frills bordering on the terminal depression.

The genus *Cylindrophis* is defined by the following suite of characters: small head not distinct from neck, covered with large symmetrical shields; the nostril in a single nasal, which forms a suture with its fellow behind the rostral, with no loreal or preocular scale; a small postocular, a mental groove present; tail short and blunt (De Rooij, 1917).

Teeth are moderate and subequal, with 9-13 in each maxillary and none in the premaxillary. Eyes are small with round or vertically subelliptical pupil that is distinct from the neighbouring shields.

Body is cylindrical with smooth scales in 19-23 rows, depending on the species. Tail is short and blunt.

In the most speciose genus *Cylindrophis* (10 recognized species) the ventrals are feebly enlarged. In the other genus *Manserpens gen. nov.* (this paper) (one species only), this is not the case.

Superficially similar-looking species in the family Anomochilidae,



Cundall, Wallach and Rossman, 1993 are separated most easily by the absence of a mental groove.

**Distribution:** Known only from Borneo.

**Etymology:** Named in honour of Daniel Man of Mitcham, Victoria, Australia, in recognition for his services to the Australian accounting industry and also wildlife conservation and education through his excellent back-office work with Snakebusters, reptile education and wildlife shows.

**Content:** *Manserpens engkariensis* (Stuebing, 1994) (type species).

**FAMILY ANOMOCHILIDAE CUNDALL, WALLACH AND ROSSMAN, 1993**

**(Terminal taxon: *Anomalochilus weberi* de Jeude, 1890)**

**Diagnosis:** Head small, indistinct from neck; forehead covered with large scales that may be either symmetrical or show an azygous parietofrontal; nostril in a single nasal, which is in contact with Supralabial 2; loreal and preocular absent; a single postocular; eye small; mental groove absent; body scales smooth; and tail short and conical (de Rooij, 1917; Tweedie, 1983; Manthey and Grossmann, 1997).

**Distribution:** Borneo and Sumatra.

**Content:** *Anomochilus* de Jeude, 1890; *Ernieswileus* gen. nov. (this paper).

**GENUS ANOMOCHILUS LIDTH DE JEUDE, 1890**

**Type species: *Anomalochilus weberi* de Jeude, 1890**

**Diagnosis:** For this genus, the diagnosis is as for the family: Head small, indistinct from neck; forehead covered with large scales that may be either symmetrical or show an azygous parietofrontal; nostril in a single nasal, which is in contact with Supralabial 2; loreal and preocular absent; a single postocular; eye small; mental groove absent; body scales smooth; and tail short and conical (de Rooij, 1917; Tweedie, 1983; Manthey and Grossmann, 1997).

The genus *Ernieswileus* gen. nov. (this paper) formerly included within *Anomochilus* is separated from *Anomochilus* by the following suite of characters: parietofrontal single, midbody scale rows 19, and no large pale spots on either side of vertebral. The new genus additionally differs from *A. weberi* (from Sumatra and southern Borneo) in showing an azygous (vs. paired) parietofrontal; 258-261 (vs. 242-248) ventrals; absence (vs. presence) of a light line along flanks; and absence (vs. presence) of large pale blotches on either side of the vertebral; and from *A. leonardi* (from Peninsular Malaysia and lowlands of eastern Borneo), in showing 19 (vs. 17) midbody scale rows; 258-261 (vs. 239-248) ventrals; and dorsum unpatterned dark brown, except for pale speckles, one scale wide, at intervals on either side of the vertebral region (vs. with large pale spots).

**Distribution:** Borneo and Sumatra.

**Content:** *Anomochilus weberi* de Jeude, 1890; *A. leonardi* Smith, 1940; *A. marleneswileae* sp. nov. (this paper).

**NEW SPECIES ANOMOCHILUS MARLENESWILEAE SP. NOV.**

**Holotype:** A specimen in the Sabah Museum Borneo, Malaysia, specimen number NH 2473, collected in 1981 by Raymond Goh, under a grassy herbaceous layer at the edge of a forest at 20 metres altitude, in the Sepilok Forest Reserve, Sandakan District, Sabah, Borneo.

The Sabah Museum Borneo, Malaysia is a government run facility that allows researchers access to their collection.

**Diagnosis:** This species *A. marleneswileae* sp. nov. was confused with the similar species *Anomochilus weberi* de Jeude, 1890 and *A. leonardi* Smith, 1940, with which it shares common properties (Stuebing and Goh 1993).

It is separated from these two species and the species described as *Anomalochilus monticola* Das, Lakim, Lim and Hui, 2008, herein assigned to a new genus (*Ernieswileus*) most readily by the following unique suite of characters: Eye minute, lateral is about four times its diameter distant from the nostril,

three times its diameter from the mouth, partially covered by the preocular scale. Four supralabials, first smallest, third tallest and forming the ventral border of the orbit, fourth the longest and low. The rostral is long, more than twice as long as broad, extending onto upper surface of snout. Frontal large, rear border semicircular. Nasal scale large, reaching dorsal surface of the head and touching the prefrontal. No separate loreal. A large praecocular scale directly behind the nasal, in broad contact dorsally with prefrontal and frontal. A large supraocular, two thirds size of frontal. One postocular, larger than eye, much smaller than supraocular. A large temporal scale forming entire dorsal border of fourth supralabial, directly behind and larger than postocular. A second large temporal scale, above and behind the first one, directly posterior to the supraocular. A pair of slightly larger parietals behind frontal, each parietal smaller than supraocular. Five infralabials. Mental half size of first infralabial, one pair of chin shields larger than infralabials. Dorsal scales are smooth and very glossy, producing diffraction colors, weakly imbricate posteriorly. Ventrals not distinguishable from the lateral scales; 252 midventrals to vent. Divided anal, 7 subcaudals. Scale rows (excluding the midventral one) 17-19-17; last six vertebral scales are enlarged. The colour (in alcohol) is purplish brown with conspicuous circular or oval light spots, with fourteen pairs; each spot covering three scales, and approximately 35 abdominal pairs (each spot covering four scales), the latter alternating in left-right positions along the body axis. The dorsal side of the snout has a v-shaped transverse cream-coloured band immediately posterior to the rostral scale. The tail has a dark tip which is less than 10 per cent of the tail area, the rest of the tail encircled by a broad light-coloured band.

*A. leonardi* Smith, 1940 is separated from this new taxon *A. marleneswileae* sp. nov. by its lower ventral count (under 248, versus 252), just 17 midbody rows (excluding the mid-ventral line) (17:17:17, versus 17:17:19) and a fourth supralabial that is not noticeably longer and of similar size to the third.

The species *A. weberi* de Jeude, 1890 is separated from this new taxon *A. marleneswileae* sp. nov. by its lower ventral count (under 248, versus 252), a 17:19:19 scale row configuration, (versus 17:19:17), and the fact that the third and fourth supralabials may be of similar height (but the supralabials in specimens from Peninsula Malaysia and Sabah may be the same as in this species). *A. weberi* is further differentiated from *A. leonardi* and *A. marleneswileae* sp. nov. by colour pattern in having no complete light bands encircling the snout and tail, having fewer and smaller spots, and possessing a faint line along the flanks.

The species described as *Anomalochilus monticola* Das, Lakim, Lim and Hui, 2008, herein assigned to a new genus (*Ernieswileus*) can be separated from *A. marleneswileae* sp. nov. by the following suite of characters: parietofrontal single, midbody scale rows 19, and no large pale spots on either side of vertebral.

The new genus additionally differs from *A. weberi* (from Sumatra and southern Borneo) in showing an azygous (vs. paired) parietofrontal; 258-261 (vs. 242-248) ventrals; absence (vs. presence) of a light line along flanks; and absence (vs. presence) of large pale blotches on either side of the vertebral; and from *A. leonardi* (from Peninsular Malaysia and lowlands of eastern Borneo), in showing 19 (vs. 17) midbody scale rows; 258-261 (vs. 239-248) ventrals; and dorsum unpatterned dark brown, except for pale speckles, one scale wide, at intervals on either side of the vertebral region (vs. with large pale spots).

**Distribution:** Known only from the holotype and therefore currently only known from the Sepilok Forest Reserve, Sandakan District, Sabah, Borneo.

**Etymology:** Named in honour of Marlene Swile of Mitchell's Plain, Cape Town South Africa, in recognition of her contributions to African herpetology and the book publishing industry.

**NEW GENUS *ERNIESWILEUS* GEN. NOV.**

**Type species:** *Anomochilus monticola* Das, Lakim, Lim and Hui, 2008.

**Diagnosis:** The genus *Ernieswileus* gen. nov. (this paper) formerly included within *Anomochilus* is separated from *Anomochilus* by the following suite of characters: parietofrontal single, midbody scale rows 19, and no large pale spots on either side of vertebral. The new genus additionally differs from *A. weberi* (from Sumatra and southern Borneo) in showing an azygous (vs. paired) parietofrontal; 258-261 (vs. 242-248) ventrals; absence (vs. presence) of a light line along flanks; and absence (vs. presence) of large pale blotches on either side of the vertebral; and from *A. leonardi* (from Peninsular Malaysia and lowlands of eastern Borneo), in showing 19 (vs. 17) midbody scale rows; 258-261 (vs. 239-248) ventrals; and dorsum unpatterned dark brown, except for pale speckles, one scale wide, at intervals on either side of the vertebral region (vs. with large pale spots).

Traits common to both the genus *Ernieswileus* gen. nov. and *Anomochilus* are the following: Head small, indistinct from neck; forehead covered with large scales that may be either symmetrical or show an azygous parietofrontal; nostril in a single nasal, which is in contact with Supralabial 2; loreal and preocular absent; a single postocular; eye small; mental groove absent; body scales smooth; and tail short and conical (de Rooij, 1917; Tweedie, 1983; Manthey and Grossmann, 1997).

**Distribution:** Borneo.

**Etymology:** Named in honor of Ernest (Ernie) Swile of Athlone, Capetown, South Africa in recognition to his contributions to African herpetology.

**Content:** *Ernieswileus monticola* (Das, Lakim, Lim and Hui, 2008).

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# The description of new snake subgenera, species and subspecies from Australia (Squamata:Serpentes).

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## ABSTRACT

A number of snake taxa within Australia have been recognized as warranting taxonomic recognition for some time, but for various reasons have remained unnamed scientifically.

This paper for the first time formally recognizes and names 12 new subgenera of Australasian Blind Snakes (plus the nominate two), as well as five new species of Blind Snake, all restricted to Australasia in accordance with the Zoological Code (Ride *et al.* 1999). Furthermore this paper formally names one new species and two new subspecies of elapid snake, all three from north-west Australia.

**Keywords:** Taxonomy; Nomenclature; Zoological Code; Typhlopidae; *Libertadictus*; *Sivadictus*; new subgenera; *Ackytyphlops*; *Suewitttyphlops*; *Robinwitttyphlops*; *Pattersontyphlops*; *Sloppytyphlops*; *Mantyphlops*; *Jackyhosertyphlops*; *Kerrytyphlops*; *Adelynhosertyphlops*; *Bennetttyphlops*; *Silvatyphlops*; *Sheatyphlops*; new species; *adelynhoserae*; *cliffrosswellingtoni*; *jackyhoserae*; *sloppi*; *richardwellsi*; *Cannia*; *Pailsus*; *hoserae*; new subspecies; *Furina*; *diadema*; *ornata*; *toddpattersoni*; *Notopseudonaja*; *modesta*; *wellsi*.

## INTRODUCTION

Globally, about 200 species of reptile were formally named for the first time in 2012. On 25 December 2012, Uetz (2012c) claimed 183 newly described reptile taxa for the year, giving a total of known and widely recognized species at just under 10,000, on his generally good and supposedly comprehensive database, a total likely to be exceeded within a few short years.

While most newly described reptiles are lizards, there were many new snake species also described and named for the first time in 2012.

For many groups of reptiles, including the Scolecophidians, molecular studies and audits of wide-ranging species are yielding ever more species, with the list of known species not yet formally described increasing. This increase is resulting from the relatively recent phenomenon of cheap and effective genetic sequencing technology and resulting molecular studies identifying new species at a rate faster than taxonomists can describe them.

Within Australia, there are more than a dozen undescribed species of Blind Snake known, as of end 2012. To partially remedy the situation, I herein describe five well known taxa long recognised as being distinct at the species level, and in the absence of molecular data, but not yet formally named, although here I note that recent molecular studies (e.g. Marin *et al.* 2012) confirm this recognition.

At the higher level, Hoser (2012b), identified as yet unnamed subgenera of Australian Typhlopids, which were not formally named pending other papers being published by Richard Wells, Julie Marin, Nicolas Vidal and others before year end.

Wells hasn't published anything and while the other authors did publish a paper at end 2012 (Marin *et al.* 2012), they took no new taxonomic actions in terms of naming the unnamed subgenera or species.

This was in spite of the presentation of further compelling molecular evidence for such assignments (Marin *et al.* 2012) and similar assignments for non-Australian subgenera of Blindsnakes by Hoser 2012b.

In order to rectify this anomaly and bring the classification of the Australian Blindsnakes into line with those of the other continents; this paper for the first time formally names the subgenera according to the Zoological Code (Ride *et al.* 1999).

Hoser (2012b) cites numerous key references in terms of Blindsnakes globally. Key publications in terms of the Australian species covered within this paper include: Annable (1995), Aplin (1998), Aplin and Donnellan (1993), Boulenger (1893a, 1893b, 1895), Cogger (1975, 1979, 2000), Cogger *et al.* (1983), Couper *et al.* (1998), Covacevich (1971), Coventry (1970), Coventry and Robertson (1971), De Vis (1891), Ehmman (1993), Fitzinger (1843), Garman (1901), Glauert (1950), Gray (1845), Hoser (1989), Houston (1976), in den Bosch and Ineich (1994), Ingram and Covacevich (1993), Jan (1863, 1864, 1865a, 1865b), Kinghorn (1929a, 1929b, 1942, 1956), Loveridge (1934, 1945), Marin *et al.* (2012), Mattison (1995), McDiarmid *et al.* (1999), McDowell (1974), Mertens (1930), Montague (1914), Parker (1931), Peters (1867, 1869), Rawlinson (1966), Robb (1966a, 1966b, 1972), Shea (1995, 1999), Shea and Horner (1997), Shine and Webb (1990), Smith (1927), Somaweera (2009), Stimson *et al.* (1977), Storr (1981b, 1983, 1984), Tilbrook (1993), Waite (1893, 1894, 1897a, 1897b, 1898, 1917, 1918a, 1918b), Wallach (1993, 1996), Wells (1979), Wells and Wellington (1983, 1985), Wilson (2005), Wilson and Knowles (1988), Worrell (1963).

Within Australia, three elapids needing taxonomic recognition have remained unnamed for several years.

In 1981, Glenn Storr merged several described snakes into the

single species *Furina ornata* (Gray, 1842). Storr (1981a) noted regional differences for these snakes within Western Australia, yet failed to accord taxonomic recognition to any. Because only two of the three well-known regional variants are named (both having originally been described as full species), I herein name the third of these, being the Pilbara form.

That this taxon has remained unnamed for over thirty years is astounding!

It is herein named for the first time ever, according to the Zoological Code at the subspecies level.

The Ringed Brown Snake, *Notopseudonaja modesta* (Günther, 1872) has been taxonomically unstable for some time.

Most authors have placed it in the genus *Pseudonaja* Günther, 1858, although Wells (2002) erected a new genus to accommodate what has long been recognized as a divergent taxon within the *Pseudonaja* group.

Molecular studies published, such as that of Pyron *et al.* 2011 (see figure on p. 336), Skinner *et al.* (2005) and Skinner (2009) have somewhat supported this position, which is why I have used the genus name for this species taxon herein.

The differences between *Notopseudonaja* and other species placed within *Pseudonaja* by most authors are described in detail by Wells (2002), who also resurrected from synonymy the species *Notopseudonaja sutherlandi* (De Vis, 1884), from north-east Australia and *Notopseudonaja ramsayi* (Macleay, 1885) from north-west NSW.

Another taxon within the *Notopseudonaja modesta* group that remains unnamed is the form from the Kimberley Ranges in north west Western Australia, best known for having a higher average ring count than those specimens from other regions.

While these specimens are quite distinct and identifiable from all other *Notopseudonaja modesta*, I am not in a position to assert reproductive isolation from other *Notopseudonaja modesta*. Therefore I have taken the conservative path and described them herein as a subspecies of *Notopseudonaja modesta* according to the Zoological Code.

Finally, there remains an unnamed "Pygmy Mulga Snake" from the Northern Territory of Australia.

The first of the Pygmy Mulga Snakes was named by Wells and Wellington (1987) as *Cannia weigeli*, this being a taxon currently only known from the West Kimberley, Western Australia, the holotype specimen being from the Mitchell River Falls area, WA. Shea *et al.* (1988) published a paper in *Herpetofauna*, relegating the Wells and Wellington taxon to synonymy with "*Pseudechis australis*" on the tenuous basis that the characteristics of the newly named species fitted within the known variation of the earlier named species.

The claim did not stand up to scrutiny, but in an indictment of Australian herpetologists, no one else bothered to do such a scrutiny and so the Wells and Wellington description was effectively ignored and forgotten, although to their credit and in spite of immense pressure from others, Wells and Wellington stood by their diagnosis and description.

Hoser (1998) described a new species from Queensland as *Pailsus pailsei*, by erecting a new genus to accommodate what was clearly a divergent taxon.

Numerous authors including Williams and Starkey (1999) (three versions as cited here), published lengthy diatribes alleging the species described by Hoser (1998) was nothing more than an underferd "*Pseudechis australis*".

The patently false claim was also peddled by Wolfgang Wüster in countless places online and elsewhere, including on the Peter Uetz moderated "Reptile database", which as recently as 25 December 2012 stated:

"Questionable genus and species. Maybe synonymous to *Pseudechis australis* (W. Wüster, pers. comm. and WÜSTER *et al.* 2004)." (Uetz 2012a)

Alternatively see Wüster *et al.* 2001, which was a print

publication rant against all Hoser papers to that date which has in the fullness of time since been shown to be a collection of lies and false claims.

Of relevance to the ongoing claims by Wüster and friends against Hoser taxonomy as recently as 2012 on Uetz's reptile database website, specifically with reference to the species *pailsei* and *rossignollii*, Wüster published a paper in 2005 (see Wüster *et al.* 2005), which presented compelling molecular evidence to support the Hoser papers of 1998, 2000 and 2001.

The false claims against the Wells and Wellington (1987) and Hoser (1998) papers were quite scandalous as the original descriptions of both taxa were extremely detailed and compelling in their evidence.

Hoser (1998) was published without knowledge of the Wells and Wellington (1987) paper, but was quite fortuitously a description of a similar, but different species.

These key facts had been confirmed by the time of publication of a more detailed paper by Hoser (2001), which also post-dated a paper by Hoser (2000), which described a similar "Pygmy Mulga Snake", named *Pailsus rossignollii* from southern New Guinea.

As a result of the wide dissemination of the relevant Hoser papers according to the Zoological code (Ride *et al.* 1999), the three species have become well-known and widely recognized, all in spite of a dishonest campaign by Wolfgang Wüster to try to convince people not to recognize the taxa.

Added to this has been the recruitment into captivity in Europe of large numbers of *Pailsus rossignollii* following the Hoser (2000) description of the taxon, still currently only known from Irian Jaya.

Of note that as of 25 December 2012, and on instruction of Wolfgang Wüster, Peter Uetz listed *Pailsus rossignollii* as a synonym of "*Pseudechis australis*" on his online database (see Uetz 2012b). The entry reads in the synonyms list as "*Pailsus rossignollii* HOSER 2000 (fide WÜSTER *et al.* 2001)", the reference itself being the long discredited paper of Wüster *et al.* (2001).

Since 2001, and initially through herpetologist Mick Pugh of Geelong, I have been aware of an undescribed taxon similar in most respects to *Pailsus pailsei* from the Northern Territory.

Via e-mail Ulrich Kuch indicated he wanted to describe the taxon, and so I deferred to him to do this.

Kuch published a paper in 2005 (Kuch *et al.* 2005), and while identifying the new species via molecular data, he failed to describe the taxon.

In that paper, as senior author he wrote "Pending the resolution of complex nomenclatural

problems and the formal description of a new species (U. Kuch *et al.*, unpublished data), we refrain from assigning names to these taxa at this time."

That statement could only be taken to mean he intended naming the species by formal description he identified in his paper as being undescribed.

Seven years later no description has appeared.

The Zoological Code expressly prohibits scientists by monopolizing taxa and encourages publication of species descriptions within 12 months of advertising such an intent.

I was later advised that Wüster had pressured Kuch not to describe the taxon as that would have necessitated him differentiating it from both *pailsei* and also probably *weigeli*, which would have meant recognizing papers and species named by two people Wüster had effectively declared "war" on (see also Kaiser 2012a, 2012b and Kaiser *et al.* 2013).

Refer also to the various letters and documents from Wüster and associates in Hoser (2012c).

None of these later actions by Wüster or Kuch could be described as either scientific or sensible, but are typical of the actions of Wüster in particular (see Hoser 2012a and again

Hoser 2012c)

As a result to end 2012, the untenable situation of an unnamed but well-known species in Australia remained.

Eipper (2012) became the first book published by an author to include the unnamed Dwarf Mulga Snake from the Northern Territory as a species recognized as new and valid, but he was relegated to listing it in the book as "sp." due to the absence of it ever being formally named according to the Zoological Code.

He said he didn't want to describe the taxon for fear of Wüster similarly declaring a "war" on him and engaging in unwanted smear and character attacks on the internet and elsewhere.

He was also concerned that Wüster or others associated with him, in particular Australians Tony Harrison, Ron Waters and Sean McCarthy would attack Eipper by initiating armed raids on his reptile facility by police and wildlife officers, which is something he also wanted to avoid.

Therefore, I take the risk of further attacks from these men and have the situation resolved here with the species being formally named according to the Zoological code as *Pailsus hoserae* sp. nov. in honor of my long-suffering wife, who has in fact had a gun shoved to her head in an illegal armed raid on our family home that was sought and initiated by the men just named in 2011.

Kuch *et al.* 2005 did also present compelling molecular evidence to support the recognition of the Wells and Wellington species *weigeli* and the two Hoser species, *pailsei* and *rossignolii* as did Wüster *et al.* the same year.

Of note is that the genus *Pailsus* was erected in 1998 to recognize the (thought to be monotypic) clade of small Mulga Snakes, recently placed in the genus *Cannia*, Wells and Wellington 1983, as a separate group from the "Black Snake" Genus *Pseudechis*, Wagler 1830 which had included both live-bearing and egg-laying, but morphologically similar species, all of somewhat larger adult size.

Molecular studies published, including Kuch *et al.* (2005) and Pyron *et al.* (2011) have been somewhat equivocal in terms of the *Pseudechis* and *Cannia* division, with current evidence supporting the split (just), with the caveat being where one may choose to draw the line defining a genus (see Pyron *et al.* 2011, p. 336).

The molecular evidence in favour of retaining the genus *Pailsus* is not terribly good.

This position is also supported by more recent descriptions of three (relatively) dwarf forms of *Cannia australis* by Hoser in 2001, the snakes having many characteristics thought to be diagnostic of the *pailsei* genus, thereby muddying the original delineation between the two erected genera *Cannia* and *Pailsus*.

So while *Pailsus* Hoser, 1998 is retained as a genus in this paper for the Dwarf Mulga Snakes, (all four species) the likely long-term position will probably be retention of the name, but as a subgenus only.

Nominate subgenera may be listed within this paper or by others as *subgen. nov.* and attributed to myself, to indicate that they are formally described at this level for the first time, even though it is usually appropriate to attribute the subgenus name and date to the original author (person who named the nominate genus in the first instance).

Please also note that the nomenclature and gender of names given below is intentional, even though the gender of the names may not match those of the person/s for whom the taxon or taxa are named after and unless specifically required under the ICZN rules, none should be amended on the basis of gender or for any other reason.

The same applies for all earlier names defined by myself, including for example *Acanthophis wellsei* Hoser, 1998 or *Acanthophis cummingi* Hoser, 1998, both of which were deliberate names and spellings.

#### **FURINA ORNATA TODDPATTERSONI SUBSP. NOV.**

**Holotype:** A specimen at the Western Australian Museum, specimen number: R11338 from Marble Bar, Western Australia, 21.1833° S, 119.7000° E.

The Western Australian Museum is a government owned and managed facility that allows access to its collection by scientists.

**Paratype:** A specimen at the Western Australian Museum, specimen number: 39081 from Nullagine, Western Australia, 21.8833° S, 120.1000° E. The Western Australian Museum is a government owned and managed facility that allows access to its collection by scientists.

**Diagnosis:** *Furina ornata* is essentially similar in most respects to *Furina diadema* (Schlegel, 1837) from eastern Australia, better known as the Red-naped snake, from which it is most easily separated by the wide orange to red occipital bar completely separating dark brown head and nuchal blotches, whereas in *F. diadema* the black of the head and neck are usually continuous below the small orange crescent on the occiput.

The species *F. ornata* is easily separated from all other Australian elapid species by the following suite of characteristics. Smooth scales in 15-17 mid-body scale rows, (17-23 rows on the neck and 13-17 just before the vent) small to moderate size, to 508 mm (snout vent), with tail measuring 14-27 per cent of the s-v length, being sexually dimorphic in adults, the males having larger and longer tails, 163-235 ventrals, 40-65 all divided subcaudals; pale to dark orange or reddish brown dorsally, each body scale edged with darker brown to form dark reticulations over the body. The head is dark brown or blackish (and somewhat paler on the snout), except for the lips which are pale cream. The belly is cream. The rostral is 1.8-2.5 times as wide as high. The internasals are a lot smaller than the prefrontals. Frontal is 1.1-1.8 times as long as wide as supraoculars. Parietals are much longer than the frontal. The nasal is widely separated from the preocular, which is in contact with the frontal or narrowly separated from it, or rarely fused to it. There are two postoculars. There are two or three primary temporals and 2-3 secondary temporals. The lower primary usually doesn't reach the lip, but in some cases is in broad contact with it. 6-7 upper labials, the variability being due to an occasional split of the fifth.

*Furina ornata toddpattersoni* subsp. nov. is separated from the nominate subspecies (including other described forms since relegated to synonymy with *F. ornata*) by the following suite of characteristics, Lighter dorsal colouration than specimens from the tropical Kimberley and Northern Territory; 244-291 ventrals, versus 212-262 in all other areas (the nominate and other described forms), dorsal scale rows increase by 4-6 on the neck, versus 2-4 elsewhere (the nominate and other described forms), 17 mid-body rows versus 15 in all other subspecies, (the nominate and other described forms).

**Distribution:** Restricted to the Pilbara region of Western Australia, the nearby parts of inland Western Australia and the Northern Territory and potentially nearby regions of similar habitat.

**Etymology:** Named in honor of Todd Patterson of near Brisbane, Queensland in recognition of his excellent work as a private sector herpetologist as well his hitherto generally unrecognised work with wildlife conservation.

#### **NOTOPSEUDONAJA MODESTA WELLSI SUBSP. NOV.**

**Holotype:** A specimen R34076 at the Western Australian Museum, from Kalumburu, North Kimberley, Western Australia, Lat -14.3, Long. 126.6. The Western Australian Museum is a government owned and managed facility that allows access to its collection by scientists.

**Paratype:** A specimen R71205 at the Western Australian Museum, from Old Mount Elizabeth Homestead, North Kimberley, Western Australia, Lat -16.2, Long. 126.1. The Western Australian Museum is a government owned and managed facility that allows access to its collection by scientists.



**Diagnosis:** *Notopseudonaja modesta* are separated from all other snakes in the genus *Pseudonaja* as commonly recognized by the following suite of characters: 17 mid-body scale rows, 160-177 ventrals (versus over 190 in all other *Pseudonaja*), 35-45 all divided subcaudals. Young snakes are also distinguishable by the narrow, sharply defined black rings on the body and tail.

*Notopseudonaja modesta wellsi* subsp. nov. are separated from all other *Notopseudonaja modesta* by the presence of 9-12 bands on the body, versus 5-8 bands for all other *Notopseudonaja modesta*.

In aged specimens, these bands are generally indistinct and hard to detect. The main body colour is a dull olive brown. Juveniles are typically a bright orange brown with distinct bands that fade with age.

**Distribution:** Known only from the Kimberley region of Western Australia.

**Etymology:** Named in honor of Richard Wells, herpetologist from NSW, Australia in recognition of his pioneering work on Australian reptile taxonomy.

**PAILSUS HOSERAE SP. NOV.**

**Holotype:** A specimen at the Northern Territory Museum, NTM R.27151, from the Adelaide River, NT. The Northern Territory Museum is a government owned and managed facility that allows access to its collection by scientists.

**Diagnosis:** Snakes of the genus *Pailsus* are known only from mainland locations in Australia and continental New Guinea in the region of Merauke.

They are most likely confused with Mulga Snakes (*Cannia australis*) on the basis of their brownish dorsal colouration and similar adult size (usually 0.8-2.8 metres).

As a rule they are separated from *Cannia australis* in the same areas by the following suite of characters: Most if not all subcaudals are single while in *Cannia australis*, about 20 posterior subcaudals are usually divided. Further separated from *Cannia australis* by the proportionately smaller and less broad head and generally more gracile build and the generally v-shaped rostral, as opposed to the horse-shoe shaped rostral in *Cannia australis*.

*Pailsus* species are separated from *Cannia* by their more elongate and angular head, widening at the rear of the skull, versus a somewhat more circular shape in *Cannia*.

These snakes are separated from *Oxyuranus* (and *Parademansia*), *Pseudonaja* (and *Notopseudonaja*) by the all or mainly single subcaudals versus the all or mainly paired subcaudals in *Pseudonaja* (and the other genera) and lack of orange or brown markings on the ventral surface in *Pailsus*. *Pailsus* is not likely to be confused with any other genus of snake.

*Oxyuranus* (and *Parademansia*), while superficially similar, have slight keeling on the neck scales, not seen in the other taxa named here. *Oxyuranus* (and *Parademansia*), also have strictly divided subcaudals.

*Pailsus hoserae* is only likely to be confused with the species *weigeli*, *rossignollii* and *pailsei*.

*Pailsus rossignollii* is separated from the other species in *Pailsus* by distribution, being found in New Guinea, while the others are Australia.

*Pailsus rossignollii* is separated from the other *Pailsus* species by the following trait, the subcaudal count for *P. rossignollii* observed is substantially less than for Australian *Pailsus*, being 49-58 for New Guinea animals known versus 69-75 for Australian animals known.

The species *rossignollii* is also distinct in that the head has a distinct bluish hue to the colour. This is unknown in the species *pailsei*, but has been seen in the species *hoserae*.

*Pailsus weigeli* is separated from the other *Pailsus* species by its dorsal pattern, having some scales lacking pigment to a

limited extent, giving the snakes a flecked or reticulate appearance. Specimens of *weigeli* also have considerable dark head markings in the form of deep etchings between the scales on the head and neck, especially in the lower labials, giving each scale a distinctive thick dark boundary, this not being seen in the other *Pailsus* species.

The species *hoserae*, is similar in most respects to *pailsei*, to which it would key out until the present date.

In the species *Pailsei* the lower anterior temporal is much wider than the posterior adjoining supralabial. In the species *hoserae* the lower anterior temporal is either the same width as, or only marginally wider than the posterior adjoining supralabial. In the species *Pailsei*, the distinctive v-shaped rostral terminates above the level of the top of the nostril. This is not the case in the species *hoserae*, where the highest point of the rostral sits lower.

In *Pailsus hoserae* the bottom lines of the rostral flare outwards, which is not seen in *Pailsus pailsei*.

In the species *pailsei*, the lower postocular tends to curl beneath the eye. This is not the case in *hoserae*. In the species *pailsei*, the preocular is distinctly longer than wide. This is not the case in *hoserae* where width and length are quite obviously about the same.

*Pailsus hoserae* has a distinct demarcation line along the lower parts of the upper labials, where the dark dorsal colour lightens to the lighter ventral colouration, giving the appearance of a whitish upper lip. In the species *pailsei*, lightening commences on the upper parts of the upper labials and is more gradual, so that there is not a moderately defined demarcation line between the darker dorsal colour and lighter venter. In the species *pailsei* the internasals are of irregular shape, while in the species *hoserae*, there are more or less squareish in shape, being wider at the posterior side.

In the species *pailsei*, only the very tip of each dorsal scale has any darkening of colour and this is very slight. By contrast in the species *hoserae*, a third of each dorsal scale noticeably darkens posteriorly.

A trait only seen in *Pailsus weigeli* (the holotype) is the fusion of the lower preocular with the adjacent upper labial.

*Pailsus weigeli* also has a frontal shield that is almost as wide as long. In the other three *Pailsus* species, it is distinctly longer than wide.

**Distribution:** Known only from the Adelaide River region of the western Northern Territory.

**Etymology:** Named in honour of Shireen Hoser, my long suffering wife, for myriad contributions to herpetology globally.

**BLIND SNAKES, FAMILY TYPHLOPIDAE MERRUM, 1820.**

On page 21 of Hoser (2012b) I made reference to a potential revision of the Australian Blind Snakes by Richard Wells, which had ostensibly been pending since early 2012. This revision was supposedly due to be published at end 2012, on the end date of an ancient Mayan calendar and as of end February 2013 there was no indication of if and when any such publication would come out. As a result, the Australian Blindsnakes are reclassified here to include subgenera as alluded to in the paper of Hoser (2012b) and also some well-known but as yet formally undescribed species.

Pending papers by others have also since been published, but with no taxonomic changes within.

The classification of these Australian Blindsnakes fits within the wider classification of Hoser (2012b), which otherwise requires no new modification.

I do however note that the more recent publications of Marin *et al.* of 23 November 2012 and Pyron *et al.* (2013) provide further molecular evidence to support the taxonomic judgements and nomenclature of Hoser (2012b).

In a rant running over 12,000 words, Kaiser *et al.* (2013) failed to provide a single shred of evidence in rebuttal for the taxonomy

and nomenclature of Hoser (2012b), other than the childish complaint that I had named too many species and genera and that I had apparently deprived them and others of the right to name taxa.

Marin *et al.* 2013 gives evidence that supports the Hoser (2012b) position of not further splitting *Libertadictus* Wells and Wellington, 1983 at the genus level on the basis of consistency with the other taxonomic judgements in Hoser 2012b.

Pyron *et al.* (2013) provides new molecular evidence in support of the erection of several genera to accommodate Asian Blindsnake species groups as done in Hoser (2012b), most notably *Maxhoserus* Hoser, 2012.

What follows below are the formal erection of ten new subgenera (as well as the nominate two, also defined herein) to accommodate various Australian species groups of Blindsnakes, followed by the description of new species in a manner consistent with Hoser (2012b).

One of the newly described and named subgenera is within *Sivadictus* Wells and Wellington, 1985 and the other ten are within the subgenus *Libertadictus* Wells and Wellington, 1983.

Of brief mention is the improper and illegal (under the Zoological Code) use of the name *Austrotyphlops* Wallach, 2006 in numerous publications (especially online), when it is in fact a junior synonym of *Libertadictus* Wells and Wellington, 1983, complete with the same type species. Refer to Hoser 2012b for the full detail.

I also mention that if the divergence limits for Blindsnake genera are brought into line with higher snakes as classified at present, by later authors, all subgenera defined by Hoser (2012b) and this paper, would need to be elevated to full genera as they tend to be well in excess of 10 MYA divergence between groups based on the calibrated molecular evidence published to date.

#### GENUS *LIBERTADICTUS* WELLS AND WELLINGTON, 1983

**Type species:** *Onychocephalus bituberculatus* Peters, 1863

**Diagnosis:** An Australian-New Guinean genus of Blindsnakes having retrocloacal sacs and solid eversible awned hemipenes that retract into the tail in a helical pattern, excluding the genera *Sivadictus* Wells and Wellington 1985, *Acutotyphlops* Wallach, 1995 and *Martinwellstyphlops* Hoser 2012, (the latter two being outside this tribe) which are defined as follows:

*Sivadictus* is separated from all other Blindsnakes by the following suite of characters: Purplish pink-brown to nearly black above, cream, yellow or pinkish below. Snout is rounded from above and in profile. Nasal cleft joining the second supralabial or the suture between the first and second labials, projecting forward and upwards to partially divide the nasal, visible from above. Rostral is large, oval or elliptical, much longer than broad. 22 mid body scale rows. Body diameter is 35-60 times in its length.

*Acutotyphlops* can be distinguished from all other Typhlopidae by any of the following characters: (1) Vshaped lower jaw; (2) short, narrow rostral; (3) an enlarged frontorostral shield; (4) occipital condyle formed solely from the basioccipital; and (5) acuminate contact of four braincase bones (parietal and basisphenoid, frontal and prootic) forming an X-shaped pattern.

*Martinwellstyphlops* would normally key out as *Acutotyphlops* as diagnosed above, but is separated from this genus by the presence of (1) a single ocular and preocular shield (vs. fragmentation into 6-10 shields), (2) three infralabials (vs. 5-7 shields), (3) fourth supralabial as tall as long (vs. at least twice as long as tall), (4) uniformly light dorsum and venter with irregular dark dorsal spots (vs. dark dorsum and light venter separated by a sharp demarcation), and absence of (5) retrocloacal sacs, and (6) a solid, awned hemipenis with helical coils in tail when retracted.

*Libertadictus* species are further defined as follows:

distinguished by the following combination of characters:

Snout trilobed dorsally, bilobed or single, angular in profile; nasal not divided by nasal cleft; nasal cleft not visible from above;

rostral shield-shaped in an oval shape usually when viewed from a dorsal aspect; midbody scales in 18-22 rows; body diameter 30-90 times in its length, eyes visible, usually as black spots.

**Distribution:** The Australian region.

**Content:** *L. bituberculatus* (Peters, 1863) (Type species), *L. adelynhoserae* sp. nov. (this paper), *L. affinis* (Boulenger, 1889), *L. ammodytes* (Montague, 1914), *L. aspina* (Couper, Covacevich and Wilson, 1998), *L. australis* (Gray, 1845), *L. batillus* (Waite, 1894), *L. bicolor* (Jan, 1864), *L. broomi* (Boulenger, 1898), *L. centralis* (Storr, 1984), *L. chamodracaena* (Ingram and Covacevich, 1993), *L. cliffrosswellingtoni* sp. nov. (this paper), *L. diversus* (Waite, 1894), *L. endoterus* (Waite, 1918), *L. ganei* (Aplin, 1998), *L. grypus* (Waite, 1918), *L. guentheri* (Peters, 1865), *L. hamatus* (Storr, 1981), *L. howi* (Storr, 1983), *L. jackyhoserae* sp. nov. (this paper), *L. kimberleyensis* (Storr, 1981), *L. leptosomus* (Robb, 1972), *L. ligatus* (Peters, 1879), *L. longissimus* (Aplin, 1998), *L. margaretae* (Storr, 1981), *L. micrommus* (Storr, 1981), *L. minimus* (Kingham, 1929), *L. nema* (Shea and Horner, 1997), *L. nigroterminatus* (Parker, 1931), *L. pilbarensis* (Aplin and Donnellan, 1993), *L. pinguis* (Waite, 1897), *L. proximus* (Waite, 1893), *L. richardwellsi* sp. nov. (this paper), *L. robertsi* (Couper, Covacevich and Wilson, 1998), *L. silvia* (Ingram and Covacevich, 1993), *L. sloppi* sp. nov. (this paper), *L. splendidus* (Aplin, 1998), *L. towelli* (Loveridge, 1945), *L. troglodytes* (Storr, 1981), *L. unguirostris* (Peters, 1867), *L. waitii* (Boulenger, 1895), *L. wiedii* (Peters, 1867), *L. yampiensis* (Storr, 1981), *L. yirrikalae* (Kingham, 1942).

#### SUBGENUS *LIBERTADICTUS* WELLS AND WELLINGTON, 1983

**Type species:** *Onychocephalus bituberculatus* Peters, 1863.

**Diagnosis:** The subgenus *Libertadictus* as defined here is confined to species of Blindsnakes with the following suite of characters: A moderately dark, small, slender long-snouted blindsnake up to 35 cm long with 20 or rarely 18, mid body scale rows and a nasal cleft proceeding from the second labial; snout strongly or moderately strongly trilobed as seen from above and slightly angular in profile. Tail is 1.5-3.3 percent of the total length, 414-485 ventrals, 11-18 subcaudals. From above the rostral is very much longer than wide and almost two thirds as wide as the head. The nostril is inferior, markedly swollen, much nearer to the rostral than the preocular. The nasal cleft extends obliquely upwards and forwards from the nostril to about midway between the nostril and the rostral. The upper surface is dark purplish brown, gradually merging with the whitish lower surface.

**Distribution:** Dry parts of southern Australia only.

**Etymology:** See Wells and Wellington, 1983.

**Content:** *L. bituberculatus* (Peters, 1863) (Type species), *L. margaretae* (Storr, 1981).

#### SUBGENUS *SUEWITTYPLOPS* SUBGEN. NOV.

**Type species:** *Typhlops ligatus* Peters, 1879.

**Diagnosis:** *Suewittyphlops* subgen. nov. species are defined by the following suite of characters: The nasal cleft is joining the first or second supralabial or preocular, and smoothly rounded from above and in profile. It is visible from above, almost dividing the nasal and contacting the first or second labial below and in some cases completely dividing the nasal. The rostral is narrow and elongate from above, being longer than broad, or similar but ovoid in shape, sometimes distinctly broader anteriorly. 22-24 mid-body rows; body diameter 20-70 times in its length and with a maximum length of about 50 cm. The colour is brown above and whitish or creamish white below, with or without slight paling in colour on snout tip and/or the tail tip.

**Distribution:** Northern half of continental Australia.

**Etymology:** Named in honor of Sue Witt breeder of Great Dane dogs from Heathcote, Victoria, who as wife of Robin Witt, has supplied our family with two very loyal guard dogs, named Oxy (short for *Oxyuranus*) and Slop (sometimes spelt Slopp), in reflection of what he does with his tongue, both dogs of which have protected the Snakebusters facility from burglars and the like, for about a decade.

**Content:** *Libertadictus (Suewitttyphlops) ligatus* (Peters, 1879)(Type species), *L. (Suewitttyphlops) ganei* (Aplin, 1998), *L. (Suewitttyphlops) kimberleyensis* (Storr, 1981), *L. (Suewitttyphlops) sloppi* sp. nov. (this paper), *L. (Suewitttyphlops) troglodytes* (Storr, 1981), *L. (Suewitttyphlops) yirikalae* (Kinghorn, 1942).

**LIBERTADICTUS (SUEWITTYPHLOPS) SLOPPI SP. NOV.**

**Holotype:** A specimen at the Western Australian Museum (WAM), number: R12110 from the Kimberley Research Station, Wyndham East Kimberley, WA, Lat. -15.65, Long. 128.70.

The Western Australian Museum is a government owned facility that allows scientists access to their collection for research purposes.

**Paratypes:** Paratype one is a specimen at the Western Australian Museum (WAM), number: R137952 from 35 km NNE of Kununurra, WA, Lat. 15.42, Long. 128.95.

Paratype two is a specimen at the Western Australian Museum (WAM), number: R119307 from Gibb River Wyndham East Kimberley, WA, Lat. -16.43, Long. 126.43.

The Western Australian Museum is a government owned facility that allows scientists access to their collection for research purposes.

**Diagnosis:** This species was formerly treated as a variant of the species *L. ligatus* (Peters, 1879), from which it is most readily separated by its proportionately more-stout and robust body and lower ventral count, 296-355 in *L. sloppi* sp. nov., versus over 355 in *L. ligatus*.

Further diagnostic features of *L. sloppi* sp. nov., include: the fact that it is perhaps Australia's most stout and robust Blindsnake, attaining 50 cm as adults. The snout is rounded from above and in profile. There are 24 mid-body scale rows and the nasal cleft, visible from above, extends from the first labial to well on top of the head.

Dorsally the colouration is bark grayish or purplish brown and ventrally cream to dull pink, with the junction between the colours sharp and straight edged.

There are 11-17 subcaudals and the tail is 2.7-3.9 percent of the total length.

**Distribution:** *L. sloppi* sp. nov. is found in north-west Western Australia and the western side of the Northern Territory. The species *L. ligatus* is restricted to south-east Queensland and northern New South Wales (NSW), the centre of distribution, with outlier populations known from both states (NSW and Queensland).

**Etymology:** Named in honor of our Blue Merle, Great Dane dog, Slop (sometimes spelt Slopp), who at less than a year of age has done a sterling job of protecting the Snakebusters reptile education facility from thieves and other undesirables and also entertaining children as needed.

It is fitting that animals that make up such an important part of the human world, should be a part of our heritage in terms of the nomenclature for our biodiversity.

**SUBGENUS ROBINWITTYPHLOPS SUBGEN. NOV.**

**Type Species:** *Typhlops (Onychocephalus) unguirostris* Peters, 1867

**Diagnosis:** The subgenus *Robinwitttyphlops* subgen. nov. are readily separated from all other *Libertadictus* by the following suite of characters: Brownish above, creamish-white below. The snout is slightly trilobed from above, sharply angular in profile. The nasal cleft is not, or scarcely visible from above, contacting the first labial below and sometimes completely dividing the nasal. Rostral is oval from above and longer than broad. Scales are 24 rows at mid body. Body diameter is 40-70 times in its length.

There is more than one species within the species *L. unguirostris* Peters, 1867 as currently recognized, this numbering at least three, with one formally described within this paper as *L. (Robinwitttyphlops) jackyhoserae* sp. nov..

**Distribution:** Known from scattered locations across Eastern and Northern Australia.

**Etymology:** Named in honor of Robin Witt breeder of Great Dane dogs from Heathcote, Victoria, who as husband of Sue Witt, has supplied our family with two very loyal guard dogs, named Oxy (short for *Oxyuranus*) and Slop (sometimes spelt Slopp), in reflection of what he does with his tongue, both dogs of which have protected the Snakebusters facility from burglars and the like, for about a decade.

**Content:** *Libertadictus (Robinwitttyphlops) unguirostris* (Peters, 1867), *L. (Robinwitttyphlops) jackyhoserae* sp. nov. (this paper).

**LIBERTADICTUS (ROBINWITTYPHLOPS) JACKYHOSERAE SP. NOV.**

**Holotype:** A specimen at the Western Australian Museum (WAM), number: R73513 from the Gibb River Homestead, Western Australia, Lat. -16.42, Long. 126.44.

The Western Australian Museum is a government owned facility that allows scientists access to their collection for research purposes.

**Paratype:** A specimen at the Western Australian Museum (WAM), number: R73538 from the Gibb River Homestead, Western Australia, Lat. -16.42, Long. 126.44.

The Western Australian Museum is a government owned facility that allows scientists access to their collection for research purposes.

**Diagnosis:** The species *Libertadictus (Robinwitttyphlops) jackyhoserae* sp. nov. has until now been confused with *L. unguirostris* (Peters, 1867), with which it is similar and closely related to within the same subgenus. In the normal course of identification, this species would be identified as *L. unguirostris* (Peters, 1867), but can be readily separated from that species (herein restricted to Queensland) by the position of the eyes and the adjoining scales. In *L. jackyhoserae* sp. nov. the line of the head shield touches the anterior edge of the eye. By contrast in *L. unguirostris* the anterior part of the eye spot eye sits back from the line of the head shield, meaning it sits completely within the boundaries of the shield.

In *L. jackyhoserae* sp. nov. each scale has a whitish edge producing a netted or sometimes spotted appearance on the upper surfaces. This is not the case for *L. unguirostris* or if so, then it is relatively indistinct and barely noticeable.

Other diagnostic traits of *L. jackyhoserae* sp. nov. include the following: The species is a moderately slender blindsnake up to 50 cm long, with a snout hooked in profile, 24 midbody scale rows, 387-474 ventrals, 11-16 subcaudals, the tail is 1.2-2.7 percent of the total length and nasal cleft proceeding from the first labial.

The rostral from above is elliptic, longer than wide and about two thirds as wide as the head. The cutting edge at the tip of the snout extends back through the nasal scale as a ridge. Nostril inferior, much nearer to rostral than to preocular. Nasal cleft proceeds from the first upper labial, curves upwards and forwards from nostril to or towards rostral.

The dorsal surface is a dark olive brown in adults, which is well demarcated from the whitish venter.

The species *L. pilbaraensis* (Aplin and Donnellan, 1993), sometimes confused with this taxon (*L. jackyhoserae* sp. nov.) is readily separated from both *L. jackyhoserae* sp. nov. and *L. unguirostris* by having just 22 midbody scale rows and that the nasal cleft proceeds from the preocular.

**Distribution:** Known only from the Kimberley region of North-west Western Australia.

**Etymology:** Named in honor of my daughter Jacky Hoser in recognition of over ten years of extremely valuable work in wildlife conservation, research and education.

**SUBGENUS PATTERSONTYPHLOPS SUBGEN. NOV.**

**Type Species:** *Typhlops wiedii* Peters, 1867

**Diagnosis:** *Pattersontyphlops* subgen. nov. are separated from



all other *Libertadictus* by the following unique suite of characters: Blackish-brown or brown dorsally, sometimes with slight lightening at the snout or alternatively a dark streak on the snout, creamish-white or yellowish cream below, sometimes with a pinkish hue. Dorsally there are sometimes 16-18 narrow dark stripes and occasionally blackening of the tail. The snout is bluntly rounded from above and in profile, or bluntly angular. The nasal cleft does not divide the nasal, which may or not be visible from above and joins the second labial below. The rostral is either broadly oval to nearly circular from above. 18-20 midbody scale rows. Body diameter is 30-80 times in its length and doesn't exceed 30 cm maximum, usually attaining about two thirds this as adults.

**Distribution:** Northern two thirds of continental Australia, except for the driest parts, including most of the relevant parts of the Western Australia, Northern Territory and South Australia.

**Etymology:** Named in honor of Sandee Patterson of near Brisbane, Queensland in recognition of her excellent work as a private sector herpetologist, in particular with the Herpetological Society of Queensland, her immense skills at breeding *Morelia* pythons, passed on to many others as well her hitherto generally unrecognised work with wildlife conservation, including through the Herpetological Society of Queensland Incorporated (HSQI).

The spelling of the subgenus name is deliberate and should not be changed unless required under the zoological rules of the time, notwithstanding possible gender confusion.

**Content:** *Libertadictus (Pattersonotyphlops) wiedii* (Peters, 1867) (Type species), *L. (Pattersonotyphlops) chamodraena* (Ingram and Covacevich, 1993), *L. (Pattersonotyphlops) affinis* (Boulenger, 1889).

#### SUBGENUS SLOPTYPHLOPS SUBGEN. NOV.

**Type Species:** *Typhlops ammodytes* Montague, 1914.

**Diagnosis:** The subgenus *Sloptyphlops subgen. nov.* are separated from all other *Libertadictus* by the following suite of characters: Light brown, brown or blackish above, whitish below. The dark brown centered dorsal scales in some specimens results in a series of reddish-brown longitudinal streaks. The snout is entirely rounded from above and in profile, ranging from being somewhat blunt to slightly angular. The nasal cleft which may or may not be visible from above (if it is, then only just), joins the preocular, continuing in front of the nostril and often dividing the nasal. The rostral is elliptical from above, longer than broad and relatively narrow and sometimes constricted anteriorly. 20 midbody scale rows. Body diameter 30-70 times in its length. Average adult maximum length is 25 cm and doesn't exceed 35 cm.

**Distribution:** Northern half of continental Australia, extending further south in the eastern third of Australia.

**Etymology:** Named in honor of our Great Dane dog, Slop (sometimes spelt Slopp), who at less than a year of age has done a sterling job of protecting the Snakebusters reptile education facility from thieves and other undesirable and also entertaining children as needed.

It is fitting that animals that make up such an important part of the human world, should be a part of our heritage in terms of the nomenclature for our biodiversity.

**Content:** *Libertadictus (Sloptyphlops) ammodytes* (Montague, 1914) (Type species), *L. (Sloptyphlops) broomi* (Boulenger, 1898), *L. (Sloptyphlops) diversus* (Waite, 1894), *L. (Sloptyphlops) richardwellsi sp. nov.* (this paper), *L. (Sloptyphlops) towelli* (Loveridge, 1945).

#### LIBERTADICTUS (SLOPTYPHLOPS) RICHARDWELLSI SP. NOV.

**Holotype:** A specimen at the Western Australian Museum (WAM), number: R100453 from about 80 km south of Telfer, Little Sandy Desert, Western Australia, Lat. -22.33, Long. 122.06.

The Western Australian Museum is a government owned facility that allows scientists access to their collection for research purposes.

**Paratypes:** Paratype one is a specimen at the Western Australian Museum (WAM), number: R111958 from 36 km northwest of Balfour Downs Homestead, Western Australia, Lat. 22.52, Long. 120.68.

Paratype two is a specimen at the Western Australian Museum (WAM), number: R111995 from 25 km northwest of Balfour Downs Homestead, Western Australia, Lat. 22.61, Long. 120.72. The Western Australian Museum is a government owned facility that allows scientists access to their collection for research purposes.

**Diagnosis:** *Libertadictus (Sloptyphlops) richardwellsi sp. nov.* is closely related to *L. ammodytes* (Montague, 1914), with which it has been confused. The two species are most readily separated by tail length, being 1.4 to 2 percent of the total length with 8 to 12 subcaudals in *L. ammodytes* (Montague, 1914) versus 2.5 to 4 percent of the total length with 13 to 18 subcaudals in *L. richardwellsi sp. nov.*. In observation in the field, for *L. ammodytes* (Montague, 1914) the tail is roughly the same length as broad, or only marginally longer, whereas in *L. richardwellsi sp. nov.* it is noticeably longer than broad.

Both *L. richardwellsi sp. nov.* and *L. ammodytes* (Montague, 1914) have in the past been treated as subspecies of *L. diversus* (Waite, 1894).

Further features diagnostic of *L. richardwellsi sp. nov.* are the following characteristics: a small and moderately slender blindsnake getting to a maximum of 35 cm in length. The snout is rounded in profile with 20 midbody scale rows. The nasal cleft proceeding from the preocular and passing a short distance upwards and forwards of the nostril on to the top of the head. This species is separated from the similar *L. diversus* (Waite, 1894) of the Kimberley region by the shape of the rostral, being narrower and concave-sided in *L. richardwellsi sp. nov.* and *L. ammodytes* (Montague, 1914) versus straight-sided from above in *L. diversus* (Waite, 1894).

*L. richardwellsi sp. nov.* and *L. ammodytes* (Montague, 1914) have a more vertical orientation of the nasal cleft as opposed to extending forward to approximate rostral in *L. diversus* (Waite, 1894).

For *L. richardwellsi sp. nov.* the rostral from above is moderately narrow, with sides slightly concave, about twice as long as wide, and about one-third to half as wide as the head. Nostril is lateral or slightly inferior, a little nearer to the rostral than to preocular. Nasal cleft contacts preocular to rear, running forwards and upwards from nostril to terminate on top of the head.

Coloration is purplish brown dorsally, being darkest on the head, gradually merging with a paler lower surface.

The upper nasal is as broad as the rostral in *L. richardwellsi sp. nov.*. This is not quite the case in *L. ammodytes* (Montague, 1914).

Attains up to 35 cm total length, with 389-498 ventrals.

**Distribution:** Known only from the East Pilbara of Western Australia.

**Etymology:** Named in honor of Richard Wells, mainly of NSW, including from Cowra, NSW and more recently of Lismore, NSW, in recognition of his extensive work on reptile taxonomy, nomenclature and systematics in general. This honor is with further specific reference to his foresight with respect to Australian Blindsnakes in his then regarded as outrageous removal of Australian species from the genera *Ramphotyphlops* and/or *Typhlops* in his then controversial papers co-authored with Cliff Ross Wellington in 1983 and 1985, now regarded as landmark publications in Australian herpetology (Wells and Wellington 1983, 1985).

#### SUBGENUS MANTYPHLOPS SUBGEN. NOV.

**Type Species:** *Typhlops (Onychocephalus) guntheri* Peters, 1865.

**Diagnosis:** *Mantyplops subgen. nov.* are separated from all other *Libertadictus* by the following suite of characters: Brown to almost black above, merging on the lower flanks with the pale

brown to creamish venter. The tail is blackish, as is often the snout or head. The tail is bluntly rounded from above and in profile. The nasal cleft isn't visible from above, or if so, only just, contacting the second labial below. Rostral is subcircular from above, scarcely to much longer than broad. 18 midbody rows. Body diameter 40-90 times in its length. Adults average 25 cm and don't exceed 40 cm.

**Distribution:** Western Australia and adjoining parts of the northern Territory, including Arnhemland.

**Etymology:** Named in honor of Daniel Man, of Mitcham, Victoria, Australia for services to accounting in Australia as well as unrecognized work in wildlife conservation by doing considerable "back office" work for the leading wildlife conservation business Snakebusters: Australia's best reptiles shows (including as previously known as "Death Adder Services"), for more than 20 years.

**Content:** *Libertadictus (Mantophlops guentheri)* (Peters, 1865)(Type species), *L. (Mantophlops guentheri) howi* (Storr, 1983), *L. (Mantophlops guentheri) micrommus* (Storr, 1981), *L. (Mantophlops guentheri) yampiensis* (Storr, 1981).

#### SUBGENUS JACKYHOSERTYPHLOPS SUBGEN. NOV.

**Type Species:** *Ramphotyphlops longissimus* Aplin, 1998

**Diagnosis:** *Jackyhosertyphlops* subgen. nov. are separated from other *Libertadictus* by the following suite of characters: Elongate and slender build. Purplish-brown or pinkish brown above, grey-white below. The head and tail or just tail may have blackening. The snout is rounded and sometimes slightly trilobed from above, bluntly angular in profile, sometimes with a strongly hooked, recurved "beak" in profile. Nasal cleft completely divides the nasal, not visible from above, contacting the second supralabial, extending slightly beyond the nostril. The rostral is large and subcircular, about as long as wide, slightly longer than wide ranging up to being noticeably longer than broad. 16-18 midbody rows. Body diameter is 70-80 times in its length. Average adult length is about 25-30 cm and not exceeding 45 cm.

**Distribution:** Most parts of Australia except the south-east.

**Etymology:** Named in honor of my daughter Jacky Hoser in recognition of over ten years of valuable work in wildlife conservation, research and education.

**Content:** *Libertadictus (Jackyhosertyphlops) longissimus* (Aplin, 1998) (Type species), *L. (Jackyhosertyphlops) adelynhoserae* sp. nov. (this paper), *L. (Jackyhosertyphlops) cliffrosswellingtoni* sp. nov. (this paper), *L. (Jackyhosertyphlops) grypus* (Waite, 1918), *L. (Jackyhosertyphlops) leptosomus* (Robb, 1972), *L. (Jackyhosertyphlops) minimus* (Kinghorn, 1929), *L. (Jackyhosertyphlops) nema* (Shea and Horner, 1997), *L. (Jackyhosertyphlops) nigroterminatus* (Parker, 1931).

#### LIBERTADICTUS (JACKYHOSERTYPHLOPS) ADELYNHOSERAЕ SP. NOV.

**Holotype:** A specimen at the Western Australian Museum (WAM), number: R22887

from Marble Bar, Western Australia, Lat -21.18, Long. 119.70.

The Western Australian Museum is a government owned facility that allows scientists access to their collection for research purposes.

**Paratypes:** The first paratype is a specimen at the Western Australian Museum (WAM), number: R51041 from Whim Creek, Western Australia, Lat. -20.83, Long. 117.83.

The Western Australian Museum is a government owned facility that allows scientists access to their collection for research purposes.

The second paratype is a specimen at the National Museum of Victoria, Australia (NMV), original number: R7200 (now listed as D12358) from Marble Bar, Western Australia, Lat -21.18, Long. 119.70.

The National Museum of Victoria, Australia is a government owned facility that allows scientists access to their collection for research purposes.

**Diagnosis:** Formerly regarded as West Australian *L. grypus* (Waite, 1918), the species *Libertadictus (Jackyhosertyphlops) adelynhoserae* sp. nov. is readily separated from *L. grypus* by its lower ventral count, 525-677 in *L. adelynhoserae* sp. nov., versus 790 in *L. grypus*, and 700-770 in *L. cliffrosswellingtoni* sp. nov. (see description below) the 790 number being the only reported number for *L. grypus*.

*L. adelynhoserae* sp. nov. is further diagnosed by the following suite of characters: It is a moderately large (to 42 cm total length), very slender, black-tailed blind-snake with snout beaked in profile, 18 midbody scale rows and nasal cleft usually proceeding from the second labial.

The tail is 1.4-4.4 percent of the total length.

The rostral (from above) is much longer than wide, about three-quarters as wide as the head and extending back to level of eyes or nearly so. Nasals narrowly separated behind rostral. Frontal smaller than prefrontal. The snout is angular from above, weakly or strongly beaked in profile. Nostrils inferior, very slightly or not swollen and much nearer to rostral than preocular. Nasal cleft proceeding from second labial or preocular, or junction between preocular and second labial or first labial to nostril, where it occasionally terminates, but mostly it proceeds for varying distances obliquely upwards and forwards towards the rostral or reaches it.

13-36 subcaudals.

Snout white; rest of head and neck blackish. Tail is sometimes wholly, but usually only for the distal 30-90 percent blackish. The rest of the dorsal and lateral surfaces pinkish-brown to moderately dark brown, gradually merging with greyish-white ventral surfaces.

**Distribution:** Believed to occur throughout most of Western Australia, with distribution centered in the Pilbara and adjacent areas, but not including the south and most of the Kimberley.

#### LIBERTADICTUS (JACKYHOSERTYPHLOPS) CLIFFROSSWELLINGTONI SP. NOV.

**Holotype:** A specimen at the Australian Museum in Sydney, NSW, Australia, specimen number: R110535, from Scott's Tank, Diamantina Lakes, North West of Windorah in Western Queensland, Lat. -23.97, Long. 141.53.

The Australian Museum in Sydney, NSW, Australia is a government owned facility that allows scientists access to their collection for research purposes.

**Paratypes:** The first paratype is a specimen at the Australian Museum in Sydney, NSW, Australia, specimen number: R65957, from Middleton, near Winton in Western Queensland, Lat. -22.35, Long. 141.55.

The second paratype is a specimen at the Australian Museum in Sydney, NSW, Australia, specimen number: R51471, from Rodney Downs, 31 miles north east of Ilfracombe in Western Queensland, Lat. -23.183, Long. 144.85.

The Australian Museum in Sydney, NSW, Australia is a government owned facility that allows scientists access to their collection for research purposes.

**Diagnosis:** *Libertadictus (Jackyhosertyphlops) cliffrosswellingtoni* sp. nov. is readily separated from both *Libertadictus (Jackyhosertyphlops) adelynhoserae* sp. nov. and *L. grypus* (Waite, 1918) by the intermediate ventral scale count. The species *Libertadictus (Jackyhosertyphlops) adelynhoserae* sp. nov. is readily separated from *L. grypus* by its lower ventral count, 525-677 in *L. adelynhoserae* sp. nov., versus 790 in *L. grypus*, and 700-770 in *L. cliffrosswellingtoni* sp. nov. this number not being seen in either other species.

*L. cliffrosswellingtoni* sp. nov. is further diagnosed by the following suite of characters: It is a moderately large (to 42 cm total length), very slender, usually black-tailed blind-snake with snout strongly beaked in profile, 18 midbody scale rows and nasal cleft usually proceeding from the second labial.

The tail is 1.4-4.4 percent of the total length.

The rostral (from above) is much longer than wide, about three-

quarters as wide as the head and extending back to level of eyes or nearly so. Nasals narrowly separated behind rostral. Frontal smaller than prefrontal. The snout is angular from above and very strongly beaked in profile. Nostrils inferior, very slightly or not swollen and much nearer to rostral than preocular. Nasal cleft proceeding from second labial or preocular, or junction between preocular and second labial or first labial to nostril, where it occasionally terminates, but mostly it proceeds for varying distances obliquely upwards and forwards towards the rostral or reaches it.

13-36 subcaudals.

Snout tip is not white although may be slightly paler than the darker region posterior to it, as opposed to a distinctively white snout tip in *L. grypus* and *L. adelynhoserae* sp. nov.; rest of head and neck blackish. Tail is sometimes wholly, but usually only for the distal 30-90 percent blackish. The rest of the dorsal and lateral surfaces pinkish-brown to moderately dark brown, gradually merging with greyish-white ventral surfaces.

**Distribution:** Believed to be restricted to the arid zone of inland central Queensland in a region generally bound in the north by the Dajarra range, or more broadly the road between Townsville and Camooweal, namely the Flinders Highway west from Townsville and the continuation westwards from Cloncurry to the NT Border.

**Etymology:** Named in honor of Cliff Ross Wellington, mainly of NSW, Australia, including now living at Woy Woy on the NSW central coast, in recognition of his extensive work on reptile taxonomy, nomenclature and systematics in general. This honor is with further specific reference to his foresight with respect to Australian Blindsnakes in his then regarded as outrageous removal of Australian species from the genera *Ramphotyphlops* and/or *Typhlops* in his then controversial papers co-authored with Richard Wells (Wells being listed as the senior author) in 1983 and 1985, now regarded as landmark publications in Australian herpetology (Wells and Wellington 1983, 1985).

The role in creating these publications by Wellington has been largely underestimated by other herpetologists and it is fitting that Cliff Ross Wellington be afforded further recognition.

#### SUBGENUS *KERTTYPHLOPS* SUBGEN. NOV.

**Type Species:** *Typhlops proximus* Waite, 1893.

**Diagnosis:** *Kertytyphlops* subgen. nov. Separated from all other Australian Blindsnakes by the following suite of characters: Rich dark brown above, fading to creamish-white below, sometimes with a small dark patch on either side of the vent. The snout is very bluntly tri-lobed from above, angular in profile. The nasal cleft is visible from above, joining the first labial below. Rostral is subcircular from above, about as long as broad. 20 mid body scale rows, body diameter is 20-40 times its length, with an average adult length of 50 cm, but known to attain nearly 75 cm on some occasions.

*Kertytyphlops* subgen. nov. is monotypic for the type species.

**Distribution:** Eastern Australia, including north Queensland and Victoria.

**Etymology:** Named in honor of Robert (Bob) Kerr of Mirboo North, Victoria, Australia for his valuable work in exposing police and judicial corruption. For this, he was wrongly charged by one of many of the ever corrupt Victorian Police in Australia with a rape that he never committed and has since been in jail for more than ten years, being shunted from one maximum security jail to another. At over 70 years of age at the time of writing this paper, it is likely he will die behind bars for a crime he never did.

This is not an unusual result in Australia or elsewhere including the United States, where corruption is endemic in the police, legal and judicial systems as well as the political systems that supposedly oversee the others. It is fitting that a subgenus be named in honor and memory of such a courageous and long suffering human being.

**Content:** *Libertadictus* (*Kertytyphlops*) *proximus* (Waite, 1893).

#### SUBGENUS *ADELYNHOSERTYPHLOPS* SUBGEN. NOV.

**Type Species:** *Ramphotyphlops pilbarensis* Aplin and Donnellan, 1993

**Diagnosis:** *Adelynhosertyphlops* are separated from all other *Libertadictus* by the following suite of characters: Brownish-black or reddish-brown above, whitish to cream below. Snout weakly to strongly trilobed from above, although when weakly trilobed this is sometimes only seen on very close inspection, meaning it is sometimes viewed mistakenly as being smoothly rounded. The snout is angular and with a slightly recurved 'beak' when look at in profile. Nasal cleft usually contacting the second labial and extending to the nostril, coming either slightly before it or after it, but not visible from above, sometimes not completely dividing the nasal. Rostral is large, oval and longer than wide, sometimes broader anteriorly. 20-22 Midbody scale rows. Body diameter is 40-80 times its length. Averages about 25 cm as adults and rarely exceeds 40 cm.

**Distribution:** Most drier parts of continental Australia.

**Etymology:** Named in honor of my daughter Adelyn (Adder-Lyn) Hoser in recognition of over twelve years of valuable work in wildlife conservation, research and education.

**Content:** *Libertadictus* (*Adelynhosertyphlops*) *pilbarensis* (Aplin and Donnellan, 1993) (Type species), *L. (Adelynhosertyphlops) australis* (Gray, 1845), *L. (Adelynhosertyphlops) centralis* (Storr, 1984), *L. (Adelynhosertyphlops) endoterus* (Waite, 1918), *L. (Adelynhosertyphlops) hamatus* (Storr, 1981), *L. (Adelynhosertyphlops) splendidus* (Aplin, 1998), *L. (Adelynhosertyphlops) waitii* (Boulenger, 1895).

#### SUBGENUS *BENNETTYPHLOPS* SUBGEN. NOV.

**Type Species:** *Typhlops pinguis* Waite, 1897

**Diagnosis:** *Bennettytyphlops* subgen. nov. are separated from all other *Libertadictus* by the following suite of characters: Large, very stout build and dark in colour, usually purplish-grey to blackish, attaining up to 50 cm total length. The snout is slightly angular in profile. There are 20-22 midbody scale rows and the nasal cleft proceeds from the second labial. The snout is subrectangular when viewed from above, weakly trilobed in appearance due to the slight swelling above the nostrils and it is short and angular in profile, sometimes with a distinct hook at the end. From above the rostral is slightly to much longer than wide and about half as wide as the head. The nostril is inferior, slightly swollen and about midway between the rostral and preocular. Attains up to 50 cm in total length and the tail is 2.6-5.7 per cent of the total length. 278-377 ventrals, 10-19 subcaudals.

**Distribution:** Drier parts of southern Australia.

**Etymology:** Named in honor of Steve Bennett of Narre Warren South, Victoria, Australia, formerly of Newcastle, NSW and Rowville, NSW, in recognition for valuable work and contributions to the hands-on conservation of reptiles in Australia and globally in the period spanning the late 1980's to the present (year 2012). Also recognized is his mentoring role in personal training, physical fitness and other personal development activities for countless people in Victoria and NSW, as well as his own remarkable achievements in the sport of bodybuilding.

**Content:** *Libertadictus* (*Bennettytyphlops*) *pinguis* (Waite, 1897) (Type species), *L. (Bennettytyphlops) bicolor* (Jan, 1864).

#### SUBGENUS *SILVATYPHLOPS* SUBGEN. NOV.

**Type Species:** *Ramphotyphlops silvia* Ingram and Covacevich, 1993.

**Diagnosis:** *Silvatyphlops* subgen. nov. is separated from all other Australian blindsnakes by the following suite of characters: 20 mid body scale rows; nasal cleft visible from above, the nasal cleft does not completely divide the nasal scale, extending from near the rostral scale to the second upper labial scale; snout is rounded from above and in profile. The snake is of very small size and slender build, being very thread like and perhaps Australia's smallest species, the subgenus being monotypic for



the species taxon *L. (Silvatyphlops) silvia*. Colouration is shiny black above, white below, with jagged, very sharply delineated junction between upper and lower colours. In some specimens the lateral edges of the scales appear pale, creating 11 broad black stripes.

**Distribution:** Known only from a narrow band of white coastal sands between Fraser Island and Noosa in south-east Queensland. They are known to inhabit rainforests, woodlands, heaths, sheltering in sand under logs and leaf litter (Wilson, 2005).

**Etymology:** Named in honor of Tony Silva an expert in aviculture and parrots in particular in recognition for his largely unrecognized work in captive breeding birds and conservation in general. He did a long prison term after blowing the whistle on corruption within the USA government and sections of aviculture in the USA, having faced a series of trumped up charges.

**Content:** *Libertadictus (Silvatyphlops) silvia* (Ingram and Covacevich, 1993).

#### SUBGENUS *BUCKLEYTYPHLOPS* SUBGEN. NOV.

**Type species:** *Ramphotyphlops aspina* Couper, Covacevich and Wilson, 1998.

**Diagnosis:** This subgenus is monotypic for the type species. *Buckleytyphlops subgen. nov.* is readily separated from all other *Libertadictus* by the following suite of characters: Most notably a lack of a caudal spine. It is further distinguished from other members of the genus *Libertadictus* by the following characters combined: 18 midbody scale rows; 403-428 ventrals; the snout is bluntly-rounded from above, rounded and flattened laterally; rostral elongate from above; nasal not completely divided by nasal cleft, clearly visible from above and joining second supralabial below.

**Distribution:** Only two specimens are recorded, both from near Barcardine in central Queensland, Australia, on the boundary of open forest on heavy red soils of desert uplands and treeless grasslands of Mitchell Grass downs.

**Etymology:** Named in honor of Robert (Bob) Buckley a well-known herpetologist of Herberton in North Queensland, who was one of the first people in Australia to breed large numbers of Green Pythons (*Chondropython viridis*). At the behest of a man named Steve Irwin, in 1994 Buckley was raided by Irwin's close friends who worked for the Queensland Wildlife department.

Buckley had all 33 of his Green Pythons taken from him. Irwin kept the seized specimens for himself at his private zoo, at Beerwah in Queensland.

Eventually Buckley won the case, which went through more than one set of hearings. Irwin and others with the Queensland government were shown to have committed perjury in the various court hearings. One such example was a claim by Irwin that it was not possible to breed Green Pythons in captivity, recorded for posterity on the official transcript, a claim rebutted by expert witness Trooper Walsh of the Washington Zoo in America who had been successfully breeding the species for more than 20 years.

It was alleged that most of Buckley's snakes had died at the Irwin zoo.

In another set of proceedings against a Niagra Park, NSW-based private zoo owner, Bob Withey, Irwin and his friends at the Queensland government got the NSW NPWS to prosecute Withey in relation to reptiles he held, with yet another claim it was not possible to breed them in captivity. This time the claim was that it was impossible to breed Spiny Tailed Monitors (*Varanus acanthurus*) in captivity.

Irwin was concerned at the heavy inroads Withey was making in a market he had wanted to have sole rights over, namely the Brisbane schools education market. The problem was with Withey's school wildlife incursions being a cost effective alternative to bussing kids to Irwin's Zoo an hour out of Brisbane.

Irwin gave false evidence against Withey, as mentioned above, easily shown to be false and the case fell over. Withey was acquitted. However Irwin effectively won the battle as Withey then agreed not to market his business in Brisbane as part of a long-term peace deal.

Subsequent to these cases in the early and mid 1990's, Irwin aggressively marketed himself as the "Crocodile Hunter". He did this by quietly registering the trademark and then after the opposition period expired, he stopped another man, fellow Queenslander Mick Pittman, from calling himself this name, even though he'd been known as "The Crocodile Hunter" for considerably longer and had established a wide following as "The Crocodile Hunter".

Irwin subsequently used "The Crocodile Hunter" trademark as his own brand and made many millions of dollars making TV shows featuring himself tormenting reptiles and wildlife in general, in unspeakable acts of on-screen animal cruelty.

The well-connected Irwin successfully evaded prosecution for numerous breaches of the various Australian wildlife laws and animal cruelty laws due to his close friendship with powerful wildlife officers and others in positions of power.

He also successfully marketed himself and his business as a wildlife charity, gaining significant government hand-outs, including cash payments and vast property holdings. His fund-raising exercises were so successful that other wildlife charities missed out on funds they were formerly awarded on an annual basis and as a result were forced to close down.

Included among the casualties was the Gould League a charity that had operated for 100 years and had educated hundreds of thousands of school children.

Irwin's income and hand-outs ostensibly for wildlife conservation, a claim repeated often in TV interviews, was regularly diverted to shameless self promotion, including massive billboards of himself and his family on Australian State Highways and the like.

His various websites are little more than money trees, actively calling for donations and selling junk merchandise, with staff at his business regularly trawling the web engaging in "reputation management" to keep dirt on his business from all parts of the web.

Records of serious safety breaches at his private zoo, including several near fatal snakebites involving staff that were reported in the tabloid media and later on the internet have been removed following threats by staff of the family business.

On 4 September 2006 Irwin was killed while being filmed tormenting a Stingray.

It had retaliated by stabbing him with its spine. It was a result many people described as karma. Not surprisingly the video footage of him tormenting the stingray was never shown to the public.

Meanwhile, Buckley's life and that of several other Queensland based herpetologists and private zoo owners had been destroyed by wildlife officers who had attacked them at Irwin's behest in order that Irwin's potential rivals in the "wildlife business" could be either removed or distracted so that they would not compete with him.

Receipt of seized reptiles, such as 33 Green Pythons, in 1994 worth about \$30,000 each was a secondary benefit for him.

Irwin repaid the favors from the government officers by publicly commending the government to the media, actively lobbying against private herpetologists and other people he viewed as "competitors" being allowed to keep live reptiles and as a "rent-a-witness" in legal proceedings against others. This he did by alleging he had expertise in all things reptile, even though he had no formal training and had never published any meaningful papers in the scientific literature, until shortly before his death when a handful of non-descript articles appeared under his name as either author or co-author.

Details of the tragic Bob Buckley case are in Hoser (1996).

**Content:** *Libertadictus* (*Buckleytyphlops*) *aspina* (Couper, Covacevich and Wilson, 1998).

**SUBGENUS SHEATYPHLOPS SUBGEN. NOV.**

**Type species:** *Typhlops batillus* Waite, 1894.

**Diagnosis:** *Sheatyphlops* subgen. nov. is separated from all other Australian Blindsnakes by the following suite of characters: 24 midbody scale rows, with a bullet-shaped head, the nasal cleft is contacting the second labial.

The subgenus is monotypic for the species *Libertadictus* (*Sheatyphlops*) *batillus* Waite, 1894.

**Distribution:** Known only from the holotype of the type species collected at Wagga Wagga, NSW in the 1800's, since registered at the Australian Museum Sydney with the specimen number R42756.

**Comment:** There is a possibility the taxon may be extinct, due to the intense habitat degradation in the area over the past 200 years. While I would recommend that the NSW National Parks and Wildlife Service (NPWS), do an audit of the region in order to find any specimens, I note that as an entity, the department has no interest in wildlife conservation whatsoever and so, the conservation status of the taxon is likely to never be known!

In fact if the department were abolished, private individuals may take up the search for the species, which is something no one will attempt at present for fear of prosecution or jail for the heinous crime of "interfere with wildlife" a criminal charge only ever laid in Australia on people with a genuine interest in wildlife and who conduct valuable research, rather than being enforced on the ratbag individuals who go out and kill wildlife in cold blood.

**Etymology:** *Sheatyphlops* subgen. nov. is named in honor of Glenn Shea of Sydney, New South Wales, Australia, the current editor of the reptile journal *Herpetofauna* in recognition of his lifelong interest in reptiles, most notably skinks of the genus *Tiliqua* and his many valuable publications about reptile taxonomy. I also mention here that I have not always agreed with every judgment he's made (including for example his synonymization of, "*Cannia weigeli*" with "*Pseudechis australis*") (see Shea *et al.* 1988). However, he is still more than worthy enough to have one or more taxa named in his honor.

**Content:** *Libertadictus* (*Sheatyphlops*) *batillus* (Waite, 1894).

**GENUS SIVADICTUS WELLS AND WELLINGTON, 1985**

**Type species:** *Anilius nigrescens* Gray, 1845.

**Diagnosis:** *Sivadictus* is separated from all other Blindsnakes by the following suite of characters: Purplish pink-brown to nearly black above, cream, yellow or pinkish below. Snout is rounded from above and in profile. Nasal cleft is long, joining the second supralabial or the suture between the first and second labials, projecting forward and upwards to partially divide the nasal, visible from above. In *Sivadictus* there is often a dark patch on either side of the vent. Rostral is large, oval or elliptical, much longer than broad. 22 mid body scale rows. Body diameter is 35-60 times in its length; tail terminates in a spine.

**Distribution:** Australia, New Guinea and Indonesia.

**Content:** *Sivadictus nigrescens* (Gray, 1845) (Type species), *S. brongersmai* (Hahn, 1980), *S. elberti* (Roux, 1911), *S. erycinus* (Werner, 1901), *S. florensis* (Boulenger, 1887), *S. polygrammicus* (Schlegel, 1839), *S. robertsi* (Couper, Covacevich and Wilson, 1998), *S. torresianus* (Boulenger, 1889), *S. undecimlineatus* (Hahn, 1980).

**SUBGENUS SIVADICTUS WELLS AND WELLINGTON, 1985**

**Type species:** *Anilius nigrescens* Gray, 1845

**Diagnosis:** *Sivadictus* as a genus is separated from all other Blindsnakes by the following suite of characters: Purplish pink-brown to nearly black above, cream, yellow or pinkish below. Snout is rounded from above and in profile. Nasal cleft is long, joining the second supralabial or the suture between the first and second labials, projecting forward and upwards to partially divide the nasal, visible from above. Rostral is large, oval or elliptical,

much longer than broad. 22 mid body scale rows. Body diameter is 35-60 times in its length; the tail terminates in a spine.

The subgenus *Sivadictus* is separated from the subgenus *Acktytyphlops* subgen. nov. by the fact that the nasal cleft does not completely divide the nasal scale, extending from near the rostral scale to the first upper labial scale; as opposed to the second upper labial scale or suture between the first and second in subgenus *Acktytyphlops* subgen. nov.. Adults of the subgenus *Sivadictus* are purplish brown as opposed to greyish brown in *Acktytyphlops* subgen. nov.. In the subgenus *Sivadictus* the ventral surfaces are pinkish white with a weak ragged junction between the upper and lower colours as opposed to evenly merging darker upper and lighter lower colouration in *Acktytyphlops* subgen. nov..

**Distribution:** Australia, New Guinea and Indonesia.

**Content:** *Sivadictus* (*Sivadictus*) *nigrescens* (Gray, 1845) (Type species).

**ACKTYTYPHLOPS SUBGEN. NOV.**

**Type species:** *Typhlops polygrammicus* Schlegel, 1839.

**Diagnosis:** *Sivadictus* is as a genus is separated from all other Blindsnakes by the following suite of characters: Purplish pink-brown to nearly black above, cream, yellow or pinkish below. Snout is rounded from above and in profile. Nasal cleft is long, joining the second supralabial or the suture between the first and second labials, projecting forward and upwards to partially divide the nasal, visible from above. Rostral is large, oval or elliptical, much longer than broad. 22 mid body scale rows. Body diameter is 35-60 times in its length; the tail terminates in a spine.

The diagnosis of the genus *Acktytyphlops* subgen. nov. is done below by the separation of the subgenus *Sivadictus* from this one.

*Sivadictus* is separated from the other subgenus *Acktytyphlops* subgen. nov. by the fact that the nasal cleft does not completely divide the nasal scale, extending from near the rostral scale to the first upper labial scale; as opposed to the second upper labial scale or suture between the first and second in subgenus *Acktytyphlops* subgen. nov.. Adults of the subgenus *Sivadictus* are purplish brown as opposed to greyish brown in *Acktytyphlops* subgen. nov.. In the subgenus *Sivadictus* the ventral surfaces are pinkish white with a weak ragged junction between the upper and lower colours as opposed to an evenly merging darker upper and lighter lower colouration in *Acktytyphlops* subgen. nov..

**Comment:** The name *Pseudotyphlops* Fitzinger, 1843 as a genus name for the taxon *polygrammicus* is not available as it was pre-occupied for another taxon in the family Uropeltidae, namely *Pseudotyphlops philippinus* Müller, 1832, the genus name first proposed by Schlegel in 1839.

**Etymology:** Named in honor of a family pet dog, an Akita, named *Acanthophis* (in recognition of the elapid snake), whom we called Acky for short. The dog successfully guarded the Snakebusters facility for about two years before an illegal theft by officers of Manningham council, who unlawfully entered our locked property, where they then kidnapped the dog in 2004. This theft of the dog in revenge for their dog control and bylaws officer, Mike Clark being named as corrupt in the book *Victoria Police Corruption-2*, (Hoser, 2009), in a case where he committed perjury in legal proceedings in 1994, where he made a written statement in the form of a sworn court document, later proven to be false by the Optus Phone company.

It should be noted also, that I had never had prior adverse dealings with this man, Mike Clark and had merely detailed his dishonesty and corruption in the book in the public interest.

At the Manningham Council dog pound and works depot in Blackburn Road North, corrupt council officers had the dog tied to a pole and then bashed with another metal pole, resulting in permanent and irreparable head and brain damage as well as injuries on most other parts of the dog's body. A council officer outraged at the extreme act of cruelty contacted our family and

advised us that the dog had been kidnapped by council officers and after a series of denials by the officers that they had illegally taken the dog or even had the dog, the council officers admitted that they had taken the dog and injured it.

The injuries to the dog were so severe that the dog did not recover and so had to be euthanized.

I make no apologies for naming a reptile subgenus in honor of a loyal animal.

**Content:** *Sivadictus (Ackytyplops) polygrammicus* (Schlegel, 1839) (Type species), *S. (Ackytyplops) brongersmai* (Hahn, 1980), *S. (Ackytyplops) elberti* (Roux, 1911), *S. (Ackytyplops) erycinus* (Werner, 1901), *S. (Ackytyplops) florensis* (Boulenger, 1887), *S. (Ackytyplops) robertsi* (Couper, Covacevich and Wilson, 1998), *S. (Ackytyplops) torresianus* (Boulenger, 1889), *S. (Ackytyplops) undecimlineatus* (Hahn, 1980).

#### FIRST REVISOR'S INSTRUCTIONS

In the unlikely event that a future worker decides that two named genus, subgenus, species or subspecies groups or entities described within this paper should be merged into a single entity and wishes to make a taxonomic and nomenclatural decision to do so, then the name to be used shall be that for which the formal description appears first in terms of position on page or page priority as in those described first take priority over those later within the same paper, if and when a conflict is deemed to take place.

Unless mandatory under the Zoological Rules of the time, no names are to have spellings altered in any way.

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**CONFLICT OF INTEREST**

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

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# **An updated taxonomy of the living Alligator Snapping Turtles (*Macrochelys* Gray, 1856), with descriptions of a new tribe, new species and new subspecies.**

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## **ABSTRACT**

Molecular studies have resolved many questions in terms of the relationships between the world's living Turtles, Terrapins and Tortoises, collectively grouped within the order Testudines. However the taxonomy has not necessarily been updated accordingly.

This paper presents a revised and updated taxonomy and nomenclature for the Alligator Snapping Turtles (genus *Macrochelys* Gray, 1856) of North America.

Formally named are one (1) new tribe, one (1) new species and one (1) new subspecies, according to the Zoological Code (Ride *et al.* 1999).

**Keywords:** Taxonomy; Testudines; Nomenclature; Zoological Code; new tribe; Macrochelyiini; new species; *Macrochelys*; *maxhoseri*; new subspecies; *muscati*.

## **INTRODUCTION**

In spite of their general abundance in most parts of the world and familiarity to scientists for many years, the taxonomy of the turtles, terrapins and tortoises (order Testudines) has been far from stable.

In the period post-dating year 2000, a number of molecular studies have greatly resolved relationships between species, genera and higher-level groupings.

Notwithstanding this, the nomenclature has failed to keep pace with the changes in knowledge and this has been in spite of numerous pre-existing and available names for some generic groupings and taxon populations.

Drawing on the available knowledge of the phylogeny of the order Testudines and the genus *Macrochelys* Gray, 1856, I hereby present an updated taxonomy for this North American genus.

Important publications in relation to the hundreds of other described Testudine species are too many to comprehensively cite here, however some key ones to date include: Allen and Neill (1950), Alvarez *et al.* (2000), Ashton and Feldman (2003), Auffenberg (1966, 1971), Austin *et al.* (2003), Avise *et al.* (1992), Baard (1990), Barth *et al.* (2002, 2004), Beheregaray *et al.* (2003, 2004), Bickham (1981), Bickham and Baker (1976), Bickham and Carr (1983), Bickham *et al.* (1996), Blanck *et al.* (2006), Bona and De La Feunte (2005), Bour (1984, 1987), Bour and Zaher (2005), Bowen and Karl (1997), Bowen *et al.* (1993), Brinkman and Wu (1999), Brinkman *et al.* (2004a, 2004b), Broadley (1981), Burbidge *et al.* (1974), Burke *et al.* (1996), Burns *et al.* (2003), Caccone *et al.* (1999, 2002, 2004), Cann (1999), Cann and Legler (1994), Cao *et al.* (2000), Carr (1952), Carr (1981), Carr and Bickham (1986), Caspers *et al.* (1996),

Cervelli *et al.* (2003), Chien *et al.* (2005), Ciofi *et al.* (2002), Clarke (1956), Claude *et al.* (2003), Conant (1975), Conant and Collins (1991), Cracraft and Donoghue (2004), Crumly (1982, 1984a, 1984b, 1993), Crumly and Sanchez-Villegra (2004), Cunningham (2002), De Broin (1988), Degenhardt (1996), De Queiroz and Ashton (2004), Derr *et al.* (1987), Diesmos *et al.* (2005), Dixon (2000), Dobie (1971), Dutton *et al.* (1996, 1999), Echelle *et al.* 2010, Engstrom and McCord (2002), Engstrom *et al.* (2002, 2004), Ernst and Barbour (1989), Ernst and Lovich (2009), Ernst *et al.* (1994), Feldman and Parham (2001, 2002, 2004), Frair (1982), Fritz and Obst (1996), Fritz (1996), Fritz *et al.* (2004, 2005a, 2005b, 2005c, 2006), Fujita *et al.* (2004), Gaffney (1975a, 1975b, 1976, 1977, 1979, 1984a, 1984b, 1988, 1996), Gaffney and Meylan (1988, 1992), Gaffney *et al.* (1991, 1998), Gaur *et al.* (2006), Georges and Adams (1992), Georges and Thomson (2006), Georges *et al.* (1998, 2002), Gerlach (2001, 2004), Glass (1949), Gmira (1993), Guicking *et al.* (2002), Hackler (2006), Hackler *et al.* (2007), Haiduk and Bickham (2002), Hartweg (1939), Hay (1908), Hedges and Poling (1999), Hedges *et al.* (1990), Herrel *et al.* (2002), Hill (2005), Hirayama (1984, 1991, 1994, 1998), Hirayama and Chitoku (1996), Hirayama *et al.* (2000), Honda *et al.* (2002a, 2002b), Hutchison (1991), Hutchison and Bramble (1981), Iverson (1991, 1992, 1998), Iverson and McCord (1994), Iverson *et al.* (2001), Iwabe *et al.* (2005), Jamniczky and Russell (2004), Janzen and Krenz (2004), Johnson (1987), Karl and Bowen (1999), Karl and Wilson (2001), Kojima and Fujiwara (2005), Kordikova (2002), Krenz *et al.* (2005), Lahanas *et al.* (1994), Lamb and Lydeard (1994), Lamb and Osentovski (1997), Lamb *et al.* (1989, 1994), Lane and Mitchell (1997), Lapparentde De Broin (2000), Lapparentde De Broin and Murelaga (1999), Le



(2006), Le and McCord (2008), Le *et al.* (2006), Legler and Georges (1993), Lenk *et al.* (1999a, 1999b), Lesia *et al.* (2003), Liao *et al.* (2001), Lieb *et al.* (1999), Limpus *et al.* (1988), Lindeman (2000a, 2000b), Lindeman and Sharkey (2001), Lo *et al.* (2006), Loveridge and Williams (1957), Mahmoud and Klicka (1979), Mannen and Steven (1999), Marlow and Patton (1981), McCord and Pritchard (2002), McCord *et al.* (1995, 2000, 2002), Megerian and Murray (1999), Meyer and Zardoya (2003), Meylan (1984, 1986, 1988, 1996), Meylan and Gaffney (1989), Meylan and Sterrer (2000), Meylan *et al.* (1990, 2000), Milstead (1969), Minx (1996), Mlynarski (1976), Moen (2006), Moody (1984), Morafka *et al.* (1984), Mount (1975), Mühlmann-Díaz *et al.* (2001), Near *et al.* (2005), Noonan (2000), Noonan and Chippindale (2006), Okayama *et al.* (1999), Palkovacs *et al.* (2002), Parham and Fastovsky (1997), Parham and Feldman (2002), Parham *et al.* (2001, 2004, 2006a, 2006b), Peng *et al.* (2005), Perala (2002a, 2002b, 2002c), Phillips *et al.* (1996), Praschag *et al.* (2006), Pritchard (1967, 1979, 1980, 1989, 1992), Rest *et al.* (2003), Reynoso and Montellano-Ballestros (2004), Rhodin (1994a, 1994b), Ride, *et al.* (1999), Roberts *et al.* (2004), Roman *et al.* (1999), Russello *et al.* (2005), Sasaki *et al.* (2004), Seddon *et al.* (1997), Seidel (1988, 1994, 1996, 2002), Seidel and Lucchino (1981), Seidel *et al.* (1981, 1986), Semyenova *et al.* (2004), Serb *et al.* (2001), Shaffer *et al.* (1997, 2008), Shi *et al.* (2005), Shipman (1993), Shishikawa (2002), Shishikawa and Takami (2001), Sites *et al.* (1981, 1984), Sloan and Taylor (1987), Souza *et al.* (2002, 2003), Spinks and Shaffer (2005, 2007), Spinks *et al.* (2004), Sqalli-Houssaini and Blanc (1990), Starkey (1997), Starkey *et al.* (2003), Stephens and Weins (2003), Stuart and Parham (2004, 2006), Swainson (1839), Takahashi *et al.* (2003), Tessier *et al.* (2005), Tinkle (1958), Vander Kuyl *et al.* (2002), Walker and Avise (1998), Walker *et al.* (1995, 1997, 1998a, 1998b), Weisrock and Janzen (2000), Whetstone (1978), Williams (1950), Wink (2001), Wood (1997), Wood *et al.* (1996), Wu *et al.* (1999), Yasukawa *et al.* (1996, 2001), Zangerl (1945, 1980), Zangerl and Turnbull (1955), Zangerl *et al.* (1988), Zardoya and Meyer (1998), Zardoya *et al.* (2003), Zhu *et al.* (2005) and Zug (1966, 1971).

Other genera may be the focus of later taxonomic revisions, but this paper is confined solely to the living members of the North American Genus *Macrochelys* Gray, 1856.

For a considerable time it has been known that there are populations of these Testudines, known locally as "Alligator Snapping Turtles" that do in fact warrant taxonomic recognition. Furthermore in light of the fact that there is a good fossil record for the genus *Macrochelys* and similar species, it is appropriate that a tribe be formally named for the group, according to the rules of Zoological Nomenclature (Ride *et al.* 1999) in order to provide a reference point for other zoologists.

As a result, I formally describe a new tribe, new subspecies and new species below.

The new species described has until now been formally lumped within *Macrochelys temmincki* Troost, 1835, even though the taxonomic significance of the population has been known for some years (Hackler, 2006, Hackler *et al.* 2007, Echelle *et al.* 2009).

#### TRIBE MACROCHELYIINI TRIBE NOV.

(Terminal Taxon: *Macrochelys temmincki* Troost, 1835)

**Diagnosis:** This tribe as currently recognized is endemic to the United States and is the largest freshwater turtle in North America (Ernst and Barbour 1989), although fossils of specimens attributed to this tribe have been found elsewhere. They are known commonly as "Alligator Snapping Turtles" in recognition of three prominent ridges along the back and their large adult size. They are differentiated from specimens within the tribe Chelydrini Swainson, 1839 by their larger adult size and the presence of an extra row of scutes along the side of the carapace as well as a long tail that is not "saw toothed".

The carapace (dorsal shell) length of adult Alligator Snapping Turtles ranges from 38 to 66 cm (15 to 26 in.), and the weight

typically ranges from 16 to 80 kg (35 to 176 lb) (Johnson 1987, Ernst and Barbour 1989). However, weights of 100 kg (220 lb) (Pritchard 1979) and carapace lengths of 80 cm (Pritchard 1980) have been reported. The carapace is approximately two-thirds as wide as it is long, extremely rough, dark brown or gray, and without markings (Pritchard 1979). The anterior carapace margin is smooth; the posterior margin is strongly serrated; and the sides are relatively straight (Carr 1952, Mount 1975, Ernst and Barbour 1989).

The carapace bears three strong, longitudinal, dorsal keels (Pritchard 1989). An extra row of scutes (plates referred to as the supramarginals) is located on the carapace between the costals and marginals. The plastron (ventral shell) is usually dark brown or gray (but can be black or tan), reduced in size, and has a cross-shaped appearance that leaves most of the soft parts exposed (Conant 1975, Ernst and Barbour 1989).

The huge head has a pointed snout, large lateral orbits, and powerful jaws with a prominent hook at the tip of the upper jaw (Carr 1952, Ernst and Barbour 1989). A pink wormlike appendage on the tongue is attached near its center to a rounded muscular base that allows movement of the appendage for attracting prey (Mahmoud and Klicka 1979, Ernst and Barbour 1989). Numerous dermal projections (tubercles) are located on the sides of the head, chin, and neck. The skin is dark brown to gray above and lighter below; darker blotches may be present on the head. The muscular tail is approximately as long as the carapace, with three rows of tubercles above and numerous small scales below (Ernst and Barbour 1989).

Sexes appear similar but can sometimes be distinguished on the basis of size, as mature males are considerably larger than females (Ernst *et al.* 1994). Males have longer preanal tail lengths than females; the vent is posterior to the rim of the carapace (Johnson 1987, Ernst and Barbour 1989), but this is not always obvious in smaller individuals (e.g. individuals 11.3 kg (25 lb) or less) (Lane and Mitchell, 1997).

Juvenile skin is generally much rougher and has more exaggerated tubercles than that of adults (Carr 1952). The snout and tail are relatively longer than those of adults, and the juvenile tail is often longer than the carapace.

Alligator Snapping Turtles commonly occur with many other turtle species. However, as already mentioned they are only likely to be confused with the common snapping turtle (*Chelydra serpentina*), and very young individuals may possibly be confused with musk or mud turtles (Family Kinosternidae). The common snapping turtle has a smaller head, a saw-toothed tail, and lacks an extra row of scutes between the costals and marginals (Conant 1975). It also has low keels on the carapace, and its eyes are situated high enough so that the orbits can be seen when viewed from above (Ernst *et al.* 1994). The head of the alligator snapping turtle is covered with hard plates, whereas the common snapping turtle's head is covered with soft flesh (Clarke 1956, Conant 1975). Adult musk and mud turtles are much smaller and have shorter tails, smooth shells, and hinged plastrons (Conant 1975). Alligator Snapping turtles (except for nesting females) rarely leave the water unless habitat becomes unsuitable; Common Snapping Turtles often move among water bodies (Lane and Mitchell, 1997).

The history of the genus *Macrochelys* is ancient (Zangerl 1945) thereby warranting its placement within a tribe separate from *Chelydra*.

**Distribution:** Living specimens occur naturally within the United States of America only. Fossil specimens are known from elsewhere.

**Content:** *Macrochelys* Gray, 1856.

**GENUS MACROCHELYS GRAY, 1856**

**MACROCHELYS TEMMINCKI TROOST, 1835**

**Diagnosis:** As for the tribe above.

**Distribution:** Herein confined to the Mississippi valley drainage and nearby rivers systems only and eastwards to the waterways of the Apalachicola, Ochlockonee, Choctawhatchee and Econfinia

Drainages, these four systems having the subspecies *M. temmincki muscati* subsp. nov. (see below). The nominate form of the subspecies *Macrochelys temmincki* is found in the drainages west of these, including the Pensacola Bay area, Pascagoula, Mobile Bay/Perdido, Mississippi, Trinity, Neches.

East of the above drainages the species *M. maxhoseri* sp. nov. is found. That is the Suwannee River drainage system of Florida and Georgia, USA.

**MACROCHELYS TEMMINCKI MUSCATI SUBSP. NOV.**

**Holotype:** A specimen in the Florida Museum of Natural History (FM) at the University of Florida, specimen number: 155266, from Liberty, Florida, USA.

The Florida Museum of Natural History (FM) at the University of Florida, is a government owned facility that allows researchers access to the collection as laid out on their website at: <http://www.flmnh.ufl.edu>

**Paratypes:** Specimens in the Florida Museum of Natural History (FM) at the University of Florida. Paratype one is specimen number 155267 from Liberty, Florida, USA. Paratype two is specimen number 87950 from Washington, Florida, USA. Paratype three is specimen number 88528 from Washington, Florida, USA. Paratype four is specimen number 117204 from Liberty, Florida, USA.

The Florida Museum of Natural History (FM) at the University of Florida, is a government owned facility that allows researchers access to the collection as laid out on their website at: <http://www.flmnh.ufl.edu>

**Diagnosis:** Formerly regarded as being a variant of the species *Macrochelys temmincki* Troost, 1835, this subspecies has been recognized by several authors in the recent past as warranting taxonomic recognition either as a subspecies or full species (e.g. Hackler, 2006, Hackler *et al.* 2007, Echelle *et al.* 2009, Roman *et al.* 1999) on the basis of molecular differences as detailed in their papers and recent papers by other authors.

This subspecies is also morphologically different from the nominate form by colouration and markings on the head. The lighter colouration on the head of the nominate form tends towards extremely thin lines, especially posterior to the eye. This is not the case in *Macrochelys temmincki muscati* subsp. nov. where the posterior light patches consists of a combination of moderately thin lines with even boundaries and sometimes irregular blotches in combination with these lines.

*Macrochelys temmincki muscati* subsp. nov. is also separated from *Macrochelys temmincki* by having an average of 2.62 supramarginals on each side of the shell as opposed to an average of 3.2 for *Macrochelys temmincki temmicki*. The nominate form (*Macrochelys temmincki temmicki*) sometimes has four on one or both sides.

*Macrochelys temmincki temmicki* never has two submarginal scutes, whereas this condition is common for *Macrochelys temmincki muscati* subsp. nov.

When *Macrochelys temmincki muscati* subsp. nov. does have three submarginal scutes the third is invariably reduced in size or rudimentary.

**Distribution:** This subspecies accounts for all populations of the species *Macrochelys temmincki* from the Apalachicola, Ochlockinee, Choctawhatchee and Econfinia Drainages. The nominate form of the subspecies *Macrochelys temmincki* is found in the drainages west of these, including the Pensacola Bay area, Pascagoula, Mobile Bay/Perdido, Mississippi, Trinity, Neches.

**Etymology:** Named in honour of David Muscat of Park Orchards, Melbourne, Victoria, Australia in recognition of his courageous work in maintaining ethics on local government and the Australian environment.

In 2012 Muscat, who had done considerable work for the community and as a well-known environmentalist with an exceptional track record, stood for the Manningham Local Council (Melbourne, Australia) (Mullum Mullum ward) in local

government elections.

However he was not voted into office, as he should have been, because of a highly illegal and unethical conduct by other candidates and their associates.

The campaign against Muscat was intense.

It included a serious of fabricated assault charges against him, laid improperly by local police and prosecuted as a means to ensure that Muscat would be kept out of government.

The criminal conviction of Muscat was assured through a corrupt magistrate at the Ringwood Magistrate's Court in Victoria.

The campaign then included a totally dishonest hate campaign run through the local tabloid media at the behest of well-connected rival candidates. More seriously, a candidate elected to council, Paul McLeish got his seat on the council at Muscat's expense and that of other legitimate candidates.

McLeish got in on the back of votes from so-called stooge or dummy candidates brought in for the express purpose of confusing the electorate and diverting votes away from Muscat.

One of the stooge candidates of McLeish was his wife, who ran under a different name in order to hide from voters her affinities to McLeish and conceal the obvious fact that she would be diverting her "preferences" to him.

Under the voting system of Victorian local government, when no single candidate gets enough votes to get elected to the local government council (as is usual), the vote goes to "preferences" dictated by each of the other candidates. McLeish's wife would of course divert hers to her husband, in effect giving him twice the vote getting power of a single ethical candidate like Muscat, who did not resort to the use of stooges or dummies to get extra votes to get elected.

Another stooge for McLeish was Paula Piccini, wife of serial candidate for everything, Stephen Mayne, better known for his website Crikey dot com dot au which was used by him as a forum to run hate campaigns based on false information marketed as "news" and a collection of lies.

Not surprisingly, that eventually led to him paying out a sizeable amount for defaming 3AW radio Shock Jock Steve Price.

That was after Price sued Mayne for defamation in the Victorian Supreme Court.

Mayne's wife didn't even live in the Mullum Mullum electorate and in effect ran solely as a stooge of McLeish for the purposes of diverting votes to McLeish in order to make sure Muscat and other genuine candidates were not voted in.

Piccini got top billing on a long ballot paper, forcing genuine candidates to the back page of the official government "how to vote" forms ensuring that she got a high number of votes to get McLeish elected, via the co-called donkey vote (where people number the form from top to bottom).

Meanwhile the genuine candidates on the back page (and without stooge candidates to boost votes) were effectively ignored by voters, most of whom wouldn't have even known they were running for election to council, because their details were printed on the reverse side of the official form, which was in fact ignored by most voters.

Another candidate elected to council in the 2012 election, Sophie Galbally, used the same tactics as McLeish to get elected, using a local resident Gerry Dale as her stooge candidate for the purposes of vote diversion.

In other words, there was no effective democracy in local government in Manningham in 2012 in spite of claims to the contrary by State Government officials, and this pattern was repeated across Victoria.

So while corrupt people now in control of Manningham Council and their friends in hate media like the Rupert Murdoch controlled "*Manningham Leader*" can peddle lies about environmental advocate David Muscat, it is appropriate that his valuable contribution to the Australian environment be properly and permanently recognized via a publication that confines itself to the facts and has formally named a new taxon.

**MACROCHELYS MAXHOSERI SP. NOV.**

**Holotype:** A specimen in the Florida Museum of Natural History (FM) at the University of Florida, specimen number: 165801, from Alachua, Florida, USA.

This is a government owned facility that allows researchers access to the collection as laid out on their website at: <http://www.flmnh.ufl.edu>

**Paratypes:** Specimens in the Florida Museum of Natural History (FM) at the University of Florida. Paratype one is specimen number 165800 from Columbia, Florida, USA. Paratype two is specimen number 84653 from Alachua, Florida, USA.

This is a government owned facility that allows researchers access to the collection as laid out on their website at: <http://www.flmnh.ufl.edu>

**Diagnosis:** Formerly regarded as being a variant of the species *Macrochelys temmincki* Troost, 1835, this species has been recognized by several authors in the recent past as warranting taxonomic recognition either as a subspecies or full species (e.g. Hackler, 2006, Hackler *et al.* 2007, Echelle *et al.* 2009).

*Macrochelys maxhoseri sp. nov.* is most easily separated from *Macrochelys temmincki* Troost, 1835 by its larger average adult size, heavier build and a greater width of the head and alveolar surfaces, making it the largest freshwater Turtle in the United States.

*Macrochelys maxhoseri sp. nov.* is further and definitively separated from *Macrochelys temmincki* Troost, 1835 by the (moderately distinct) lighter markings on the head (particularly posterior to the eye), tending to form wide (sometimes irregular) stripes as opposed to thinner (regular) or very thin stripes or spots or blotches.

Hackler *et al.* 2007 and Echelle *et al.* 2009 have provided a molecular justification and basis for recognition of *Macrochelys maxhoseri sp. nov.* at the species level and this is also relied upon as part of the formal diagnosis herein.

This species differs from *Macrochelys temmincki* in that in this species the abdominal scutes, normally widely separated for *Macrochelys temmincki* send forth angular median extensions that make contact with the quadrangle of umbilical scales frequently.

In line with *Macrochelys temmincki mucati subsp. nov.* *Macrochelys maxhoseri sp. nov.* is also separated from *Macrochelys temmincki temmicki* by having an average of about 2.6 supramarginals on each side of the shell as opposed to an average of 3.2 for *Macrochelys temmincki temmicki*. The nominate form (*Macrochelys temmincki temmicki*) sometimes has four on one or both sides.

*Macrochelys temmincki temmicki* never has two submarginal scutes, whereas this condition is common for *Macrochelys maxhoseri sp. nov.* and *Macrochelys temmincki mucati subsp. nov.*

When *Macrochelys maxhoseri sp. nov.* or *Macrochelys temmincki mucati subsp. nov.* does have three submarginal scutes the third is invariably reduced in size or rudimentary.

**Distribution:** This taxon is restricted to the Suwannee River drainage system of Florida and Georgia, USA. Specimens from drainages west of this system remain referred to the taxon *Macrochelys temmincki*.

**Etymology:** Named in honour of my cousin, Max Hoser of Liverpool and Campbelltown, NSW, Australia, (born in the UK), for various contributions to herpetology in the 1970's and 1980's and social services in NSW in the period since.

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**CONFLICT OF INTEREST**

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

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Top: *Tropidechis sadleri* Hoser, 2003 from Cairns, Qld.

Bottom: *Tympanocryptis pinguicollis* Mitchell, 1948 from Canberra airport, ACT.

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