ISSUE 14, PUBLISHED 30 JUNE 2012

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

Australasian Journal of Herpetology

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Published 30 June 2012.

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

Australasian Journal of Herpetology
Issue 14, 30 June 2012
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Australasian Journal of Herpetology

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Image: Blue-bellied Black Snake (*Panacedechis guttatus*) cross Collett's (Jaffa) Snake (*Panacedechis colletti*).
Cover image: Pilbara Death Adder (*Acanthophis wellsei*).
All images within by Raymond Hoser.

Australasian Journal of Herpetology 14:3-5.
Published 30 June 2012.

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

Yeomansus: A New Genus for the Slender Racer (Serpentes:Colubridae).

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Received 11 March 2012, Accepted 18 April 2012, Published 30 June 2012.

ABSTRACT

The Slender Racer from drier parts of central Asia was originally described as "*Masticophis spinalis*" by Peters in 1866. It has had an unstable taxonomic history having being shunted between genera, including *Zamenis* by Jan in 1866, *Coluber* by Slevin in 1925 and then *Hierophis* by Schätti in 1988.

However phylogenetic studies by Nagy et. al. (2004) and more recently Pyron et. al. (2011), using molecular methods have confirmed that this species is placed between the genera *Hierophis* Fitzinger 1834 and *Eirenis* Jan, 1863.

Furthermore this taxon shows a deep divergence from the other two groups.

Because of this situation and the fact that it is not tenable to merge *Hierophis* and *Eirenis*, a new monotypic genus, *Yeomansus* gen. nov. is created for the species "*Masticophis spinalis*" according to the Zoological Code.

The facts and circumstances leading to the avoidable death of United Kingdom snake expert Luke Yeomans on 29 June 2011 are also given.

Keywords: Taxonomic revision; new genus; *Yeomansus*; *Hierophis*; *Eirenis*; systematics; venomoid.

INTRODUCTION

The racers, formerly placed in the genus *Coluber* (sesu lato) have been the subject of intense taxonomic scrutiny in recent years (Ananjeva et. al. 2006, Nagy et. al. 2004a, 2004b, Pyron et. al. 2011).

Using both morphological and molecular methods, relationships between most species have been resolved and where necessary genera have been resurrected from synonymy with *Coluber*, or new ones created.

The species described as "*Masticophis spinalis*" by Peters in 1866, commonly known as the "Slender Racer" is one of the species whose phylogeny has been well established by molecular means by numerous studies including those of Nagy et al. (2004a, 2004b) and Pyron et. al. (2011).

After being shunted between genera *Zamenis* by Jan in 1866, *Coluber* by Slevin in 1925 and then *Hierophis* by Schätti in 1988, Nagy et. al. presented evidence to suggest that the species should be placed in the genus *Eirenis* Jan, 1863, with the view being widely adopted by others including the influential (but commonly inaccurate) website "Wikipedia" as of January 2012.

Molecular phylogenies produced by Pyron et. al. (2011) and others show the Slender Racer sits between both *Hierophis* and *Eirenis* and is not particularly close to either group.

Until now and in light of this knowledge, herpetologists have tended to shunt this species between either genus, with no strong consensus developing as to which is the correct one.

The reality is that short of merging *Hierophis* and *Eirenis* no consensus is likely to occur. However a viable solution to the problem and a means of creating taxonomic stability is to erect a third genus to accommodate this taxon.

Doing so would remove the need to decide where to allocate this species and would also more accurately reflect the relationship of this taxon to the other two groups.

As such a move (to erect a genus) for the Slender Racer is inevitable, it is better done sooner rather than later and is therefore done here according to the Zoological Code (Ride et. al. 1999).

There is no need to formally define the genera *Hierophis* and *Eirenis* as this is done elsewhere, although in the diagnosis below for the new genus *Yeomansus* gen. nov., the diagnosis does explain how to separate the relevant taxon from the other species.

While found in a region remote from Western Europe and North America, there has been plenty of material published in relation to the Slender Racer, and it is well-known to science.

Important publications include, Ananjeva et. al. (2006), Bauer et. al. (1995), Boulenger (1893), Dujsebayeva (2010), Günther (1872), Jan (1866, 1867), Kharin (2011), Kharin and Akulenko (2008), Macey et. al. (1988), Mell (1931), Nagy et. al. (2004a, 2004b), Peters (1866), Pyron et. al. (2011), Schätti (1988), Schätti and Wilson (1986), Shannon (1956), Slevin (1925), Stejneger (1907), Xu et. al. (2000), and Zhao and Adler (1993).

While there is often an inertia by herpetologists to adopt usage of a new name for a genus, especially a monotypic one, this is unlikely to be the case for the taxon placed in this new genus for two reasons: 1/ due to the history of the nomenclature for the species and current confusion as to the generic allocation meaning people will be looking for a current and if need be new genus for the taxon, and 2/ I have decided to name the genus after a very popular and charismatic reptile expert from the UK, Luke Yeomans, allowing people to identify a snake with someone they already know of, making memorizing the new name easy.

GENUS *YEOMANSUS* GEN. NOV.

Type species: *Masticophis spinalis* Peters, 1866.

Diagnosis: This genus is monotypic for the type species *spinalis*. It is separated from all other snakes within genera *Coluber*, *Zamenis*, *Hierophis* and *Eirenis* by the following suite of characters: The snout is prominent and fairly pointed. The rostral is nearly as deep as it is broad, the portion visible from above measuring one third to two fifths its distance from the frontal; internasals shorter than the prefrontals; frontal broader than the supraocular, one and a half times as long as it is broad, a bit longer than its distance from the end of the snout, as long as the parietals; loreal longer than deep; one preocular, separated from or just touching the frontal, with a small subocular below it; two postoculars; temporals usually 1+2, 2+2 or 2+3; eight (sometimes nine) supralabials, numbers 4-5 or 5-6 entering the eye; five lower labials in contact with the anterior chin shields; posterior chin shields are as long as or slightly longer than the anterior and separated from each other by small scales. Scales are smooth with 17 dorsal mid-body rows. The 180-203 ventrals are very indistinctly angulate laterally, anal is divided and there are 85-99 subcaudals.

The snake's colour is pale olive-brown above; a distinct yellow dark-edged vertebral streak commencing on the frontal shield; posterior part of body has several longitudinal streaks, labials, preoculars and postoculars are yellow; the lower parts are yellow, with a blackish streak or series of blackish spots along the outer edge of the shields. The hemipenis is calcylate and there are no enlarged basal spines on the hemipenis.

Adults attain a metre in length, and as per the common name these are slender fast-moving diurnal snakes.

Distribution: Found in a broad region stretching from South Korea to east Kazakhstan, including Russia (Siberia), Mongolia and northern China. It is most commonly caught in drier habitats with loose rocks at ground level and some vegetation.

Etymology: Named in honour of Luke Yeomans, a well-known British Herpetologist, who died prematurely from a King Cobra bite at his UK facility on 29 June 2011.

His contributions to herpetology are numerous and include his pioneering work in breeding the Irian Jaya Dwarf Mulga Snake (*Pailsus rossignollii*) in the decade following my formal description of the taxa in 2000 (Hoser 2000). The results of his breedings are expected to appear in a book about keeping and breeding Australasian elapid snakes by Scott Eipper later in 2012.

Besides being an extremely passionate and skilled herpetologist, Yeomans was also a wonderful human being who never lost sight of the beauty of the reptiles he loved so dearly.

However it is the things that went wrong during his life that should be highlighted as a warning to other potential herpetologists in future generations.

Yeomans first came to my attention in the early 1990's after he was prosecuted for the heinous crime of feeding live food to a reptile.

For this mortal sin, he was dragged through Britain's criminal courts, prosecuted, convicted and fined. Then he was held up for public hatred in Britain's notorious tabloid media.

The legal precedent now sits as a threat and if need be, a means to criminally charge any other reptile keeper who dares use live food for any reptiles, including such humble items as mealworms or crickets and then upsets anyone in a government authority.

Yeomans said he was originally "dobbed in" by another reptile person, Mark O'Shea, whom he said had an axe to grind against him. The relevant authority in this case, the RSPCA in the UK, ran the prosecution.

I wrote about the case in the book "*Smuggled: The Underground Trade In Australia's Wildlife*", (Hoser, 1993), and unexpectedly met Yeomans in person at the Orlando Reptile Expo in the United States.

That was in 1993, when the League of Florida Herpetological Societies invited me there to give a talk about Australia's own draconian wildlife law enforcement.

As inferred already, it was the personality of Yeomans that impressed me rather than his herpetological skills, noting that in Orlando, I didn't get to see Yeomans working with reptiles!

My next contact with Yeomans was in the period postdating my description of the Irian Jaya Dwarf Mulga Snake in 2000 and him wanting to breed them in captivity. Ultimately he did this.

Beyond that, the next conversations related to the issue of safety for himself in his own reptile shows that he intended doing at a "King Cobra Sanctuary" he was planning to open in the UK in mid 2011.

In this, I specifically mean the use of venomoid snakes as described by Hoser (2004).

These are snakes that have had their venom glands surgically removed in a virtually painless operation and where the snakes get to keep their fangs and are as far as they are concerned "normal".

Yeomans had seen how in the previous 6 years myself and ten staff had done over 10,000 venomous snake shows with the world's five deadliest snakes and without any fatal or near fatal snakebites.

He had seen videos of myself taking bites from the snakes to prove they were safe and was well aware of the benefits of the venomoid snakes, not just for the safety aspect, but also the welfare of the snakes.

In fact Yeomans himself had previously owned a venomoid cobra!

Yeomans toyed with the idea of making all his large King Cobras venomoid because he feared that sooner or later he'd make a handling error and get bitten. However he decided against doing so and the reason for this is important.

He had no issues with the surgery and the false claims of cruelty to the snakes. In fact in terms of the venomoid snakes, there was no sensible reason for him not to get them except for one.

That reason was the expected attacks he would get from Mark O'Shea, a man he described as his sworn enemy, and Wolfgang Wüster, both within the reptile fraternity and both of the UK and both of whom had been key sponsors of an anti-Hoser and anti-venomoid petition website, run by a convicted wildlife smuggler, David John Williams and his close friend Shane Hunter in Australia.

Yeomans was in extreme fear that should O'Shea or Wüster become aware of him having venomoid snakes, that they would attack and undermine his reptile display business and worse still have him targeted by the RSPCA again.

With one "animal cruelty" conviction already, Yeomans decided the likelihood of attacks and another more serious conviction would terminally disable his business and so he decided instead to take the risk of keeping his snakes that he handled for shows "hot".

Besides the phone calls we had, Yeomans also sent numerous e-mails complaining about the reckless conduct of Mark O'Shea and his friend Wolfgang Wüster in terms of himself, even detailing how O'Shea had improperly had him expelled from the International Herpetological Society.

Yeomans made countless comments about O'Shea in particular, whom he described as being a cross between a rat and a dog.

He said O'Shea was physically like a rat, as in small, bony and hairy and like a Shitzu dog in that he constantly "yapped", "shits you" and never shuts up.

I could devote several pages to the adverse comments made by Yeomans about O'Shea, Wüster and their unethical behaviour, but these are not particularly relevant beyond what has already been told in terms of how they made Yeomans choose not to protect himself with venomoid Cobras.

On 29 June 2011, Yeomans made the snake handling error that cost him his life.

Just days before his "King Cobra Sanctuary" was due to open, one of his "hot" snakes bit him and he died.

At just 47 years of age a herpetologist in the prime of his career was killed.

If Luke Yeomans had not been forced by these other so-called "herpetologists" to put his life at unnecessary risk with snakes that could easily have been devenomized, he would still be breeding rare and endangered reptiles and educating people at his new "King Cobra Sanctuary".

Much has been made in recent years of the threats to private individuals and their rights to be allowed to keep and study reptiles. The alleged threat is often identified as coming from outside the herpetological community. The usual bogeyman identified are militant animal rights groups and the like.

They are not the real enemy.

These people lack expertise in reptiles and do not carry any political or legal power in terms of reptiles and the law. Put simply, no one takes them seriously. By contrast the real enemy is within the reptile community. The reckless conduct of O'Shea and Wüster were in effect directly responsible for the premature death of Yeomans. Here in Australia, in 2011 and 2012, my family, my business, my friends and staff have been subjected to numerous armed raids, criminal charges and the like designed to destroy the Snakebusters business.

While the raids, criminal charges and the like have been conducted by (in this case) very corrupt government wildlife officers under the control of the corrupt and hateful Glenn Sharp of the Victorian Government Wildlife Department (DSE), the whole series of actions were in fact initiated by people within the reptile fraternity. In our case the enemy was a group of newly established "reptile businesses", which included former employees of the government run zoo, part of the same department that regulates us.

Because they couldn't match the standards of Snakebusters, they simply used their powers to unlawfully close us down!

By naming a snake genus after Luke Yeomans, it is hoped that people who look into the etymology of the name, familiarize themselves with the story of his totally avoidable and premature death and see who are the culpable people who not only made his life at times unbearable in life, but also effectively brought it to a premature abrupt end.

It's hoped that people realise that the enemies of herpetology are more likely to be within the reptile community rather than outside.

REFERENCES CITED

Ananjeva, N. B., Orlov, N.L., Khalikov, R. G., Darevsky, I. S., Ryabov, I. S. and Barabanov, A. V. 2006. *The Reptiles of North Eurasia. Taxonomic Diversity, Distribution, Conservation*. Pensoft Series Faunistica 47:250 pp.

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

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

Dujsebayeva, T. N. (ed.) 2010. Short review of last changes in the checklist of amphibians and reptiles of Kazakhstan. In: Dujsebayeva, T. N. (ed.) *Herpetological Researches in Kazakhstan and adjacent countries*. Almaty: ACBK - KBCU:260 pp. (p. 37-52).

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

Hoser, R. T. 1993. *Smuggled: The Underground Trade in Australia's Wildlife*, Apollo Publishing, Moss Vale, NSW, Australia:159 pp.

Hoser, R. T. 2000. A new species of snake (Serpentes: Elapidae) from Irian Jaya, *Litteratura Serpentium* 20(6):178-186.

Hoser, R. T. 2004. Surgical Removal of Venom Glands in Australian Elapids:The creation of Venomoids. *The Herptile* 29(1):37-52.

Jan, G. 1866. *Nouv. Arch. Mus.* Paris ii:7

Jan, G. 1867. *Iconographie générale des ophidiens. 23. Livraison*. J.B. Bailière et Fils, Paris.

Kharin, V. E. 2011. Annotated catalogue of amphibians and reptiles (Amphibia, Reptilia) of the Far-Eastern Marine Biosphere FEB RAS. *Biodiversity and Environment of Far East Reserves*, Vladivostok, DVMBGPZ DVO RAN 2011(1):30-48.

Kharin, V. E. and Akulenko, M. V. 2008. Rare and little-known snakes of North-Eastern Eurasia. 1. A new record of *Hierophis spinalis* (Colubridae) from Russian Far East. *Current Studies in Herpetology* 8(2):160-169.

Macey, J. R., Papenfuss, T. J. and Zhao, E. 1988. The snakes of Ningxia Hui autonomous region as an indication of a herpetofaunal corridor. *Chinese Herp. Research* 2(1):4-5.

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

Nagy et. al. (2004a) (AKA Nagy, Z. T., Lawson, R., Joger, R. and Wink, M. 2004). Molecular systematics of racers, whipsnakes and relatives (Reptilia: Colubridae) using mitochondrial and nuclear markers. *Journal of Zoological Systematics and Evolutionary Research* 42(3):223-233.

Nagy et. al. (2004b) (AKA Nagy, Z. T., Schmidtler, J. F., Joger, U. and Wink, M. 2004). Systematik der Zwergnattern (Reptilia: Colubridae: Eirenis) und verwandter Gruppen anhand von DNA-Sequenzen und morphologischen Daten. *Salamandra* 39(3/4):149-168.

Peters, W. C. H. 1866. Mittheilung über neue Amphibien (Amphibolurus, Lygosoma, Cyclodus, Masticophis, Crotaphopeltis) und Fische (Diagramma, Hapalogenys) des Kgl. Zoologischen Museums. *Monatsber. Königl. Preuss. Akad. Wissensch.* Berlin 1866:86-96.

Pyron, R. A., et. al. 2010. The phylogeny of advanced snakes (Colubroidea), with discovery of a new subfamily and comparison of support methods for likelihood trees**.** *Mol. Phylogenet. Evol.* 58:329-342.

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

Schätti, B. and Wilson, L. D. 1986. *Coluber* Linnaeus. Holarctic racers. *Catalogue of American Amphibians and Reptiles* 399(1986):1-4.

Schätti, B. 1988. *Systematik und Evolution der Schlangengattung* Hierophis *Fitzinger, 1843*. PhD Diss. Univ. Zürich 1988.

Shannon, F.A. 1956. The reptiles and amphibians of Korea. *Herpetologica* 12(1):22-49.

Slevin, J. R. 1925. Contributions to Oriental herpetology. II. Korea or Chosen. *Proc. Cal. Acad. Sci.* (4)14(5):89-100.

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

Xu X., Huang, J., Zhang, L. and Zhang, M. 2000. *Coluber spinalis*, a record new to Anhui Province. Sichuan. *Journal of Zoology* 19(3).

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

Australasian Journal of Herpetology 14:6-8.
Published 30 June 2012.

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

A Division of the Patch-nosed Snakes, genus *Salvadora* Baird and Girard, 1853 (Serpentes: Colubridae: Colubrinae).

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Received 15 March 2012, Accepted 4 May 2012, Published 30 June 2012.

ABSTRACT

The Patch-nosed Snakes placed within the genus *Salvadora* Baird and Girard, 1853 have had a stable taxonomic history at the genus level since the genus was first named in 1853. However the division of the genus into two distinctive lineages has been well known for many years (Smith, 1938).

A review of these snakes yields a need to divide the genus.

Salvadora Baird and Girard, 1853 retains, *Salvadora bairdi* Jan, 1860, *Salvadora grahamiae* Baird and Girard, 1853, *Salvadora hexalepis* (Cope, 1867), *Salvadora deserticola* Schmidt, 1940 and *Salvadora intermedia* Hartweg, 1940.

A new genus *Aiselfakharius* gen. nov. is erected to contain the species *Salvadora lemniscata* (Cope, 1895) and *Salvadora mexicana* (Duméril, Bibron and Duméril, 1854) according to the Zoological Code.

The latter genus is most easily separated from the former by its higher subcaudal count (121-139 versus 82-103), one preocular (versus two or more) and an unenlarged rostral (versus one that usually is).

Keywords: Patch-nosed Snake; Taxonomy; *Aiselfakharius*; *Salvadora*; new genus.

INTRODUCTION

The Patch-nosed Snakes are sometimes recognized by their greatly enlarged or over-sized rostral scale that protrudes somewhat and is commonly indented in the middle like a digging shovel. This assists the snakes when digging in sand in search for reptile eggs and other food items.

The seven currently recognized species within the genus as currently understood and placed within the genus *Salvadora* Baird and Girard, 1853 have had a stable taxonomic history at the genus level since the genus was first named in 1853. In 1960 Cope proposed the name *Phimothyra*, but used the species *grahamiae* as the type for his genus. This is the same type species as used for the genus *Salvadora* Baird and Girard, 1853, meaning the Cope name disappears into synonymy with *Salvadora*.

As inferred already, not all snakes in the genus have the greatly enlarged rostral scale that gives the genus its name.

Two species in particular, namely *Salvadora lemniscata* (Cope, 1895) and *Salvadora mexicana* (Duméril, Bibron and Duméril, 1854) do not have this modified rostral and are thought to be primitive to the other species. The more elongate tail also confirms the casual observations by snake catchers that these species are not as fossorial as the others within the genus as currently understood.

As mentioned in the abstract, these differences and/or others are regarded as being sufficient to warrant division of the genus as currently understood into two, which is done herein according to the Zoological Code (Ride et. al. 1999).

I am not averse to dividing genera into subgenera, but in this case the division is so large and consistent that I cannot sustain an argument in favour of a more conservative position.

Being native to north and central America, these snake are well-known, even if rarely kept in captivity as compared to other locally occurring species.

Important papers in terms of *Salvadora* as recognized to date include Baird and Girard (1853), Bogert (1939, 1945), Bogert and Degenhardt (1961), Boulenger (1893), Cameron and Hansen (1994), Christman et. al. (1998), Conant (1942), Conant and Collins (1991), Cope (1867, 1879, 1895), Davis and Dixon (1957), Degenhardt et. al. (1956), Dixon (2000), Dixon and Lemos-Espinal (2010), Duméril et. al. (1854), Flesch et. al. (2010), Gelbach and Collette (1957), Hall (1951), Hartweg (1940), Husak and Wright (1998), Jadin and García-Vázquez (2008), Jan (1860), Leviton and Banta (1964), Liner (2007), Martin (1958), McCranie and Wilson (2001), Schmidt (1940), Schmidt and Shannon (1947), Smith (1938, 1941), Smith and Smith (1976), Smith and Taylor (1945), Stebbins (1985), Taggart et. al. (1994), Tanner (1954), Taylor (1938), Van Denburgh (1895), Vázquez Díaz and Quintero Díaz (2005) and Wright and Wright (1957).

GENUS *AISELFAKHARIUS* GEN. NOV.

Type species: *Zamenis mexicanus* Duméril, Bibron and Duméril, 1854

Diagnosis: Wright and Wright (1957) give an excellent diagnosis of the genus *Salvadora* as recognized to date. This is provided herein, slightly altered as part of the diagnosis for the new genus *Aiselfakharius* gen. nov..

The snakes of the genus *Salvadora* as recognized to date are medium in size, up to 120 cm long, with a long slender body that tapers and with a tail that is 18 to 34 percent of the total length (see below), the head is elongate and distinct. Cephalic plates are normal except for the rostral which is usually thickened, widened, triangular and curved back over the snout in all forms except for those now placed in the genus *Aiselfakharius* gen. nov.. Loreal is single or divided, one pre-ocular in *Aiselfakharius* gen. nov. versus 2 or more in *Salvadora*. Postoculars 2-3, suboculars sometimes present, supralabials usually 8-10, infralabials usually 8-12, with anywhere from none to 3 contacting the eye (see below). The second pair of chin shields are in contact or separated by as many as 3 small scales, eye is large with a round pupil above labials 4-7, scales are smooth with indistinct apical pits in 17-19 dorsal mid-body rows, 9-17 +3 maxillary teeth, the hemipenis is non-capitate, without bifurcation, with apical calyces, single sulcus and long basal spines.

The genus *Aiselfakharius* gen. nov. is easily separated from *Salvadora* by the following characters: one preocular (instead of two or more), the tail is 30 per cent of the total length or more (versus less than 30 per cent in *Salvadora*), 121-139 subcaudals (versus 82-103 in *Salvadora*), 3 supralabials enter the eye (versus no more than two entering the eye in *Salvadora*), the rostral is not greatly enlarged (as is the case in *Salvadora*).

The dorsal body pattern in *Aiselfakharius* gen. nov. may be either striped or speckled (usually striped) and if there is speckling it is typically on the anterior third of the body.

Distribution: Mexico and the region south including Guatemala.

Etymology: *Aiselfakharius* gen. nov. is named in recognition of the Akram Elfahkri of Northcote, Melbourne, Victoria, Australia, known to his friends and family as “Ace”. The scientific name has been deliberately spelt in a manner in order to sound the same as he is known, but spelt so as to be naturally said as spelt and without difficulty by those unaware of the intention of the name.

Ace is herein recognized for numerous services to the Victorian Taxi Industry and for extremely brave efforts in fighting corruption within the Victorian Taxi Directorate (VTD) and predecessor Vicroads in the 1980’s and 1990’s including against corrupt VTD lawyers Terry O’Keefe, David Robby and John Connell, and their army of corrupt and dishonest “enforcement officers”, better described as violent thugs, who broke every conceivable rule, including George Olsen, Roger Bowman, John Brentnall, John Perry, Len Hodgens, Gordon Alliston, Geoffrey Goodson, Derry Ashton, Andrew Pingo and Arnold Howard (see Hoser 1995 and Hoser 1999 for details).

Content of *Aiselfakharius* gen. nov.

Aiselfakharius mexicana (Duméril, Bibron and Duméril, 1854)(Type species).

Aiselfakharius lemniscata (Cope, 1895).

Content of *Salvadora* Baird and Girard, 1853

Salvadora grahamiae Baird and Girard, 1853 (Type species).

Salvadora bairdi Jan, 1860.

Salvadora hexalepis (Cope, 1867).

Salvadora deserticola Schmidt, 1940.

Salvadora intermedia Hartweg, 1940.

REFERENCES CITED

Baird, S. F. and Girard, C. 1853. *Catalogue of North American Reptiles in the Museum of the Smithsonian Institution. Part 1.- Serpents*. Smithsonian Inst., Washington, xvi + 172 pp.

Bogert, C. M. 1939. Notes on snakes of the genus *Salvadora* with a redescription of a neglected Mexican species. *Copeia* 1939(3):140-147.

Bogert, C. M. 1945. Two additional races of the patch-nosed snake, *Salvadora hexalepis*. *American Museum Novitates* (1285):1-14.

Bogert, C. M. and Degenhardt, W. G. 1961. An addition to the fauna of the United States, the Chihuahua Ridge-nosed rattlesnake in New Mexico. *American Museum Novitates* (2064):1-15.

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

Cameron, S. and Hansen, R. W. 1994. *Salvadora hexalepis* (Western Patchnose Snake). *USA: California Herpetological Review* 25(1):34-35.

Christman, B. L., Kilpatrick, S. L., Painter, C. W. and Stuart, J. N. 1998. Geographic Distribution. *Salvadora grahamiae*. *Herpetological Review* 29(1):54-55.

Conant, R. 1942. Notes on the young of three recently described snakes, with comments upon their relationships. *Bulletin of the Chicago Academy of Sciences* 6(10):193-200.

Conant, R. and Collins, J. T. 1991. *A Field Guide to Reptiles and Amphibians of Eastern/Central North America*, 3rd ed. Houghton Mifflin (Boston/New York), xx + 450 p.

Cope, E. D. 1867. On the Reptilia and Batracia of the Sonoran Province of the Nearctic Region. *Proc. Acad. Nat. Sci. Philadelphia* 18[1866]:300-314.

Cope, E. D. 1879. Eleventh contribution to the herpetology of tropical America. *Proc. Amer. Philos. Soc.* 18:261-277.

Cope, E. D. 1895. The classification of the ophidia. *Transactions of the American Philosophical Society* (1894)18:186-219.

Davis, W. B. and Dixon, J. R. 1957. Notes on Mexican Snakes (Ophidia). *Southwestern Naturalist* 2:19-27.

Degenhardt, W. G., Painter, C. W. and Price, A. H. 1996. *Amphibians and reptiles of New Mexico*. Univ. New Mexico Press:431 pp.

Dixon, J. R. 2000. *Amphibians and reptiles of Texas*, second edition. Texas A and M University Press:421 pp.

Dixon, J. R. and Lemos-Espinal, J. A. 2010. *Amphibians and Reptiles of the State of Queretaro, Mexico*. Tlalnepantla Unam:428 pp.

Duméril, A. M. C., Bibron, A. H. A. and Duméril, A.H.A. 1854. *Erpétologie générale ou Histoire Naturelle complète des Reptiles. Vol. 7 (partie 1).* Paris, xvi + 780 S.

Flesch, A. D., Swann, D. E., Turner, D. S. and Powell, B. F. 2010. Herpetofauna of the Rincon Mountains, Arizona. *Southwestern Naturalist* 55(2):240-253.

Gelbach, F. R. and Collette, B. B. 1957. A contribution to the herpetofauna of the highlands of Oaxaca, Mexico. *Herpetologica* 13:227-232.

Hall, C. W. 1951. Notes on a small herpetological collection from Guerreo. *Univ. Kansas Sci. Bull.* 34(4):201-212.

Hartweg, N. 1940. Description of *Salvadora intermedia*, new species, with remarks on the *grahamiae* group. *Copeia* 1940(4):256-259.

Hoser, R. T. 1995. *The Hoser Files: The Fight against Entrenched Official Corruption*. Kotabi Publishing, Doncaster, Victoria, Australia:322 pp.

Hoser, R. T. 1999. *Victoria Police Corruption* (2 Vols), Kotabi P/L, Doncaster, Victoria, Australia:1536 pp.

Husak, J. F. and Wright, J. 1998. Geographic Distribution. *Salvadora grahamiae lineate*. *Herpetological Review* 29(2):116.

Jadin, R. and García-Vázquez, U. O. 2008. *Salvadora mexicana* (Mexican Patchnose Snake): Combat Behavior. *Herpetological Bulletin* (104):39-40.

Jan, G. 1860. Iconographie générale des ophidiens. 1. Livraison. J.B. Bailière et Fils, Paris.

Leviton, A. E. and Banta, B. H. 1964. Midwinter reconnaissance of the herpetofauna of the Cape Region of Baja California, Mexico. *Proc. Cal. Acad. Sci.* 30(7):127-156.

Liner, E. A. 2007. A Checklist of the Amphibians and Reptiles of Mexico. *Louisiana State University Occasional Papers of the Museum of Natural Science* 80:1-60.

Martin, P. S. 1958. A biogeography of reptiles and amphibians in the Gomez Farias Region, Tamaulipas, *Mexico Miscellaneous publications*, Museum of Zoology, University of Michigan (101):1-102 + 7 plates.

McCranie, J. R. and Wilson, L. D. 2001. The herpetofauna of the Mexican State of Aguascalientes. *Courier Forschungsinstitut Senckenberg* 230:1-57.

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

Schmidt, K. P. 1940. Notes on Texan snakes of the genus *Salvadora*. *Field Mus. Nat. Hist. Zool. Series 24* (12):143-150.

Schmidt, K. P. and Shannon, F. A. 1947. Notes on amphibians and reptiles of Michoacan, Mexico. *Zoological Series of Field Museum of Natural History* 31(9):63-85.

Smith, H. M. 1938. Notes on the snakes of the genus *Salvadora*. *Univ. Kansas Sci. Bull.* 25(12):229-237.

Smith, H. M. 1941. Further notes on Mexican snakes of the genus *Salvadora*. *Smithsonian Misc. Coll.* 99(20):1-12.

Smith, H. M. and Smith, R. B. 1976. Synopsis of the Herpetofauna of Mexico. Vol. III. *Source analysis and index for Mexican reptiles*. John Johnson, North Bennington, Vermont.

Smith, H. M. and Taylor, E. H. 1945. An annotated checklist and key to the snakes of Mexico. *Bull. US Natl. Mus.* (187):iv + 1-239.

Stebbins, R. C. 1985. *A Field Guide to Western Reptiles and Amphibians*, 2nd ed. Houghton Mifflin, Boston.

Taggart, T. W., Irwin, K. J. and Sweetman, A.1994. *Salvadora grahamiae* (Mountain Patchnose Snake). *USA:Texas Herpetological Review* 25(2):77.

Tanner, W. W. 1954. Herpetological notes concerning some reptiles of Utah and Arizona. *Herpetologica* 10:92-96.

Taylor, E. H. 1938. Notes on the herpetological fauna of the Mexican state of Sonora. *Univ. Kansas Sci. Bull.* 24(19):475-503.

Van Denburgh, J. 1895. A review of the herpetology of Lower California. Part I:Reptiles. *Proc. Cal. Acad. Sci*. (2)5:71-163.

Vázquez Díaz, J. and Quintero Díaz, G. E. 2005. *Anfibios y Reptiles de Aguascalientes* [2nd ed.]. Conabio, Ciema:318 pp.

Wright, A. H. and Wright, A. A. 1957. *Handbook of snakes of the United States and Canada*, Comstock Publishers, Ithaca/London (2 Vols).

Tax Invoice

Invoice Number: 16897
Reference:
Date: 15/06/2012

Australasian Journal of Herpetology

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Australasian Journal of Herpetology 14:9-16.
Published 30 June 2012.

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

A review of the taxonomy of the living Crocodiles including the description of three new tribes, a new genus, and two new species.

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Received 12 March 2012, Accepted 30 April 2012, Published 30 June 2012.

ABSTRACT

Despite the obvious interest of Crocodilians to people and the fact that most living species are well-studied, the taxonomy of the living Crocodilians has been inconsistent with modern classification systems used for other vertebrates.

This paper reviews Crocodiles and updates the taxonomy and nomenclature.

The largest genus *Crocodylus* as currently understood is divided four ways. This is done using pre-existing names for three genera, namely *Crocodylus* Laurenti, 1768 exclusively for the species *niloticus*; *Motina* Gray, 1844 for the four New World Crocodile species; *Oopholis* Gray, 1844 for the Asian/Australian species and a new monotypic genus *Oxycrocodylus* gen. nov. for the African species *suchus*.

Oopholis is subdivided into subgenera, with the name *Philas* Gray, 1874 being available for the smaller freshwater species within *Oopholis.*

These four genera are in turn are placed in a new tribe Crocodylini tribe nov.

The genera *Mecistops* Gray, 1844 and *Osteolaemus* Cope, 1861 are placed in their own tribe Mecistopsini tribe nov..

The genera and *Gavialis* Gray, 1831 and *Tomistoma* Müller, 1846 are also placed in their own tribe Gavialini tribe nov..

A new Freshwater Crocodile is formally described, namely the species *O. adelynhoserae* from southern New Guinea (formerly regarded as a variant of *O. novaeguineae*).

A second new Freshwater Crocodile is formally described, namely the species *O. jackyhoserae* from the Liverpool River system of Arnhem Land, Northern Territory Australia (formerly regarded as a variant of *O. johnstoni*).

As implicitly stated already, the subfamily Crocodylinae is subdivided into three tribes, formally named for the first time.

This paper presents a summary list of the classification listing all 29 now recognized living species in the order Crocodylia within their higher level placements.

Keywords: Taxonomic revision; new genera; genus; subgenus; *Crocodylus*; *Oxycrocodylus*; Crocodylini; *Osteolaemus*; *adelynhoserae*; *jackyhoserae; Oopholis*; *Motina*; Crocodylini; Mecistopsini; Gavialini; new tribes.

INTRODUCTION

Crocodiles eat humans!

For that reason alone, they attract the attention of people. In the last 100 years the Crocodylia have also become a family of economic importance to many people as species are harvested for skins and meat. This significance has increased with the establishment of crocodile farms for the specific purpose of raising large numbers of carcasses for sale.

Due to these factors and the relatively small number of species (less than 30 living Crocodile and Alligator species globally), Crocodilians are without doubt among the best-studied of reptiles.

While there have been numerous taxonomic studies into these species, aided in part by a good fossil record for the group and ancestors, the taxonomy of the group has until now been far from stable.

Most well-known species of Crocodilian have been placed in their own (often monotypic) genera by various authors, usually without justification, over the last two centuries.

As a result there are available, "names" for almost any taxonomic configuration of the group one could imagine. However due largely to the small number of extant species, herpetologists have tended to lump all the true crocodiles into the single genus *Crocodylus* Laurenti, 1768, as much out of laziness than for any sensible reason based on actual phylogenies.

Numerous phylogenies have been proposed not just for those species within *Crocodylus* as generally recognized, but also in terms of associated genera including species often assigned to *Crocodylus* by past authors.

Since about 2000 and with the advent of molecular methods, the true phylogeny of the entire extant Crocodylidae has become well established and arguments over the major detail have all but evaporated (see results of Oaks 2007 and others).

The relevant clades have been diagnosed and as a result some of the older and available generic names such as *Mecistops* Gray, 1844, have been revived (McAiley, et. al. 2006), with relevant taxa or taxon placed within.

However the one species currently classified within *Crocodylus* by most authorities to date and in greatest need of removal from the genus based on modern phylogenies published, is the species *suchus* (Hekkala et. al. 2011). As a result, I publish a description of a new genus to accommodate the species below.

The taxonomy of the Alligatoridae has in recent years been considerably more stable than that of the Crocodylidae and this paper presents the currently accepted taxonomy for the extant species.

The purpose of this paper is not to summarize all that is known about extant Crocodilians.

Instead it is to present a new taxonomic arrangement in the wake of recent molecular studies, such as those of the authors cited within this paper, that reflects the true phylogeny of the modern extant Crocodilians and places the taxonomy in line with that of the other living reptiles in terms of where the boundaries for genera and species are drawn.

Where new groups, tribes, genus (single) or species are formally named for the first time, these are diagnosed in sufficient detail to enable identification of the said crocodiles in accordance with the Zoological Code (Ride et. al. 1999). Further details on the relevant species groups, species or subspecies can be found in the relevant literature cited at the end of this paper.

THE CROCODILES THEMSELVES

There have been numerous important studies on the modern crocodiles. An excellent summary of knowledge of the group to 2006 was published by Trutnau and Sommerlad (2006), although the results of some very important molecular studies have been published in the five years since then.

The excellent bibliography (and contents within) at the rear of that book is also relied upon in terms of this paper and the various taxonomic judgments made within.

Rather than rehash the entire bibliography of the book by Trutnau and Sommerlad (2006) with additions, I shall merely make mention of some key studies relevant to the conclusions made within this paper.

These include: Abercrombie et. al. (1980), Adams et. al. (1980), Brochu (1997, 2001, 2003), Burgin (1980), Bustard (1980), Cogger et. al. (1993), Cope (1861), Davis et. al. (2002), Densmore (1983), Densmore and Owen (1989), Densmore and White (1991), Eaton, et. al. (2008), Gartside et. al. (1977), Geoffroy (1807), Glenn et. al. (1988), Gray (1870), Guggisberg (1972), Hall (1989, 1991), Hall and Johnson (1987), Hall and Portier (1994), Harshman et. al. (2003), Hekkala et. al. (2011), Helfernberger (1981), Inger (1948), Janke et. al. (2005), Ko Ko et. al. (2006), Lawson et. al. (1989), Lee et. al. (2009), Lilljeborg (1867), Machkour-M'Rabet et. al. (2009), Man et. al. (2011), Martin (2008), McAiley, et. al. (2006), Menzies et. al. (1979), Miles et. al. (2009), Montague (1984), Neill (1971), Oaks (2007), Ouboter and Nanhoe (1998), Piras et. al. (2009), Platt and Thorbjarnarson (2000), Rainwater et. al. 1988, Romer (1956), Ruffeil and Farrias (2008), Sah and Stuebing (1996), Schmidt (1928), Schmitz et. al. (2003), Seymour, et. al. (2004), Solmu (1994), Spix (1825), St. John et. al. (2012), Summers (2005), Tucker et. al. (1996), Waitkuwait (1989), Webb et. al. (1983a, 1983b), Wells and Wellington (1984, 1985), Wermuth (1953), Whitaker and Basu (1983).

Most species, subspecies and the like have been already described at some stage in the past.

However it is noted that some have been synonymized and effectively ignored for many years.

One group example is seen in the taxonomic history of the species group lumped within "*Osteolaemus tetraspis* Cope, 1861".

For many years the taxon-group was treated as being a single species within *Crocodylus* (e.g. Murray, 1862a, 1862b, Bocage, 1866). In 1867, Lilljeborg erected a new genus *Halcrosia* for the same group.

This name subsequently was synonymised with *Osteolaemus,* as were the species taxa, *osborni* Schmidt, 1919 and *afzelii* Lilljeborg, 1867, both since found to be specifically distinct in the last decade (Eaton, 2010). One can add to this a potential fourth species from the same genus apparently found in the region of Nigeria, for which a description has been deferred herein pending further work by Eaton and others.

Other examples include the species taxa "*Crocodylus suchus* Geoffroy, 1807*"* long thought by most herpetologists as being synonymous with "*Crocodylus niloticus*" (see Schmitz et. al. 2003). "*Crocodylus suchus"* is herein placed in a new genus as a result of further evidence provided by Hekkala et. al. (2011).

Smaller Freshwater species from Asia and Australasia have also been taxonomically neglected.

"*Crocodylus mindorensis*" Schmidt, 1935, from the Philippines has recently been removed from synonymy with "*Crocodylus novaeguineae*".

The taxon *mindorensis* has also been considered a variant of *siamensis* (Neill 1971), and would as a matter of course reasonably be concluded as having characteristics intermediate between the two species found to the east and west.

However the results of Man et. al. (2011) Fig. 2, places the taxon *siamensis* closest to *palustris* and then *C. porosus*, leading me to place it in that species group.

Man et. al. (2011) found the species *mindorensis* and *novaeguineae* to be sufficiently divergent from the other Asian taxa to warrant being placed in a subgenus as done herein.

The other Australia/New Guinea taxa either previously known or described herein were not investigated by Man et. al., but can be assumed to be within this subgroup.

Of note is that Man et. al. did not divulge the source of the *novaeguineae* investigated so their results may have been from the taxon described herein as *adelynhoserae* sp. nov. from southern New Guinea as opposed to the northern species *novaeguineae.*

Man et. al. (2011) placed the taxa *niloticus* and *acutus* particularly close and on their results alone, they could not be split at the genus level. However based on the earlier results of other authors such as McAliley et. al. (2006) which were quite different, I've maintained the split at the genus level, resurrecting the genus *Motina* to accommodate the four Central American crocodiles.

The taxon described as the species "*webbi*" Wells and Wellington, 1985 has been synonymized by virtually all authors since with the pre-existing "*johnstoni*".

Although note that in this paper I resurrect "*webbi*" at subspecies level within "*johnstoni*" to create a new combination for the species name.

That the "normal" Northern Territory Freshwater Crocodiles are different to those from coastal Queensland had been known for a long time. The only serious question has been whether or not this should be recognized at the species level or not.

In the absence of molecular data, I recognize the Northern Territory/Western Australian Freshwater Crocodiles at the subspecies level only, but using the available name, *webbi.*

The species, *Crocodylus raninus* Müller and Schlegel, 1844 of Borneo has long been ignored by taxonomists, but has recently been accorded full species status as another "Freshwater" species (Ross 1990, 1992).

An alleged Freshwater species from Sulawesi remains in need of investigation, to see if in fact it even exists and/or is conspecific with either *novaeguineae* or *raninus.*

Two well-defined species level taxa have been effectively described in the literature, but not formally named according to the Zoological Code (Ride et. al. 1999).

As a result they are formally described and named herein for the first time.

A new Freshwater Crocodile is formally described, namely the species *adelynhoserae* from southern New Guinea (formerly regarded as a variant of *novaeguineae*).

The species *novaeguineae* is herein restricted to the region north of the central cordillera on Island New Guinea.

Another new Freshwater Crocodile is formally described, namely the species *jackyhoserae* currently only known from the Liverpool River system of Arnhem Land, Northern Territory Australia (formerly regarded as a variant of *C. johnstoni*). This newly described taxon is best known in the recent literature as the dwarf sandstone country form of Freshwater Crocodile.

These new species are both herein placed within the genus *Oopholis* Gray, 1844, the genus including all Australasian Crocodiles and the subgenus *Philas* Gray, 1874, the group containing all the smaller Freshwater species.

THE LAYOUT OF THE CLASSIFICATION WITHIN THIS PAPER

The taxonomic judgments made within this paper, have either been stated or alluded to already in this paper and because they are in the main derived from the results of recent molecular studies are not rehashed here.

It is presented in the following manner.

The family Crocodylidia is defined, followed by the newly defined tribes, each defined and which lists the content genera.

The genera are not specifically defined, save for the new monotypic genus *Oxycrocodylus* gen. nov. for the African species *suchus*. In terms of the other available generic names used within this paper, I hereby rely either on the original descriptions by the authors and/or modified ones as provided by later authors cited within this paper.

The largest genus *Crocodylus* as currently understood is divided four ways. This is done using pre-existing names for three genera, namely *Crocodylus* Laurenti, 1768 exclusively for the species *niloticus*; *Motina* Gray, 1844 for the four New World Crocodile species; *Oopholis* Gray, 1844 for the Asian/Australian species and a new monotypic genus *Oxycrocodylus* gen. nov. for the African species *suchus*.

Oopholis is subdivided into subgenera, with the name *Philas* Gray, 1874 being available for the smaller freshwater species within *Oopholis.*

These four genera are in turn are placed in a new tribe Crocodylini defined herein.

The genera *Mecistops* Gray, 1844 and *Osteolaemus* Cope, 1861 are placed in their own tribe Mecistopini tribe nov. defined herein.

The genera *Gavialis* Gray, 1831 and *Tomistoma* Müller, 1846 are also placed in their own tribe Gavialini tribe nov. defined herein.

Following the tribe and genus descriptions, the two new species are formally named and described.

Following the descriptions is presented a simple list of the extant Crocodylidae (with the Gavialidae subsumed within as a new tribe) and Alligatoridae, noting that there is nothing new proposed within this paper for that family.

FAMILY CROCODYLIDAE (TRUE CROCODILES)

The order Crocodylia includes, crocodiles, alligators (including Caimans and the like), and various extinct forms as well.

These are all the familiar crocodile/alligator-type reptiles. They are usually large, usually semi-aquatic and covered by leathery scaly skin, typically with raised rows of shields along the back, large mouth and sharp teeth. All are egg-layers.

Eyes situated atop their heads enable them to keep a lookout for prey, while their thick powerful, vertically flattened tails swiftly propel them through the water.

Crocodiles and alligators are top-notch hunters and will eat just about any kind of meat they can get their teeth to catch. With teeth specialized just for spearing, neither family bothers to chew its food, they swallow large chunks or the entire prey animal whole.

Their eyesight above water is excellent, and thanks to vertical pupils that can open up extra wide to let in additional light and they also have keen night vision. The slit-like ears are also very sensitive to sounds.

The sense of smell is also highly developed due to special organs in their snouts.

The Crocodylidae (including Gharials and kin) are separated from other extant forms (alligators and kin) by the following suite of characters: Alligators have a wide "U"-shaped, rounded snouts (like a shovel), whereas crocodiles tend to have longer and more pointed "V"-shaped snouts.

In alligators, the upper jaw is wider than the lower jaw and completely overlaps it. Therefore, the teeth in the lower jaw are almost completely hidden when the mouth closes, fitting neatly into small depressions or sockets in the upper jaw. However, in crocodiles, the upper jaw and lower jaw are approximately the same width, and so teeth in the lower jaw fit along the margin of the upper jaw when the mouth is closed. Therefore, the upper teeth interlock (and "interdigitate") with the lower teeth when the mouth shuts.

Crocodiles have a jagged fringe on their hind legs and feet; alligators do not. Alligator have webbed feet; crocodiles do not.

Unlike Alligators, crocodiles and kin have functioning salt glands on their tongue.

This allows crocodiles to easily filter out salt and therefore allows them to inhabit brackish and saltwater habitats. While alligators also have these structures, they appear to have lost the ability to use them for excreting significant amounts of salt and hence prefer to stay in freshwater areas.

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TRIBE CROCODYLINI TRIBE NOV.

(Terminal taxon: *Crocodylus niloticus*)

Diagnosis: Separated from others within the Crocodilinae by the following suite of characters: Medium to long snout, usually more than 1.5 times the width at its base. Ridges on the upper side of the snout appear as pairs of rostrally converging preorbital ridges, unpaired preorbital bulges and elevated triangular surfaces. Most species have a premaxilla that is perforated to make room for the first pair of mandibular teeth. There is no ossified median nasal septum. The iris is greenish. In older animals the frontal edges of the orbits extend to the thirteen or fourteenth maxillary teeth. The upper eyelids have a rough, furrowed surface and have almost no ossification. The supratemporal fenestrae are relatively large. The vomers are not visible at the palate. The mandibular symphysis extends almost to the fourth to eighth mandibular teeth. The nuchals and dorsals are separated from each other. The median longitudinal pair of dorsal scales shows pronounced parallel keels past the root of the tail. The rear edges of the limbs have more-or-less pronounced scale crests.

Content: *Crocodylus* Laurenti, 1768; *Motina* Gray, 1844; *Oopholis* Gray, 1844; *Oxycrocodylus* gen. nov..

TRIBE MECISTOPSINI TRIBE NOV.

(Terminal Taxon: *Mecistops cataphractus*)

Diagnosis: The tribe is most easily defined by defining the two component genera of quite different external appearances.

Species within this tribe are diagnosed and separated from all other extant crocodilians by one or other of the following two suites of characters:

1/ A small-to-medium-sized crocodilian (usually around 2.5 m, but maximum sizes reported to be up to 4.2 m) takes its common name from its narrow, specialized snout, where it resembles the new world crocodile taxon *intermedius*. Protective scales over the back of the neck are present in three or four rows and merge with the scales on the back, unlike the other extant members of the Crocodylidae which have two distinct rows of scales. Blotches which are present on back are more typical of the Gavialini and some Alligators. Dentition: 5 (rarely 4) pre-maxillary; 13-14 maxillary; 15-16 mandibular, total number of teeth is 64-70 (Genus *Mecistops*); or,

2/ Heavily armoured (neck, back, tail) with pronounced, ossified ventral scales. Nuchal scale pattern: 3 transverse series (1: two large scales; 2: two large scales; 3: two very small scales). Adult colouration uniformly dark on the back and sides, with lighter brown banding on body and tail of juveniles, and yellow patterning on head. Belly colour is yellowish with numerous black patches. Maximum recorded size 1.9m (6.3 feet). Short, blunt snout (snout length = basal width), more similar in fact to a Caiman, which may be due to the fact that this genus *Osteolaemus* has a similar ecology the dwarf caimans. Dentition: 4 pre-maxillary; 12-13 maxillary; 14-15 mandibular, total number of teeth is 60-64 (Genus *Osteolaemus*).
Within *Osteolaemus, O. tetraspis* is lighter in colour, with more pointed, upturned snout. Heavy dorsal scale armour on back has led to the name 'rough-backed' dwarf crocodile. *O. osborni* is poorly known. It appears to have a down-turned snout and less dorsal armour. It is believed one or possibly two other species of *Osteolaemus* occur in west Africa, at least one of which has an available name (*afzelii* Lilljeborg, 1867).

Content: *Mecistops* Gray, 1844; *Osteolaemus* Cope, 1861.

TRIBE GAVIALINI TRIBE NOV.

(Terminal Taxon:*Gavialis gangeticus*)

Diagnosis: The two component genera have not always been classified together. Recently a number of authors have placed them in either the family Gavialidae or the subfamily Gavialinae.

However the results of molecular studies have not upheld the placement, instead finding the two genera to be well rooted within the Crocodylidae. While these two genera do sit apart from the other extant crocodile genera, I do not believe a subfamily placement is warranted and hence they are placed within a new tribe, defined herein.

The diagnosis for the tribe to separate it from all other extant crocodilians is best done by separately defining each of the monotypic genera (even though each genus does in fact have features in common). The tribe is therefore defined by species with one or other of the following suite of characters:

1/ Extremely long and narrow snouts that are set off from the rest of the skull and lacking ridges or jagged seams. The fourth tooth of the lower jaw does not slide into a hole or groove in the upper jaw; all teeth of the upper jaw and lower jaw bite past each other and are slightly pointed towards the outside so that their tips extend outside the edges of the jaws. The teeth are homodontic. All of the maxillary teeth or mandibular teeth are of similar size. The nasals are separated by medial enlargements on the maxillary bones, which together form a median seam, not only separated from the nasal opening but also from the premaxillary bones. The supratemporal fenestrae are larger than in other crocodilians and in their shape and size similar to the circular orbits. The postorbital pillar begins on the jugal, which has an isodiametric cross section in the area of the infratemporal foramina. The quadrate does not participate in the rear edge of the infratemporal foramen. The choana do not have a raised medial septum or bulging rim at the rear. The dorsal and flank scales are underlain by ossifications of the skin. The ventral scales are not ossified. The nuchals and dorsals are not separate. The backs of limbs have a scale crest (genus *Gavialis*), or;

2/ Long and narrow snouts, whose length can be up to 4.5 times the width at its base. There are no ridges on the top of the head. The premaxilla have grooves on each side into which the first mandibular teeth fit. There is no median bony nasal septum. The frontal edges of the orbits extend to the fifteenth and sixteenth maxillary teeth. The iris is brown. The upper eyelids have a rough surface and have little ossification. The supratemporal fenestrae are quite large. Their distance from each other is about half their diameter. The vomers at the palate are at the level of the frontal edges of the palatal fenestrae and not visible. The palatines extend to the level of the twelfth and thirteenth maxillary teeth and do not or barely extend past the frontal edges of the palatal fenestrae. The mandibular symphysis extends to the fourteenth to fifteenth mandibular teeth. The splenials participate in the formation of the mandibuloar symphysis. The nuchals and dorsals are not separate. The median longitudinal rows of dorsal scales continue to have parallel keels past the root of the tail. There are longitudinal scale crests on the rear sides of the four limbs (genus *Tomistoma*).

Content: *Gavialis* Oppel, 1811; *Tomistona* Müller, 1838.

GENUS *OXYCROCODYLUS* GEN. NOV.

Type species: *Crocodilus suchus* Geoffroy, 1807

Diagnosis: Physically similar in appearance to the Nile Crocodile (*Crocodylus niloticus*), now monotypic for the genus *Crocodylus*. The genus *Oxycrocodylus* gen. nov. is monotypic for the species *suchus*.

In *Crocodylus niloticus* (including all recognized or named subspecies) there are 16-20 scales per transversal ventral scale row, whereas in *Oxycrocodilus* gen. nov. there are just 12-15.

In *Oxycrocodylus* gen. nov. the ear slit is angled at 40 to 45 degrees, whereas in *Crocodylus niloticus* the ear slit is angled at about 30 degrees.

Oxycrocodylus gen. nov. is noted for its smaller adult size than *Crocodylus niloticus* (usually 1.5-2.5 metres versus 4-5 metres, for males of both species), shorter, more thickset build and considerably more docile temperament.

Oxycrocodylus gen. nov. is only likely to be confused with the species *niloticus*.

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Other African crocodile genera are defined within the tribe *Mecistopini* tribe nov. above (relied upon as part of this diagnosis) and are therefore easily separated from this taxon.

The exact distribution of this genus is not certain due to the past confusion with *Crocodylus niloticus.* However it is known to inhabit southern parts of the Sahara region in permanent and semi-permanent waterways, usually adjacent to rocky refugia with relatively dense vegetation. In wetter regions where it occurs, the genus is generally uncommon in major rivers, but often more common in smaller tributaries.

Reports of dwarf races of *Crocodylus niloticus* in various parts of Africa, may in fact be attributable to the new genus *Oxycrocodylus* gen. nov..

It is also likely that there is more than one species of *Oxycrocodylus* gen. nov. within Africa, presumably each being confined to one or more major drainage system or region.

The genus is reported to have occurred in the Nile River System as recently as the early 1900's and was apparently well-known to Ancient Egyptians with mummified skulls of this genus being found among artifacts.

Etymology: Named in honor of my Great Dane dog Oxyuranus (in turn named after an Australian genus of elapid snake). In the eight year period from 2004 to 2012, he kept the Snakebusters facility safe from numerous burglary attempts. These were by inexperienced snake handler imitators and business competitors who thought that they could enhance their own prospects by attacking the Snakebusters enterprise and steal reptiles.

These persons not only sought to attack Snakebusters, but also committed countless other crimes and wrongful actions, solely motivated by a desire to make a lot of easy money and with no regard for reptiles or even people for that matter.

Oxyuranus (we called him "Oxy") did a sterling duty in protecting our property for many years and without ever complaining, putting him ahead of human security guards, enabling Australia's best reptile education and shows to continue. As a result, over 2 million people were exposed to Snakebusters education one way or other and as a result herpetology in Australia got a major boost.

In other words this dog did more for herpetology than most people, including many ostensibly within the field. Therefore it's appropriate he have a genus of crocodile named in his honor.

***OOPHOLIS (PHILAS) ADELYNHOSERAE* SP. NOV.**

Holotype: A preserved specimen number: 121997 at the California Academy of Sciences (CAS), USA, from Balimo, Papua New Guinea, Lat: 8.0471013888889 S, Long: 142.95652169444 E. The specimen was supplied by Fred Parker in 1968.

The California Academy of Sciences (CAS), USA is a government owned facility that allows access to its collection for research purposes.

Paratype: A preserved specimen number: 121998 at the California Academy of Sciences (CAS), USA, from Balimo, Papua New Guinea, Lat: 8.0471013888889 S, Long: 142.95652169444 E. The specimen was supplied by Fred Parker in 1968.

The California Academy of Sciences (CAS), USA is a government owned facility that allows access to its collection for research purposes.

Diagnosis: This species was formerly classified as a variant of *O. novaeguineae* until now.

It is separated from *O. novaeguineae* by 5 or 6 post-occipital scales on the neck, versus 4 (consistently) in *O. novaeguineae.*

O. adelynhoserae sp. nov. has a distinctly narrower snout than *O. novaeguineae*. *O. novaeguineae*. appear to have triangular head and snout, with minimal curvature inwards at the posterior part of the snout, whereas in *O. adelynhoserae* sp. nov. the upper part of the snout narrows more rapidly giving the snout the appearance of being separate from the rest of the head

In both species the snout is roughly twice as long as it is wide at the base.

O. adelynhoserae sp. nov. nests during the wet season, whereas *O. novaeguineae* nests during the dry season. *O. adelynhoserae* sp. nov. lays fewer, larger eggs which hatch into significantly (by 5 cm) longer hatchlings on average.

The two species have quite different breeding biologies.

O. novaeguineae averages 35.2 eggs per clutch while *O. adelynhoserae* sp. nov. lays an average of 21.7 per clutch. *O. novaeguineae* typically nests on floating plant islands in overgrown canals and sidearms. By contrast *O. adelynhoserae* sp. nov. usually nests on land (Hall and Johnson 1987, Hollands 1987).

Hatchling *O. adelynhoserae* sp. nov. measure 25-30 cm, versus 20-25 cm in *O. novaeguineae* and 18-20 cm in *O. johnstoni.*

O. adelynhoserae sp. nov. is the species of Freshwater Crocodile found south of the central cordillera of New Guinea, with the centre of distribution being the Fly River system and tributaries. Specimens from Port Moresby and environs formerly attributed to *O. novaeguineae* are attributable to *O. adelynhoserae* sp. nov..

O. novaeguineae is now restricted to the river systems north of the central cordillera, with the distribution centered on the Sepik River System and tributaries.

While the species distribution boundaries for each of *O. novaeguineae* and *O. adelynhoserae* sp. nov. are not known, it is likely that *O. adelynhoserae* sp. nov. encroaches that of *O. novaeguineae* on the south-east end of Island New Guinea, based on known distributions of other species groups with north-south divisions on island New Guinea. An obvious example includes the Scrub Pythons (*Australiasis amethistina*).

There have been numerous studies published on "*O. novaeguineae*". Unfortunately many of these would in fact be attributable to *O. adelynhoserae* sp. nov.. Herpetologists looking at studying New Guinea crocodiles in the future should be aware of the fact that previous studies did not differentiate between the two local Freshwater species.

Etymology: Named in honor of my daughter Adelyn Hoser for her many valuable contributions to herpetology and reptile education in the first 13 years of her life.

***OOPHOLIS (PHILAS) JACKYHOSERAE* SP. NOV.**

Holotype: A preserved specimen number: R90361 at the Australian Museum Sydney, from the Liverpool River, Arnhem Land, Northern Territory. (12° 42' S, 133° 47' E), caught and lodged in October 1979.

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

Paratypes: Preserved specimen numbers: R90359 and R90360 at the Australian Museum Sydney, from the Liverpool River, Arnhem Land, Northern Territory. (12° 42' S, 133° 47' E), caught and lodged in October 1979.

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

Diagnosis: Separated from *O. johnsoni* (including *O. johnsoni webbi*) the only species it is likely to confused with by the lower number of transversal scales on the ventral side 20, versus 22-24 in *O. johnsoni.*

O. johnsoni consistently has 4 large post-occipitals in a row, while *O. jackhoserae* sp. nov. sometimes has five or six.

O. jackhoserae sp. nov. is readily separated from *O. johnsoni* by it's considerably more elongate and gracile build and consistently smaller adult size (males average under 1.5 m in *O. jackhoserae* sp. nov. versus 1.7 m in *O. johnsoni*), giving it a common name of "Dwarf Freshwater Crocodile". *O. jackhoserae* sp. nov. has considerably longer limbs and is immediately separated from *O. johnsoni* and all others in the genus *Oopholis* by this trait.

The length of the front limb in the "arm-pit" to the beginning of the hind limb (at apex) is 54 to 56.8 per cent of the distance in *O. johnsoni* versus 57-58 per cent in *O. jackhoserae* sp. nov..

O. jackhoserae sp. nov. is also separated from *O. johnsoni* by the fact that the scutes are generally more raised than is seen in *O. johnsoni*, giving *O. jackhoserae* sp. nov. a somewhat rugose appearance.

This species was formerly classified as a variant of *O. johnsoni* until now.

O. jackhoserae sp. nov. is known only from the Liverpool River system, Arnhem Land, Northern Territory Australia, although there have been unconfirmed reports of so-called Dwarf Freshwater Crocodiles from other parts of the Northern Territory. Whether these are *O. jackhoserae* sp. nov. or some other taxon isn't known.

While I recognize the taxon *webbi* as diagnosed by Wells and Wellington in 1985, that taxon is treated herein as a subspecies of *O. johnstoni*, and is the locally occurring variant of that species in the Northern Territory in the region adjacent to where the new taxon *O. jackyhoserae* sp. nov. occurs.

The diagnosis for *O. jackyhoserae* sp. nov. given here applies in terms of both subspecies *O. j. johnsoni* and *O. j. webbi* in terms of comparisons with those taxa.

REFERENCES CITED

Abercrombie, C. L., Davidson, D., Hope, C. A. and Scott, D. E. 1980. Status of Morelet's crocodile (*Crocodylus moreletii*) in Belize. *Biol. Conserv.* 17:103-113.

Adams, S. E., Smith, H. M. and Baccus, R. 1980. Biochemical variation in the American alligator. *Herpetologica* 36:289-296.

Bocage, J. V. d. B. 1866. Lista dos reptis das possessões portuguezas d'Africa occidental que existem no Museu Lisboa. *Jorn. Sci. Math. Phys. Nat. Lisboa* 1:37-56.

Brochu, C. A. 1997. Morphology, Fossils, Divergence Timing, and the Phylogenetic Relationships of Gavialis. *Systematic Biology* 46(3):479-522.

Brochu, C. A. 2001. Congruence between physiology, phylogenetics and the fossil record on crocodilian historical biogeography, p. 9-28. In: *Proceedings of the conference on crocodilian biology and evolution.* Grigg, G. and Seebacher, F. (eds.). Surrey Beatty and Sons, Inc., Sydney, New South Wales, Australia.

Brochu, C. A. 2003. Phylogenetic approaches toward crocodylian history. *Annual Review of Earth and Planetary Sciences* 31:357-397.

Brochu, C. A. and Storrs, G. W. 2012. A giant crocodile from the Plio-Pleistocene of Kenya, the phylogenetic relationships of Neogene African crocodylines, and the antiquity of *Crocodylus* in Africa. *Journal of Vertebrate Paleontology* 32 (3):587.

Burgin, S. 1980. The status of the biology and ecology of Papua New Guinea's crocodile, *Crocodylus novaeguineae* (Schmidt). *Science in New Guinea* 7(3):163-170.

Bustard, H. R. 1980. Status of the Gharial (*Gavialis gangeticus* Gmelin) in *Bhutan J. Bombay nat. Hist. Soc.* 77:150.

Cogger, H. G., Cameron, E. E., Sadlier, R. A. and Eggler, P. 1993. *The Action Plan for Australian Reptiles.* Australian Nature Conservancy Agency.

Cope, E. D. 1861. Recent species of Emydosaurian reptiles represented in the Museum of the Academy. *Proc. Acad. Nat. Sci. Philadelphia* 1860:549.

Davis, L. M., Glenn, T. C., Strickland, D. C., Guillette, L. J., Elsey, R. M., Rhodes, W. E., Dessauer, H. C. and Sawyer, R. H. 2002. Microsatellite DNA analyses support an east-west phylogeographic split of American alligator populations. *Journal of Experimental Zoology* 294(4)352-372.

Densmore, L. D. 1983. Biochemical and immunological systematics of protein divergence detected between *Gavialis* and *Tomistoma*: evidence for crocodilian monophyly. *Comp. Biochem. Physiol* 77B:715-720.

Densmore, L. D. and Owen, R. D. 1989. Molecular systematics of the order Crocodilia. *Am. Zool.* 29:831-841.

Densmore, L. D. and White, P. S. 1991. The systematics and evolution of the Crocodilia as suggested by restriction endonuclease analysis of mitochondrial and nuclear ribosomal DNA. *Copeia* 1991:602-615.

Eaton, M. J., Martin, A., Thorbjarnarson, J. and Amato, G. 2008. Species-level diversification of African dwarf crocodiles (Genus *Osteolaemus*): a geographic and phylogenetic perspective. *Molecular phylogenetics and evolution* 50(3):496-506.

Eaton, M. J. 2010. Dwarf Crocodile *Osteolaemus tetraspis.* Pp. 127-132 in *Crocodiles. Status Survey and Conservation Action Plan*. Third Edition, ed. by Manolis, S. C. and Stevenson, C. Crocodile Specialist Group: Darwin.

Edition, ed. by S.C. Manolis and C. Stevenson. Crocodile Specialist Group: Darwin.

Gartside, D. F., Dessauer, H. C. and Joanen, T. 1977. Genic homozygosity in an ancient reptile (*Alligator mississippiensis*). *Biochem. Genet.* 15:655-663.

Glenn, T., Dessauer, H. C. and Braun, M. 1998. Characterization of microsatellite DNA loci in American alligators. *Copeia* 1998:591-602.

Geoffroy, S. H. 1807. Description de deux crocodiles qui existent dans le Nil, compare´s au crocodile de Saint-Domingue. *Ann. Mus. Hist. Nat.*, 10:67-86, 264+2 pl.

Gray, J. E. 1870. Note on the Black Crocodile of Africa. *Ann. Mag. Nat. Hist.* (4)6:427.

Guggisberg, C. A. W. 1972. *Crocodiles: Their Natural History, Folklore, and Conservation*. Newton Abbot: David & Charles:195 pp.

Hall, P. M. 1989. Variation in geographic isolates of the New Guinea crocodile (*Crocodylus novaeguineae* Schmidt) compared with the similar, allopatric, Philippine crocodile (*C. mindorensis* Schmidt). *Copeia* 1989 (1):71-80.

Hall, P. M. 1991. Estimation of nesting female crocodilian size from clutch characteristics: correlates of reproductive mode, and harvest implications. *Journal of Herpetology* 25(2):133-141.

Hall, P. M. and Johnson, D. R. 1987. Nesting biology of *Crocodylus novaeguineae* in Lake Murray District, Papua New Guinea. *Herpetologica* 43:249-258.

Hall, P. M. and Portier, K. M. (1994). Cranial morphology of New Guinea (*Crocodylus novaeguineae*) crocodiles: ontogenetic variation in relative growth of the skull and an assessment of its utility as a predictor of the sex and size of individuals. *Herpetological Monographs* 8:203-225.

Harshman, J., Huddleston, C. J., Bollback, J. P., Parsons, T. J. and Braun, M. 2003. True and False Gharials: A Nuclear Gene Phylogeny of Crocodylia. *Systematic Biology* 52(3):386-402.

Hekkala, E., Shirley, M. H., Amato, G., Austin, J. D., Charter, S., Thorbjarnarson, J. Vliet, K. A., Houck, M. L., Desalle, R. and Blum, M. J. 2011. An ancient icon reveals new mysteries: Mummy DNA resurrects a cryptic species within the Nile crocodile. *Molecular Ecology.*

Helfernberger, N. 1981. Ein Beitrag zur Fortpflanzungsbiologie von *Osteolaemus t. tetraspis. Herpetofauna* 3(11):9-11.

Hollands, M. 1987. The management of crocodiles in Papua New Guinea. In *Wildlife management - Crocodiles and Alligators.* Reed books, Chipping Norton, NSW, Australia:73-89.

Inger, R. F. 1948. The systematic status of the crocodile *Osteoblepharon osborni. Copeia* 1948 (1):15-19.

Janke, A., Gullbert, A., Hughes, S., Aggarwal, R. K. and Arnason, U. 2005. Mitogenomic analyses place the gharial (*Gavialis gangeticus*) on the crocodile tree and provide Pre-K/T divergence times for most crocodilians. *Journal of Molecular Evolution* 61(5):620-626.

Ko Ko, W., Khin, M. M., Lay, L, Kalyar, K. and Holmstrom, B.

Hoser 2012 - Australasian Journal of Herpetology 14:9-16.

2006. Crocodiles in Myanmar: Species diversity, historic accounts, and current population status and conservation. *Herpetological Natural History* 10(1):77-89.

Lawson, R., Kofron, C. P. and Dessauer, H. C. 1989. Allozyme variation in a natural population of the Nile crocodile. *Ibid.* 29:863-871.

Lilljeborg, W. 1867. Description of *Halcrosia afzelii*, a new crocodile from Sierra Leone, West Africa. *Proc. Zool. Soc. London* 1867:715-718.

Machkour-M'Rabet, S., Hénaut, Y., Charruau, P., Gevrey, M., Winterton, P. and Legal, L. 2009. Between introgression events and fragmentation, islands are the last refuge for the American crocodile in Caribbean Mexico. *Marine Biology* 156(6):1321-1333.

Man, Z., Yishu, W., Peng, Y. and Xiobing, X. 2011. Crocdilian phylogeny inferred from twelve mitochondrial protein-coding genes, with new complete mitochondrial genomic sequences for *Crocodylus acutus* and *Crocodylus novaeguineae. Molecular Phylogenetics and Evolution* 60:62-67.

Martin, S. 2008. Global diversity of crocodiles (Crocodilia, Reptilia) in freshwater. *Hydrobiologia* 595:587-591.

McAliley, L. R., Willis, R. E., Ray, D. A., White, P. S., Brochu, D. A. and Densmore, L. D. 2006. Are crocodiles really monophyletic?:Evidence for subdivisions from sequence and morphological data. *Molecular Phylogeny and Evolution* 39(1):16-32.

Miles, L. G., Lance, S. L., Isberg, S. R., Moran, C. and Glenn, T. C. 2009. Cross-species amplification of microsatellites in crocodilians: assessment and applications for the future. *Conservation Genetics* 10(4):935-954.

Menzies, R. A., Kushlan, J. and Dessauer, H. C. 1979. Low degree of genetic variability in the American alligator (*Alligator mississippiensis*). *Isozyme Bull.* 12:61.

Montague, J. J. 1984. Morphometric analysis of *Crocodylus novaeguineae* from the Fly River drainage, Papua New Guinea. *Aust. Wildl. Res.* 11:395-414.

Müller, S. and Schlegel, H. 1844. Over de Krokodillen van den Indischen Archipel. In: Temminck,V. (1839-1847) Verhandelingen over de natuurlijke geschiedenis der Nederlandsche overzeesche bezittingen, door de leden der Natuurkundige Commisie in Oost-Indie en andere schrijvers. *Leijde Vitg. door C.J. Temminck, Leiden, Leuchtmans u. Hoeck in comm.*:28.

Murray, A. 1862a. Description of *Crocodilus frontatus*, a new crocodile from Old Calabar River, West Africa. *Ann. Mag. Nat. Hist.* (3)11:222-227.

Murray, A. 1862b. Description of *Crocodilus frontatus*, a new crocodile from Old Calabar River, West Africa. *Proc. zool. Soc. London* 1862:213-218.

Neill, W. T. 1971. *The last of the ruling reptiles: alligators, crocodiles, and their kin*. Columbia Univ. Press, New York.

Oaks, J. R. 2007. Phylogenetic systematic, biogeography and evolutionary ecology of the true crocodiles (Eusachia:Crocodylidae:*Crocodylus*). MSc Thesis (published online).

Ouboter, P. E. and Nanhoe, L. M. 1998. Habitat selection and migration of *Caiman crocodilus crocodilus* in a swamp and swamp-forest habitat in Northern Suriname. *J. Herpetol* 22:283-294.

Piras, P.,Teresi, L., Buscalioni, A. D. and Cubo, J. 2009. The shadow of forgotten ancestors differently constrains the fate of Alligatoroidea and Crocodyloidea. *Global Ecology and Biogeography* 18:30-40.

Platt, S. G. and Thorbjarnarson, J. B. 2000. Population status and conservation of Morelet's crocodile, *Crocodylus moreletii*, in northern Belize. *Biol. Conserv.* 96:21-29.

Rainwater, T. R., Platt, S. G. and McMurry, S. T. 1998. A population study of Morelet's crocodile (*Crocodylus moreletii*) in the New River watershed of northern Belize, p. 206-220. in: *Crocodiles. Proceedings of the 14th working meeting of the crocodile specialist group*. IUCN:The World Conservation Union, Gland, Switzerland.

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

Romer, A. S. 1956. *Osteology of the reptiles*. Univ. of Chicago Press, Chicago.

Ross, C. A. 1990. *Crocodylus raninus* S. Müller and Schlegel, a valid species of crocodile (Reptilia: Crocodylidae) from Borneo. *Proc. Biol. Soc. Washington* 103(4):955-961.

Ross, C. A. 1992. Designation of a lectotype for *Crocodylus raninus* S. Müller and Schlegel, 1844 (Reptilia:Crocodylidae), the Borneo crocodile. *Proc. Biol. Soc. Washington*, 105(2):400-402.

Sah, S. M. and Stuebing, R. B. 1996. Diet, growth and movements of juvenile crocodiles *Crocodylus porosus* Schneider in the Klias River, Sabah, Malaysia. *J. Trop. Ecol.* 12:651-662.

Spix, J. W. d. 1825. *Animalia nova sive species novae lacertarum, quad in itenere per Braziliam annis MDCCCXVII-MDCCCXX jussu et aspiciis Maximiliani Josephi I. Bavariae Regis suscepto collegit et descripsit*. Monachii: Typa Frac. Seraph. Hubaschmanni. 4to. pp. 1-26, pl. 1-28.

St. John, J. A., Braun, E. L., Isberg, S. R., Miles, L. G., Chong, A. Y. Jaime Gongora, P. 2012. Sequencing three crocodilian genomes to illuminate the evolution of archosaurs and amniotes. *Genome Biology* 13:415.

William Rangel Vasconcelos, Tomas Hrbek, Ronis Da Silveira, Benoit De Thoisy, Luis Augusto Ruffeil, A. d. S. and Farias, I. P. 2008. Phylogeographic and conservation genetic analysis of the black caiman (*Melanosuchus niger*). *Journal of Experimental Zoology Part A: Ecological Genetics and Physiology* 309A(10):600-613.

Schmidt, K. P. 1928. A new crocodile from New Guinea. *Zoological Series of Field Museum of Natural History* 12(14):175-181.

Schmitz, A., Mausfeld, P., Hekkala, E., Shine, T., Nickel, H., Amato, G. and Böhme, W. 2003. Molecular evidence for species level divergence in African Nile crocodiles *Crocodylus niloticus* (Laurenti, 1786). *Comptes Rendus Palevol.* 2:703-712.

Seymour, R. S., Bennett-Stamper, C. L., Johnston, S. D., Carrier, D. R. and Grigg, G. C. 2004. Evidence for endothermic ancestors of crocodiles at the stem of archosaur evolution. *Physiological and Biochemical Zoology* 77(6):1051-1067.

Solmu, G. C. (1994). Status of *Crocodylus porosus* and *Crocodylus novaeguineae* populations in Papua New Guinea, 1981-1994. In: *Crocodiles. Proceedings of the 12th Working Meeting of the Crocodile Specialist Group.* IUCN, Gland, Switzerland:77-102.

Summers, A. P. 2005. Evolution - Warm-hearted crocs. *Nature* 434(7035):833-834.

Trutnau, L. and Sommerlad, R. 2006. *Crocodilians: Their Natural History and Captive Husbandry.* Edition Chamaira, Frankfurt am Maim:646 pp.

Tucker, A. D., Limpus, C. J., McCallum, H. I. and McDonald, K. R. 1996. Ontogenetic dietary partitioning by *Crocodylus johnstoni* during the dry season. *J. Herpetol.* 1996(4):978-988.

Waitkuwait, W. E. 1989. Present knowledge on the West African slender-snouted crocodile, *Crocodylus cataphractus* Cuvier, 1824 and the West African dwarf crocodile, *Osteolaemus tetraspis* Cope, 1861. In: *Crocodiles. Their Ecology, Management and Conservation. A Special Publication of the IUCN/SSC Crocodile Specialist Group.* IUCN, Gland, Switzerland:259-275.

Webb et. al. 1983a. (Webb, G. J. W., Manolis, S. C. and Buckworth, R. 1983). *Crocodylus johnstoni* in the McKinlay river area, NT. I. Variation in the diet, and a new method of assessing the relative importance of prey. *Aust. J. Zool.* 30:877-899.

Webb et. al. 1983b. (Webb, G. J. W, Manolis, S. C. and Sack, G. C. 1983. *Crocodylus johnstoni* and *C. porosus* coexisting in a tidal river. *Aust. Wildl. Res.* 10:639-650.

Wells, R. W. and Wellington, C. R. 1984. A synopsis of the class Reptilia in Australia. *Australian Journal of Herpetology* 1(3-4):73-129. [1983]

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

Wermuth, H. 1953. Systematik der Rezenten Krokodile. *Mitteilungen aus dem Zoologischen Museum im Berlin* 29(2):375-514.

Whitaker, R. and Basu, D. 1983. The Gharial (*Gavialis gangeticus*): A review. *J. Bombay Nat. Hist. Soc.* 79(3):531-548.

NEW CLASSIFICATION OF EXTANT (LIVING) CROCODYLIA

ORDER CROCODYLIA
FAMILY CROCODYLIDAE

TRIBE CROCODYLINI TRIBE NOV.

GENUS *CROCODYLUS* LAURENTI, 1768

Crocodylus niloticus Laurenti, 1768 (Nile crocodile).

GENUS *MOTINA* GRAY, 1844

Motina acutus (Cuvier, 1807) (American crocodile).

Motina moreletii (Duméril and Bibron, 1851) (Morelet's crocodile).

Motina intermedius (Graves, 1819) (Orinoco crocodile).

Motina rhombifer (Cuvier, 1807) (Cuban crocodile).

GENUS *OOPHOLIS* GRAY, 1844

Oopholis palustris comb. nov. (Lesson, 1831) (Mugger crocodile).

Oopholis porosus (Schneider, 1801) (Saltwater crocodile).

Oopholis siamensis comb. nov. (Schneider, 1801) (Siamese crocodile).

SUBGENUS *PHILAS* GRAY, 1874

Oopholis (*Philas*) *adelynhoserae* sp. nov. (South New Guinea Freshwater Crocodile).

Oopholis (*Philas*) *jackyhoserae* sp. nov. (Liverpool River Freshwater Crocodile).

Oopholis (*Philas*) *johnsoni* comb. nov. (Krefft, 1873) (Australian Freshwater crocodile).

Oopholis (*Philas*) *mindorensis* comb. nov. (Schmidt, 1935) (Philippine crocodile).

Oopholis (*Philas*) *novaeguineae* comb. nov. (Schmidt, 1928) (North New Guinea crocodile).

Oopholis (*Philas*) *raninus* comb. nov. (Müller and Schlegel, 1844) (Borneo Freshwater Crocodile).

GENUS *OXYCROCODYLUS* GEN. NOV.

Oxycrocodylus suchus comb. nov. (Geoffroy, 1807) (Desert Crocodile).

TRIBE MECISTOPSINI TRIBE NOV.

GENUS *MECISTOPS* MÜLLER, 1846

Mecistops cataphractus (Cuvier, 1825) (Slender-snouted crocodile).

GENUS *OSTEOLAEMUS* COPE, 1861

Osteolaemus afzelii (Lilljeborg, 1867) (African Dwarf crocodile).

Osteolaemus osborni (Schmidt, 1919) (African Dwarf crocodile).

Osteolaemus tetraspis Cope, 1861 (African Dwarf crocodile).

TRIBE GAVIALINI TRIBE NOV.

GENUS *GAVIALIS* OPPEL, 1811.

Gavialis gangeticus (Gmelin, 1789) (Gharial).

GENUS *TOMISTOMA* MÜLLER, 1838

Tomistoma schlegelii (Müller, 1858) (False Gharial).

FAMILY ALLIGATORIDAE

SUBFAMILY ALLIGATORINAE

GENUS *ALLIGATOR* CUVIER, 1807

Alligator mississippiensis (Daudin, 1802) (American Alligator).

Alligator sinensis Fauvel, 1879 (Chinese Alligator).

SUBFAMILY CAIMANINAE

GENUS *PALEOSUCHUS* GRAY, 1862

Paleosuchus palpebrosus (Cuvier, 1807) (Cuvier's Dwarf Caiman).

Paleosuchus trigonatus (Schneider, 1801) (Smooth-fronted Caiman).

GENUS *CAIMAN* SPIX, 1825

Caiman yacare (Daudin, 1802) (Yacare Caiman).

Caiman crocodilus (Linnaeus, 1758) (Spectacled Caiman).

Caiman latirostris (Daudin, 1802) (Broad-snouted Caiman)

GENUS *MELANOSUCHUS* GRAY, 1862

Melanosuchus niger (Spix, 1825) (Black Caiman)

Hoser 2012 - Australasian Journal of Herpetology 14:9-16.

Australasian Journal of Herpetology 14:17-23.
Published 30 June 2012.

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

A five-way division of the agamid genus *Laudakia* Gray, 1845 (Squamata: Sauria: Agamidae).

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Received 13 March 2012, Accepted 8 April 2012, Published 30 June 2012.

ABSTRACT

The Agamid genus *Laudakia* Gray, 1845 has had a checkered history in terms of nomenclature. However in recent years a number of molecular studies have confirmed the relationships between species within the genus *Laudakia senso lato* and closely related genera.

As currently recognized the genus *Laudakia senso-lato* consists of five distinct species groups.

All are sufficiently divergent in terms of morphology, habits and divergence as ascertained from molecular studies to be accorded full genus status.

One of these groups is already commonly referred to as the genus *Phrynocephalus* Kaup, 1825 (26 species). In terms of the rest, the names *Laudakia* and *Plocederma* Blyth, 1854 are available for two other groups.

The other two unnamed groups are formally named according to the Zoological Code within this paper. These are *Adelynkimberleyea* gen. nov. for the *caucasia* group and *Jackyindigoea* gen. nov. for the taxon *sacra*.

Within *Adelynkimberleyea* gen. nov. the morphologically and ecologically divergent taxon *lehmanni* is placed in the newly named subgenus *Agamatajikistanensis* subgen. nov..

Keywords: Taxonomic revision; new genera; new subgenus; *Laudakia*; *Phrynocephalus*; *Plocederma*; *Adelynkimberleyea*; *Jackyindigoea*; *Agamatajikistanensis.*

INTRODUCTION

Lizards of the mainly south-west Asian genus *Laudakia* Gray, 1845 fit the profile of typical agamids in most respects.

They are dwellers of dry habitats and are stout spinose lizards with a round pupil. The body is slightly flattened with a broad head. The scales are distinctly tubercular and the ears in particular display the protective spines typical of many desert dwelling lizards. The tail is covered in whorls of spiny scales. Most species typically reach about 30cms in length of which the tail is about half.

The body tends to be some shade of grey, orange, yellow or even blackish in colour and the back may be marked in diamond or other shaped blotches or lateral stripes or bands which range from a various paler or darker colouration.

There are frequently similar coloured blotches on the flanks which sometimes join with the back markings to appear as complete bars. Females are typically more drab in colouration and with smaller heads and there is considerable variation in colour, not just between species, but also within given species depending on locality.

In line with other “dragons” these lizards interact with one another doing so-called press-ups, raising and lowering the whole forepart of the body, head-bobbing, arm waving and the like.

The lizards subject of this paper, have been referred to the genus *Laudakia* Gray, 1845 in recent years, but have had a checkered past taxonomically.

Henle (1995) gives a detailed account of the taxonomy of the group to that date.

While these lizards were in the first instance referred to the catch-all genus *Agama* by Boulenger (1885), this changed when Moody (1980), split the genus *Agama* (*sensu lato*) into six genera. In doing so he overlooked Stejneger’s (1936) designation of *Stellio saxatilis* of Laurenti, 1768 which is based on a figure in Seba (1734) as the type species.

This species is however unidentifiable.

Moody (1980) erroneously reused *Stellio* for the so-called *Stellio-group* of agamid lizards (currently referred to *Laudakia* Gray, 1845). Many authors followed Moody (1980) until some authors pointed out that *Stellio* was unavailable. They didn't fully discuss the implications for agamid nomenclature until 1995 when Henle proposed a restructure of the group using available existing nomenclature. To that end, Henle (1995) suggested to restrict *Laudakia* to *L. tuberculata* and to use *Plocederma* for the so-called *stellio-group* which was ultimately interpreted by most herpetologists to include about 20 species.

Two other groups of phenotypically similar agamids the Asian genus *Phrynocephalus* Kaup, 1825, includes about in excess of 20 species (about 26 recognized in 2012) and the middle-eastern genus *Acanthocercus* Fitzinger, 1843 includes 8 described species, (all bar one described in the 1800's) were also dealt with by Henle (1995), who resurrected both genera and placed the component species within.

Acceptance of Henle's position in terms of genera *Phrynocephalus* and *Acanthocercus* by other herpetologists continues to 2012.

However in terms of the remaining species, most authors have subsumed *Plocederma* within *Laudakia*, which had date priority (e.g. Almog et. al. 2005). Hence *Laudakia* as currently recognized contains about 22 described species.

In the period since 1995 there have however been numerous phylogenetic studies into species within *Laudakia* (senso lato, as in including *Plocederma*), including studies that have included what has now emerged as the four distinct phylogenetic groups.

Important and relevant phylogenetic studies include, Macey et. al. (1998, 2000a, 2000b, 2004, 2006), Moody (1980), Rastegar-Pouyani and Nilson (2002) and others.

Macey and others have also cited numerous important studies on similar and related genera as well as geological studies to infer divergence times of the relevant species groups within *Laudakia* (*senso lato*, as in including *Plocederma*).

The final result of these studies in terms of the taxonomic placements used in this paper is perhaps best seen in Macey et. al. (2006), Fig. 2., page 884, which sees five main phylogenetic groups (including *Phrynocephalus* and excluding *Acanthocercus*) for *Laudakia sensu lato*.

As mentioned by Henle (1995), there is the available name *Plocederma* for the species taxon *stellio*. However for the so-called *caucasia*-group and the species *sacra*, there are no available genus names.

To resolve the situation, there are only two alternatives. One is to maintain all within *Laudakia*, but that would necessitate the merging of the widely used *Phrynocephalus* back into *Laudakia*. This is not tenable or consistent with the allocation of agamids within other genera based on similar divergences.

The second and eminently sensible alternative is to maintain *Phrynocephalus* as separate from *Laudakia* and to similarly subdivide the other four groups into genera, using the available names for two and assigning names to the other two.

This is done below.

The other two unnamed groups are formally named according to the Zoological Code (Ride et. al. 1999) within this paper. These are *Adelynkimberleyea* gen. nov. for the *caucasia* group and *Jackyindigoea* gen. nov. for the species taxon *sacra*.

Important studies relevant to species within the four genera *Laudakia* Gray, 1845, *Plocederma* Blyth, 1854, *Adelynkimberleyea* gen. nov. and *Jackyindigoea* gen. nov. include, Abo-Taira et. al. (1996), Aghili et. al. (2010), Almog et. al. (2005), Al-Quran (2009), Ananjeva and Atajev (1984), Ananjeva and Kalyabina-Hauf (2006), Ananjeva and Orlov (2005), Ananjeva and Orlova (1979), Ananjeva and Peters (1982), Ananjeva and Tuniev (1994), Ananjeva et. al. (1981, 1990), Anderson (1872), Anderson (1963, 1999), Anderson and Leviton (1969), Andersson (1900), Bahuguna (2008), Baier et. al. (2009), Baig (1988, 1989, 1999), Baig and Böhme (1989), Bar and Haimovitch (2012), Baran et. al. (2001), Barts and Wilms (2003), Berger-Dell'mour (1986), Beutler and Frör (1980), Bird (1936), Blanford (1874, 1875, 1876), Blyth (1854a, 1854b), Boulenger (1885, 1890), Boulenger et. al. (1907), Brammah et. al. (2010), Broggi (1978), Cheatsazan et. al. (2008), Clark et. al. (1966), Crochet et. al. (2006), Cuvier (1831), Daan (1967), Damhoureyeh et. al. (2009), de Filippi (1843, 1867), Dieckmann (2010), Dodsworth (1913), Duméril and Bibron (1837), Dujsebayeva et. al. (2007), Eichwald (1831), El-Toubi (1947), Engelmann et. al. (1993), Ficotela et. al. (2010), Fitzinger (1843), Forcart (1950), Freynik (2010), Frommer (2009), Frynta et. al. (1997), Göcmen et. al. (2003), Golubev (1998), Gorman and Shochat (1972), Gruber and Fuchs (1977), Günther (1860), Haas (1951), Haas and Werner (1969), Hall (2009), Heidari et. al. (2010), Hillmann (2003), Honda et. al. (2000), Ilgaz et. al. (2005), Khan (2012), Leviton et. al. (1992), Linnaeus (1758), Lorenz (2006, 2011), Manthey and Schuster (1999), Marx (1976), Minton (1996), Mishagina (2004, 2005), Müller (2006), Murthy (2010), Nevo (1981), Nikolsky (1896, 1897a. 1897b, 1915), Panov and Zykova (1995, 1998), Parker (1935), Roitberg et. al. (2000), Schlüter (2010, 2011), Schmidt (1926, 1939), Sindaco and Jeremcenko (2008), Sindaco et. al. (2000), Smith (1935), Sowig (1989), Stoliczka (1871, 1872), Szczerbak (2003), Thieme (1980), Trapp (2006), Tuniyev et. al. (1991), Venugopal (2010), Waltner (1975), Werner (1897, 1899, 1917), Werner (1971, 1992), Wettstein, and Löffler (1951), Xyda (1983), Zhao (1998a, 1998b), Zhao and Adler (1993).

Phrynocephalus and *Laudakia* have been well-defined previously, so it isn't necessary to redefine them here, although for each a brief diagnosis is given.

GENUS *PHRYNOCEPHALUS* KAUP, 1825

Type species: *Lacerta caudivolvula* Pallas, 1814

Diagnosis: Similar in most respects to *Laudakia* sensu lato (including genera *Plocederma*, Blyth 1854 for the species *stellio*, *Adelynkimberleyea* gen. nov. for the *caucasia* group and *Jackyindigoea* gen. nov. for the species taxon *sacra*) by the lacking of an obvious tympanum (or ear drum) in that it is concealed from obvious external view.

This genus is diagnosed from similar agamids by the following suite of characters: Tympanum concealed (separates from *Laudakia*) and the body is dorsoventrally depressed (separates from all other Agamids in the region where these groups of lizards occur (Middle-east, Himalayas and nearby).

Content of genus *Phrynocephalus*

Phrynocephalus arabicus Anderson, 1894.

Phrynocephalus axillaris Blanford, 1875.

Phrynocephalus clarkorum Anderson and Leviton, 1967.

Phrynocephalus euptilopus Alcock and Finn, 1897.

Phrynocephalus forsythii Anderson, 1872.

Phrynocephalus golubewii Shenbrot and Semyonov, 1990.

Phrynocephalus guinanensis Wang and Wang, 2009.

Phrynocephalus guttatus (Gmelin, 1789).

Phrynocephalus helioscopus (Pallas, 1771).

Phrynocephalus interscapularis Lichtenstein, 1856.

Phrynocephalus luteoguttatus Boulenger, 1887.

Phrynocephalus maculatus Anderson, 1872.

Phrynocephalus mystaceus (Pallas, 1776).

Phrynocephalus ornatus Boulenger, 1887.

Phrynocephalus persicus De Filippi, 1863.

Phrynocephalus przewalskii Strauch, 1876.

Phrynocephalus putjatai Bedriaga, 1909.

Phrynocephalus raddei Boettger, 1888.

Phrynocephalus reticulatus (Eichwald, 1831).

Phrynocephalus roborowskii Bedriaga, 1906.

Phrynocephalus rossikowi Nikolsky, 1898.

Phrynocephalus scutellatus (Oliver, 1807).

Phrynocephalus strauchi Nikolsky, 1899.

Phrynocephalus theobaldi Blyth, 1863.

Phrynocephalus versicolor Strauch, 1876.

Phrynocephalus vlangalii Strauch, 1876.

GENUS *LAUDAKIA* GRAY, 1845

Type species: *Agama tuberculata* Gray, 1827.

Similar in most respects to *Phrynocephalus* (described above), but with a distinct tympanum (separates it from *Phrynocephalus*) and the body is dorsoventrally depressed (separates it from all other Agamids in the region where these groups of lizards occur as in the Middle-east, Himalayas and nearby). Other genera in the region except genera *Plocederma*, Blyth 1854 for the species *stellio*, *Adelynkimberleyea* gen. nov. for the *caucasia* group and *Jackyindigoea* gen. nov. for the species *sacra*, all formerly included in this genus have a laterally compressed body.

Laudakia is separated from the other similar genera described within this paper by having the largest dorsal scales, smaller than the ventrals and flanks with few enlarged scales and often a distinct transverse fold across nape.
The tympanum is large, superficial; fifth toe extends beyond second; caudal scales in distinct annuli.

The mid dorsum of the body may or may not have several rows of heterogeneous enlarged scales; scales of dorsal rows are keeled (instead of not keeled in *Adelynkimberleyea* gen. nov.).

The premaxilla has three teeth in this genus versus two in *Adelynkimberleyea* gen. nov..

This lizards in this genus has 15-18 molars, versus 14-15 in all other genera within *Laudakia sensu lato*.

There are usually four (rarely three) whorls in each tail segment versus three or less in other genera within *Laudakia sensu lato.* The only exception is the species *melanura* (within *Laudakia sensu stricto*) which has an inconsistent number in each segment.

Lizards with *Laudakia* are also generally of larger adult size than the lizards in the other genera.

The species within this genus are separated from genera *Plocederma*, Blyth 1854, *Adelynkimberleyea* gen. nov. and *Jackyindigoea* gen. nov. by the diagnoses below.

Species in those genera are not listed in *Laudakia* (immediately) below.

Content of genus *Laudakia*

Laudakia tuberculata (Gray, 1827) (Type species).

Laudakia nupta (De Filippi, 1843).

Laudakia dayana (Stolicza, 1871).

Laudakia fusca (Blanford, 1876).

Laudakia nuristanica (Anderson and Leviton, 1969).

Laudakia agrorensis (Stolicza, 1872).

Laudakia melanura (Blyth, 1854).

Laudakia pakistanica (Baig, 1989).

GENUS *PLOCEDERMA* BLYTH, 1854

Type species: *Lacerta stellio* Linnaeus, 1758

Diagnosis: This genus is similar in most respects to *Phrynocephalus* (described above), but with a distinct tympanum (separates it from *Phrynocephalus*) and the body is dorsoventrally depressed (separates it from all other Agamids in the region where these groups of lizards occur (Middle-east, Himalayas and nearby), except for genera *Laudakia* and *Jackyindigoea* gen. nov. and *Adelynkimberleyea* gen. nov. (both described below).

The tympanum is large, superficial; fifth toe extends beyond second; caudal scales in distinct annuli.
This genus is monotypic for the highly variable taxon *stellio*.

It is separated from all other *Laudakia* sensu lato by the following suite of characters: A middle-sized lizard with a moderately depressed body. Total length reaches up to 35 cm, or slightly longer. The flat and triangular head is covered with asymmetrically distributed small scales and plates. Snout is longer than the distance eye-tympanum. Spiny scales on the neck and sides of the head. The dorsum is covered with small and large scales. Ventral scales are smooth, callous glands, which are present in males, consist of 3-5 rows of modified scales in pre-cloacal position, and an isolated group of scales in the middle of abdomen, near the umbilical scar. The tail is moderately depressed in its proximal part; the distal part is rounded or slightly oval in cross-section. The scales of the tail are arranged into distinct circular segments, each consisting of two whorls of enlarged mucronate (spiny) scales. The coloration is extremely variable, depending on race, sex, age and substrate.

Distribution: Middle-east from Greece to Egypt and Saudi Arabia and countries in between.

GENUS *ADELYNKIMBERLEYEA* GEN. NOV.

Type species: *Stellio caucasicus* Eichwald, 1831

Diagnosis: The genus *Laudakia sensu lato* including this genus is separated from most other Agamids in the same region by the following characters: Similar in most respects to *Phrynocephalus* (described above), but with a distinct tympanum (separates it from *Phrynocephalus*). The body is dorsoventrally depressed (separates it from all other Agamids in the region where these groups of lizards occur, namely the Middle-East, Himalayas and nearby), excluding those genera formerly placed within *Laudakia sensu lato*, including *Plocederma*, Blyth 1854 for the species *stellio*, *Laudakia* and *Jackyindigoea* gen. nov. for the species *sacra* (described below).

The tympanum is large, superficial; fifth toe extends beyond second; caudal scales in distinct annuli.

Adelynkimberleyea gen. nov. is separated from *Laudakia* and *Plocederma* by the fact that the scales of dorsal rows are smooth (as opposed to keeled).

The premaxilla has two teeth in this genus versus three in *Laudakia.*

This lizards in this genus have 14-15 molars, versus 14-15 in *Laudakia*.

This genus is similar in most respects to *Phrynocephalus* (described above), but with a distinct tympanum (separates it from *Phrynocephalus*) and the body is dorsoventrally depressed (separates it from all other Agamids in the region where these groups of lizards occur (Middle-east, Himalayas and nearby), except for genera *Plocederma*, *Laudakia* and *Jackyindigoea* gen. nov. (described below).

Jackyindigoea gen. nov. is separated from all other *Laudakia* sensu lato including *Adelynkimberleyea* gen. nov. by the following suite of characters: They are comparatively large lizards with a snout-vent length of 120- 150 mm and a tail length of 180-240 mm.
Gular sac is developed to a greater degree than in all other *Laudakia* sensu lato. Body scales are small and granular. The scales are not well differentiated. There is a very slight but noticeable nuchal crest on the head. It begins from the middle of the occiput and continues as a poorly differentiated vertebral stripe. The longitudinal rows of enlarged and feebly keeled scales on the vertebral region are arranged parallel to each other. There are neither groups of enlarged scales nor separate enlarged scales on the dorsal lateral regions.
The males have a large patch of callous scales on the belly. The annuli and segmentation of the scales on the basal quarter of the tail are not prominent. On the lateral surface of the tail there are three to four annuli in each segment.
There is a small granular dark pattern on the back. The center of the back tends to have more black and toward the sides a dark golden brown dominates. The separate elements of this pattern are connected to heavily-marked diffuse transverse stripes. The narrow stripes form two rows of the dark colored scales that

continue from the neck to the tail. Overall the lizard is darkly colored but there are a few randomly scattered yellow blotches on the back. Juveniles are lighter in color tending more toward a dark golden brown with darker speckling all over the back. The dark golden brown forms bands across the back which are offset at the spine.

The tympanum is large, superficial; fifth toe extends beyond second; caudal scales in distinct annuli.

The genus *Adelynkimberleyea* gen. nov. is found from the Middle East and nearby areas, across drier parts of south-west Asia through to western China.

Etymology: Named in honor of my daughter Adelyn Kimberley Hoser, in recognition of 8 years working with Snakebusters, Australia's best reptile shows in educating countless others about reptiles.

Content of *Adelynkimberleyea* gen. nov.

Adelynkimberleyea caucasia (Eichwald, 1831) (Type species).

Adelynkimberleyea badakhshana (Anderson and Leviton, 1969).

Adelynkimberleyea bochariensis (Nikolsky, 1897).

Adelynkimberleyea erythrogastra (Nikolsky, 1896).

Adelynkimberleyea himalayana (Steindachner, 1867).

Adelynkimberleyea lehmanni (Nikolsky, 1896).

Adelynkimberleyea microlepis (Blanford, 1874).

Adelynkimberleyea mucronata **(**Guibe 1957).

Adelynkimberleyea papenfussi Zhao, 1998.

Adelynkimberleyea stoliczkana (Blanford, 1875).

Adelynkimberleyea wui Zhao, 1998.

***AGAMATAJIKISTANENSIS* SUBGEN. NOV.**

Type species: *Stellio lehmanni* Nikolsky, 1896

Diagnosis: This subgenus is monotypic for the species, *Adelynkimberleyea lehmanni*. It is separated from all other lizards in the genus *Adelynkimberleyea* gen. nov. by the following suite of characters: Head and body depressed. The snout is longer than the distance between the eye-tympanum or eye with and more than two times that of tympanum diameter. Tympanum exposed, being deep and more than half the eye width. Nostril is pierced below the canthus rostralis and cannot be viewed from above, equal or more than half of nasal, separated by one or two scales from the rostral directing backwards. No gular pouch, gular plicate, upper head scales, heterogenous, subequal, usually carinated except the supraocular scales which are smooth at the anterior part of the head at the level of the anterior margin of the eye-flower shaped formation

of enlarged scales on the anterior side of the head; color is olivaeceous with irregular black spots; head is uniform yellow or grey, upper parts of leg and tail usually speckled with black, but may sometimes show a banded pattern; underparts are usually yellow, usually spotted with black. The throat in live shows yield black and orange spots that may appear and then disappear. There are scales on the body with strong ridges and spines; several vertical rows of highly enlarged spinose scales; no patch on flanks; dorsolateral fold marked with enlarged spinose scales with distinct high ridges; tail segment of three; callous glands present.

There are 11-15 (supra) labials, groups of highly spinose scales present on the sides of the head and neck, preauricle constitutes a circular series; vertebral scales heterogenous, strongly keeled, vertical series of distinctly enlarged scales with distinct ridges and spines interrupted by other moderately enlarged scales; several enlarged mucronate scales randomly present; ventral scales are smooth and smaller than enlarged dorsals, gular scales smooth, 88-109 mid-body rows, limbs strong and covered with large mucronate scales. Hind limb is about equal to or more than the distance between the gular fold and the cloaca; fingers and toes compressed. Tail is depressed, but oval in cross-section. Tail sections are distinct, each segment consists of 3 whorls of large mucronate scales; near its origin, mid-dorsal rows consist of two whorls in each segment, 22-30 scales in the first complete whorl around the tail, 3-5 rows of callous glands present in males at precloacal, there is no patch in the abdominal position in this species and not represented in females.

This species is endemic to the Pamir mountains, centered in Tajikistan. The area in which this species is distributed is approximately 137,880 square km. This species is found up to 3,400 m above sea level.

Where it is found it is a common species.

In terms of local habitats it's a montane species, inhabiting rocks, precipices, ruins, and ravines. It climbs shrubs and trees and takes refuge in cracks between rocks, voids under stones, and in burrows.

Etymology: Named after the lizard and the location where it is found.

GENUS *JACKYINDIGOEA* GEN. NOV.

Type species: *Agama himalayana sacra* Smith, 1935

Diagnosis: Separated from all other *Laudakia sensu lato* by the following suite of characters: They are comparatively large lizards with a snout-vent length of 120-150 mm and a tail length of 180-240 mm.

Gular sac is developed to a greater degree than in all other *Laudakia* sensu lato. Body scales are small and granular. The scales are not well differentiated. There is a very slight but noticeable nuchal crest on the head. It begins from the middle of the occiput and continues as a poorly differentiated vertebral stripe. The longitudinal rows of enlarged and feebly keeled scales on the vertebral region are arranged parallel to each other. There are neither groups of enlarged scales nor separate enlarged scales on the dorsal lateral regions.

The males have a large patch of callous scales on the belly. The annuli and segmentation of the scales on the basal quarter of the tail are not prominent. On the lateral surface of the tail there are three to four annuli in each segment.

There is a small granular dark pattern on the back. The center of the back tends to have more black and toward the sides a dark golden brown dominates. The separate elements of this pattern are connected to heavily-marked diffuse transverse stripes. The narrow stripes form two rows of the dark colored scales that continue from the neck to the tail. Overall the lizard is darkly colored but there are a few randomly scattered yellow blotches on the back. Juveniles are lighter in color tending more toward a dark golden brown with darker speckling all over the back. The dark golden brown forms bands across the back which are offset at the spine.

The tympanum is large, superficial; fifth toe extends beyond second; caudal scales in distinct annuli.

This genus is similar in most respects to *Phrynocephalus* (described above), but with a distinct tympanum (separates it from *Phrynocephalus*) and the body is dorsoventrally depressed (separates it from all other Agamids in the region where these groups of lizards occur (Middle-east, Himalayas and nearby), except for *Plocederma*, *Laudakia* and *Adelynkimberleyea* gen. nov. (described above).

The genus is monotypic for the species *sacra*, and it is only known from the region near the type locality of Lhasa, Tibet, China.

Etymology: Named in honor of my daughter Jacky Indigo Hoser, in recognition of 8 years working with Snakebusters, Australia's best reptile shows in educating countless others about reptiles.

REFERENCES CITED

Abo-Taira, A. M., Zaher, M. M. and Al-Badry, F. M. 1996. Sex and species determination based on external morphology characters in *Agama pallida* and *Agama stellio* (Reptilia-Agamidae). *Journal of the Egyptian German Society of Zoology* 21(B):259-279.

Aghili, H., Rastegar-Pouyani, N., Rajabizadeh, M., Kami, H. G. and Kiab, B. H. 2010. Sexual dimorphism in *Laudakia erythrogastra* (Sauria: Agamidae) from Khorasan Razavi Province, Northeastern Iran. *Russian Journ. of Herp.* 17(1).

Al-Quran, S. 2009. The Herpetofauna of the Southern Jordan. *American-Eurasian J. Agric. and Environ. Sci.*, 6(4):385-391.

Almog, A., Bonen, H., Herman, K. and Werner, Y. L. 2005. Subspeciation or none? The hardun in the Aegean (Reptilia: Sauria: Agamidae: *Laudakia stellio*). *J. Nat. Hist.* 39(7):567-586.

Ananjeva, N. B. and Atajev, J. 1984. *Stellio caucasica triannulatus* - A new Subspecies of the caucasian Agama from South- Western Turkmenia. *Trudy Zool. Inst. Akad. Nauk SSSR* 124:4-11.

Ananjeva, N. B. and Kalyabina-Hauf, S. A. 2006. On the problems of the Rock Agamas of *Laudakia caucasia* -complex (Agamidae, Sauria). *Modern Herpetology* 5/6:5-17.

Ananjeva, N. and Orlov, N. 2005. Lizards of North Eurasia. *Reptilia* (GB) (38):54-63.

Ananjeva, N. B. and Orlova, V. F. 1979. Distribution and geographic variability of *Agama caucasia* (Eichwald, 1831). *Proceedings of the Zoological Institute of the Academy of Sciences* USSR (89):4-17.

Ananjeva, N. B. and Peters, G. 1982. Notizen über Agama chernovi aus Tadzikistan (USSR) und ihre Umwelt. *Herpetofauna* 4(20):8-11.

Ananjeva, N. B. and Tuniev, B. S. 1994. Some aspects of historical biogeography of Asian rock agamids *Russ. J. Herpetol.* 1(1):43.

Ananjeva, N. B., Peters, G. and Rzepakovsky, V. T. 1981. New species of the mountain agamas from Tadjikistan, *Agama chernovi* sp. nov. *Trudy Zoologicheskogo Instituta Akademii Nauk* SSSR 101(1981):23-27.

Ananjeva, N. B., Peters, G., Macey, J. R. and Papenfuss, T. 1990. *Stellio sacra* (Smith 1935) - a distinct species of Asiatic rock agamid from Tibet. *Asiatic Herpetological Research* 3:104-115.

Anderson, J. 1872. On some Persian, Himalayan, and other Reptiles. *Proc. Zool. Soc.* London 1872:371-404.

Anderson, S. C. 1963. Amphibians and Reptiles from Iran. *Proc. Cal. Acad. Sci.* Ser. 4, 31(16): 417-498.

Anderson, S. C. 1999. The lizards of Iran. *Contributions to Herpetology* Volume 15, Society for the Study of Amphibians and Reptiles, Saint Louis, Missouri: i-vii:1-442.

Anderson, S. C. and Leviton, A. E. 1969. Amphibians and reptiles collected by the Street expedition to Afghanistan, 1965. *Proc. Cal. Acad. Sci.* (4)37:25-56.

Andersson, L. G. 1900. Catalogue of Linnean type-specimens of Linnaeus's Reptilia in the Royal Museum in Stockholm. *Bihang till Konglika Svenska Vetenskaps-Akademiens*. Handlingar. Stockholm. (4)26(1):1-29.

Bahuguna, A. 2008. Altitudinal variations in morphological characters *of Laudakia tuberculata* Hardwicke, and Gray, 1827 from western Himalayas (Uttarakhand), India. *Russian Journal of Herpetology* 15(3):207-211.

Baier, F., Sparrow, D. J. and Wiedl, H. J. 2009. *The Amphibians and Reptiles of Cyprus*. Edition Chimaira, Frankfurt/M.:370 pp.

Baig, K. J. 1988. New record of *Agama nuristanica* (Sauria: Agamidae) from Pakistan. *Biologia*, Islamabad:34:199-200.

Baig, K. J. 1989. A new species of Agama (Sauria: Agamidae) from northern Pakistan. *Bulletin of the Kitakyushu Museum of Natural History* (9):117-122.

Baig, K. J. 1999. Description and ecology of a new subspecies of Black Rock Agama, *Laudakia melanura* (Sauria: Agamidae) from Balochistan, Pakistan. *Russ. J. Herpetol.* 6(2):81-86.

Baig, K. J. and Böhme, W. 1995. Partition of the *Stellio*-group of Agama. *8th Ord. Gen. Meet. Soc. Europ. Herpet.*:36.

Bar, A. and Haimovitch, G. 2012. *A Field Guide to Reptiles and Amphibians of Israel.* Pazbar Ltd:246 pp.

Baran, I., Kumlutas, Y., Olgun, K., Ilgaz, C. and Kaska, Y. 2001. The Herpetofauna of the Vicinity of Silifke. *Turk. J. Zool.* 25:245-249.

Barts, M. and Wilms, T. 2003. Die Agamen der Welt. *Draco* 4(14):4-23.

Blanford, W. T. 1874. Descriptions of new lizards from Persia and Baluchistàn. *Ann. Mag. Nat. Hist.* (4)13:453-455.

Berger-Dell'mour, H. 1986. Zur Herpetofauna des Golan. *Ann. Naturhist. Mus. in Wien* (Ser. B) 87:59-67.

Beutler, A. and Frör, E. 1980. Die Amphibien und Reptilien der Nordkykladen (Griechenland). *Mitteilungen der Zoologischen Gesellschaft Braunau* 3:255-290.

Bird, C. G. 1936. The distribution of reptiles and amphibians in Asiatic Turkey with notes on a collection from the Vilayets of Adana, Gaziantep and Malatya. *Ann. Mag. Nat. Hist.* (10)18:257-281.

Blanford, W. T. 1874. Descriptions of new Reptilia and Amphibia from Persia and Baluchistan. *Ann. Mag. Nat. Hist.* (4)14:31-35.

Blanford, W. T. 1875. List of Reptilia and Amphibia collected by the late Dr. Stoliczka in Kashmir, Ladák, eastern Turkestán, and Wakhán, with descriptions of new species. *J. Asiatic Soc. Bengal, Calcutta,* new ser., 44(2)3:191-196.

Blanford, W. T. 1876. *Eastern Persia, an account of the journeys of the Persian Boundary Comission, 1870-71-72. Vol. II. The zoology and geology*. London:516 pp.

Boulenger, G. A. 1885. *Catalogue of the Lizards in the British Museum (Nat. Hist.) I. Geckonidae, Eublepharidae, Uroplatidae, Pygopodidae, Agamidae.* London:450 pp.

Boulenger, G. A. 1890. *The Fauna of British India, Including Ceylon and Burma. Reptilia and Batrachia*. Taylor and Francis, London:xviii, 541 pp.

Boulenger, G. A., Annandale, N., Wall, F. and Regan, C. T. 1907. Reports on a collection of batrachia, reptiles and fish from Nepal and the western Himalayas. Lacertilia. *Records of the Indian Museum* 1:149-155.

Blyth, E. 1854a. Notices and descriptions of various reptiles, new or little-known. Part I. *J. Asiat. Soc.* Bengal 22[1853]:639-655.

Blyth, E. 1854b. Proceedings of the Society. Report of the Curator, Zoological Department. *J. Asiat. Soc. Bengal* 23 [1854]:737-740.

Brammah, M., Hoffman, J. and Amos, W. 2010. Genetic divergence between and within two subspecies of *Laudakia stellio* on islands in the Greek Cyclades. *The Herpetological Journal* 2010(20):91-98.

Broggi, M. F. 1978. Herpetologische Beobachtungen auf der Insel Lesbos (Griechenland). *Salamandra* 14(4):161-171.

Clark, R. J., Clark, E. D. and Anderson, S. C. 1966. Report on two small collections of reptiles from Iran. *Occ. Pap. Cal. Acad. Sci.* (55):1-9.

Cheatsazan, H., Rabani, V., Mahjoorazad, A. and Kami, H. G. 2008. Taxonomic status of the Yellow-Headed Agama, *Laudakia nupta fusca* (Blanford, 1876) (Sauria: Agamidae). *Zoology in the Middle East* 44:41-50.

Crochet, P., Lymberakis, P. and Werner, Y. L. 2006. The type specimens of *Laudakia stellio* (Linnaeus) (Reptilia: Agamidae) and its subspecies. *Journal of Natural History* 40(7-8):461-471.

Cuvier, G. 1831. *The Animal Kingdom arranged in conformity with its organization, by the Baron Cuvier, ... with additional descriptions of all the species hitherto named, and of many not before noticed, by Edward Griffith... and others*. Vol. 9. Whittaker, Treacher and Co., London:481 pp.

Daan, S. 1967. Variation and taxonomy of the hardun *Agama stellio* (Linnaeus 1758) (Reptilia, Agamidae). *Beaufortia* 14:109-134.

Damhoureyeh, S. A., Qarqaz, M. A., Baker, M. A., Himdan, N., Eid, E. and Amr, Z. S. 2009. Reptiles and Amphibians in Dibbeen Nature Reserve, Jordan. *Vert. Zoology* 59(2):169-177.

de Filipi, F. 1843. Intorno ad alcune specie di rettili. *Giorn. Ist. Lomb. e Bib*. Ital. 6:407-415.

de Filippi, F. 1867. On the structure of the skin in *Stellio caucasicus. Ann. Mag. Nat. Hist.* (3)19:145-146.

Dieckmann, M. 2010. Der Hardun Laudakia stellio. *Natur und Tier Verlag*:64 pp.

Dodsworth, P. T. L. 1913. On the Habits of the Rock Lizard (*Agama tuberculata*). *J. Bombay nat. Hist. Soc.* 22:404.

Duméril, A. M. C. and Bibron, G. 1837. *Erpétologie Générale ou Histoire Naturelle Complete des Reptiles.* Vol. 4. Libr. Encyclopédique Roret, Paris:570 pp.

Dujsebayeva, T. N., Ananjeva, N. B. and Miroschnichenko, L. V. 2007. Studies on specialized epidermal derivatives in iguanian lizards. I. Gross morphology, topography and histology of callose scales in the Asian Rock Agama, *Laudakia himalayana* (Steindachner, 1869) (Squamata: Agamidae). *Amphibia-Reptilia* 28(4):537-546

Eichwald, E. 1831. *Zoologia specialis, quam expositis animalibus tum vivis, tum fossilibus potissimuni rossiae in universum, et poloniae in specie, in usum lectionum publicarum in Universitate Caesarea Vilnensi*. Zawadski, Vilnae.

El-Toubi, M. R. 1947. Some observations on the osteology of the lizard, *Agama stellio* (Linnaeus). *Journ. Morph.* 81(2):135-149.

Engelmann, W. E. et. al. 1993. *Lurche und Kriechtiere Europas.* Neumann Verlag (Radebeul, Germany):440 pp.

Ficetola, G. F., Crottini, A., Casiraghi, M. and Padoa-Schioppa, E. 2010. New data on amphibians and reptiles of the Northern Areas of Pakistan: distribution, genetic variability and conservation issues. *North-Western Journal of Zoology* 6(1):1-12.

Fitzinger, L. 1843. *Systema Reptilium, fasciculus primus, Amblyglossae.* Braumüller et Seidel, Wien:106 pp.

Forcart, L. 1950. Amphibien und Reptilien von Iran. *Verh. naturf. Ges.* Basel 61:141-156.

Freynik, C. 2010. Über die eurasischen Hardune *Laudakia stellio stellio* (Linnaeus, 1758) und *Laudakia stellio daani* (Beutler and Frör, 1980). *Sauria* 32(1):13-29.

Frommer, J. 2009. Zu Besuch bei *Laudakia stellio* und *Pseudotrapelus sinaitus* in Jordanien. *Iguana-Rundschreiben* 22(1):5-14.

Frynta, D. et. al. 1997. Results of the Czech biological expedition to Iran. Part 1. Notes on the distribution of amphibians and reptiles. *Acta Soc. Zool. Bohem*. 61:3-17.

Göcmen, B., Tosunoglu, M. and Taskavak, E. 2003. A taxonomic comparison of the Hardun, *Laudakia stellio* (Reptilia, Agamidae), populations of southern Turkey (Hatay) and Cyprus. *Zoology of the Middle East* 28:25-32.

Golubev, M. 1998. *Agama chernovi* is a junior synonym of *Stellio bochariensis* (Sauria: Agamidae). *Hamadryad*, 22:119-120.

Gorman, G. C. and Shochat, D. 1972. Multiple lactate dehydrogenase alleles in the lizard *Agama stellio. Experientia* 28:351-353.

Gruber, U. and Fuchs, D. 1977. Die Herpetofauna des Paros-Archipels (Zentral-Ägäis). *Salamandra* 13(2):60-77.

Günther, A. 1860. Contributions to a knowledge of the reptiles of the Himalaya mountains. - I. Descriptions of the new species. II. List of Himalayan reptiles, with remarks on their horizontal distribution. *Proc. Zool. Soc. London* 1860:148-175.

Haas, G. 1951. A new subspecies of *Agama stellio* (Linnaeus) from Southern Israel (Negev), *Agama stellio brachydactyla*, subsp. nov. *Ann. Mag. Nat. Hist.* (12)4:1052-1053.

Haas, G. and Werner, Y. L. 1969. Lizards and snakes from Southwestern Asia, collected by Henry Field. *Bull. Mus. Comp. Zool.* Harvard 138:327-406.

Hall, W. P. 2009. Chromosome Variation, Genomics, Speciation and Evolution in *Sceloporus* Lizards. *Cytogenet. Genome Res.* 127:143-165.

Heidari, N., Cheatsazan, H., Kami, H. G. and Shafiei, S. 2010. Sexual dimorphism of the Black Rock Agama, *Laudakia melanura lirata* (Blanford, 1874) (Sauria: Agamidae). *Zoology in the Middle East* 49:49-54.

Henle, K. 1995. A brief review of the origin and use of *'stellio'* in herpetology and a comment on the nomenclature and taxonomy of agamids of the genus *Agama.* (sensu lato) (Squamata: Sauria: Agamidae). *Herpetozoa* 8(1/2):3-9.

Hillmann, B. 2003. Herpetologische Eindrücke aus dem Iran. *Elaphe* 11(4):61-71.

Honda, M. et. al. 2000. Phylogenetic relationships of the family Agamidae (Reptilia: Iguania) inferred from mitochondrial DNA sequences. *Zoological Science* 17:527-537.

Ilgaz, C., Baran, I., Avci, A., Olgun, K. and Kumlutas, Y. 2005. On *Laudakia caucasia* (Eichwald, 1831) (Sauria: Agamidae: *Laudakia*) specimens collected from northeastern Anatolia. *Russian Journal of Herpetology* 12(3):183-186.

Khan, B. 2012. An Introduction to Biodiversity of Gilgit-Baltistan. *Wildlife of Pakistan* 1 (1):18-20.

Leviton, A. E., Anderson, S. C., Adler, K. and Minton, S. A. 1992. *Handbook to Middle East Amphibians and Reptiles.* SSAR, Oxford, Ohio (Contr. to Herpetol. No. 8):252 pp.

Linnaeus, C. 1758. *Systema naturæ per regna tria naturæ, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis.* Tomus I. Editio decima, reformata. Laurentii Salvii, Holmiae. 10th Edition:824 pp.

Lorenz, D. 2006. Über Haltung und Zucht von *Laudakia caucasia* (Eichwald, 1831) im Freilandterrarium in Sachsen. *Elaphe* 14(4):21-24.

Lorenz, D. 2011. Haltung, Nachzucht und Verhalten von Kaukasusagamen. *Elaphe* 19(1):46-50.

Loveridge, A. 1920. Notes on East African lizards collected 1915-1919, with description of a new genus and species of skink and new subspecies of gecko. *Proc. Zool. Soc. London* 1920:131-167.

Loveridge, A. 1923. Notes on East African lizards collected 1920-1923 with the description of two new races of *Agama lionotus* Boulenger. *Proc. Zool. Soc.* London 1923:935-969.

Macey, J. R., Schulte, J. A., II, Ananjeva, N. B., Larson, A., Rastegar-Pouyani, N., Shammakov, S. M. and Papenfuss, T. J. 1998. Phylogenetic relationships among agamid lizards of the *Laudakia caucasia* species group: Testing hypotheses of biogeographic fragmentation and an area cladogram for the Iranian Plateau. *Mol. Phylogenet. Evol.* 10:118-131.

Macey, J. R., Schulte II, J. A. and Larson, A. 2000a. Evolution and phylogenetic information content of mitochondrial genomic structural features illustrated with acrodont lizards. *Syst. Biol.* 49:257-277.

Macey, J. R., Schulte II, J. A., Larson, A., Ananjeva, N. B., Wang, Y., Pethiyagoda, R., Rastegar-Pouyani, N. and Papenfuss, T. J. 2000b. Evaluating trans-Tethys migration: An example using acrodont lizard phylogenetics. *Syst. Biol.* (49):233-256.

Macey, J. R., Papenfuss, T. J., Kuehl, J. V., Fourcade, H. M. and Boore, J. L. 2004. Phylogenetic relationships among amphisbaenian reptiles based on complete mitochondrial genomic sequences. *Mol. Phylogenet. Evol.* (33):22-31.

Macey, R. J., Schulte II, J. A., Fong, J. J., Das, I. C. and Papenfuss, T. J. 2006. The complete mitochondrial genome of an agamid lizard from the Afro-Asian subfamily agaminae and the phylogenetic position of *Bufoniceps* and *Xenagama*. *Molecular Phylogenetics and Evolution* (39):881-886.

Manthey, U. and Schuster, N. 1999. *Agamen, 2. Aufl.* Natur und Tier Verlag (Münster):120 pp.

Marx, H. 1976. Supplementary catalogue of type specimens of reptiles and amphibians in Field Museum of Natural History. *Fieldiana Zoology* 69(2):33-94.

Minton, S. A. Jr. 1966. A contribution to the herpetology of West Pakistan. *Bull. Amer. Mus. Nat. Hist.* 134:29-184.

Mishagina, J. V. 2004. On diet of Turkestan agama (*Laudakia lehmanni*, Agamidae) and Turkestan rock gecko (*Cyrtopodion fedtschenkoi*, Gekkonidae) from the Kughitang ridge. *Probl. osvoenya pustyn*, 2004, (2):49-55.

Mishagina, J. V. 2005. Ant diet of *Laudakia lehmanni* (Nikolsky, 1896) (Reptilia, Agamidae) from the Kughitag Ridge. *Euroasian Entomological Journal* 4(2):121-124.

Moody, S. M. 1980. Phylogenetic and historical biogeographical relationships of the genera in the family Agamidae (Reptilia: Lacertilia). Ph.D. thesis, Univ. Michigan.

Müller, P. M. 2006. Die griechische Dracheninsel-Hardune (*Laudakia stellio*) auf Rhodos mit einer Anmerkung zu *Hemidactylus turcicus* als möglichen Predator für *Mesobuthus gibbosus anatolicus* [Skorpion]. *Iguana-Rundschreiben* 19(2):12-15.

Murthy, T. S. N. 2010. *The reptile fauna of India*. B.R. Publishing, New Delhi:332 pp.

Nevo, E. 1981. Genetic variation and climatic selection in the lizard *Agama stellio* in Israel and Sinai. *Theoretical and Applied Genetics* 60(6):369-380.

Nikolsky, A. M. 1896. *Diagnoses reptilium et amphibiorum novorum in Persia orientali a N. Zarudny collectorum. Annuaire Musée Zoologique de l'Académie Impériale des Sciences de St.-Pétersbourg*, 1:369-372.

Nikolsky, A. M. 1897a. *Stellio bochariensis* n. sp. *Annuaire Musée Zoologique de l'Académie Impériale des Sciences de St.-Pétersbourg* 2:159-161.

Nikolsky, A. M. 1897b. *Les reptiles, amphibiens et poissons recueillis (part.) Mr. N. Zaroudny dans la Perse orientale [in Russian]. Annuaire Musée Zoologique de l'Académie Impériale des Sciences de St.-Pétersbourg* 2:306-348.

Nikolsky, A. M. 1915. *Fauna Rossii sopredel. Stran, Rept. Vol. 1 [Reptiles of Russia and adjacent countries. Reptiles (Reptilia). Vol. 1. Chelonia and Sauria*; in Russian]. Imper. Acad. Sci., Petrograd, 532 pp. [Translated from Russian by the Israel Program for Scientific Translations 1963]

Panov, E. N., and Zykova, L. Y. 1995. Variability and differentiation of populations in *Laudakia caucasia* (Reptilia, Agamidae) complex. *Russian Academy of Sciences. Advances in Current Biology* 115(3):293-315.

Panov, E. N., Zykova, L. Y. 1998. Differentiation and interrelations of two representatives of *Laudakia stellio* complex (Reptilia: Agamidae) in Israel. *Russ. J. Herpetol.* 4(2):102-114.

Parker, H. W. 1935. A new melanic lizard from Transjordania, and some speculations concerning melanism. *Proc. Zool. Soc.* London 1935:137-142.

Rastegar-Pouyani, N. and Nilson G. 2002. Taxonomy and biogeography of the Iranian species of *Laudakia* (Sauria: Agamidae). *Zoology in the Middle East* 26:93-122.

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

Roitberg, E. S., Mazanaeva, L. F., Ilyina, E. and Orlova, V. F. 2000. Die Echsen Dagestans (Nordkaukasus, Russland): Artenliste und aktuelle Verbreitungsdaten (Reptilia: Sauria: Gekkonidae, Agamidae, Anguidae, Scincidae et Lacertidae). *Faunist. Abh. Staatl. Mus. Tierk.* Dresden 22:(8).

Schlüter, U. 2010. Der Herpetofauna von Symi [Griechenland]. *Elaphe* 18(4):62-67.

Schlüter, U. 2011. Die Herpetofauna von Rhodos. *Reptilia* (Münster) 16(88):66.

Schmidt, K. P. 1926. Amphibians and Reptiles of the James Simpson-Roosevelt Asiatic Expedition. *Field Mus. Nat. Hist., Zool.* Ser. 12:167-173.

Schmidt, K. P. 1939. Reptiles and amphibians from Southwestern Asia. *Pub. Field Mus. Nat. Hist., Zool.* 24:49-92.

Sindaco, R. and Jeremcenko, V. K. 2008. *The reptiles of the Western Palearctic*. Edizioni Belvedere, Latina (Italy):579 pp.

Sindaco, R., Venchi, A., Carpaneto, G. M. and Bologna, M. A. 2000. The Reptiles of Anatolia: a Checklist and Zoogeographical analysis. *Biogeographia* 21-2000:441-554.

Smith, M. A. 1935. *The fauna of British India, including Ceylon and Burma. Reptiles and Amphibia, Vol. II. Sauria.* Taylor and Francis, London:440 pp.

Sowig, P. 1989. Der Hardun, *Agama stellio* (Linnaeus 1758) auf der Ionischen Insel Paxos gesichtet. *Salamandra* 25(2):117-119.

Stoliczka, F. 1871. Notes on new or little-known Indian lizards. *Proc. Asiat. Soc. Bengal* (Calcutta)1871:192-195.

Stoliczka, F. 1872. Notes on some new species of Reptilia and Amphibia collected by Dr. W. Waagen in north-Western Punjab. *P. Asiat. Soc. Bengal* (Calcutta)1872:124-131.

Szczerbak, N. N. 2003. *Guide to the Reptiles of the Eastern Palearctic*. Krieger, Malabar, FL, USA:260 pp.

Thieme, W. 1980. Die Kaukasusagame, *Agama caucasica*, in der Natur und im Terrarium. *Herpetofauna* 2(8):27-29.

Trapp, B. 2006. Dünne Luft - eine Exkursion ins Hochland des Irans und die Türkei. *Reptilia* (Münster) 11(3):40-49.

Tuniyev, B. S., Atayev, C. and Shammakov, S. 1991. *Stellio erythrogaster nurgeldievi* ssp. nov. (Agamidae, Sauria) - A new subspecies from the eastern Kopet-Dagh. *Izv. Akad. Nauk. Turkm.* SSR 6:50-60.

Venugopal, P. D. 2010. An updated and annotated list of Indian lizards (Reptilia:Sauria) based on a review of distribution records and checklists of Indian reptiles. *Journal of Threatened Taxa* 2(3):725-738.

Waltner, R. C. 1975. Geographical and altitudinal distribution of amphibians and reptiles in the Himalayas Cheetal (Dehra Dun, India) 16(1):17-25; 16(2):28-36; 16(3):14-19; 16(4):12-17.

Werner, F. 1897. Über einige noch unbeschriebene Reptilien und Batrachier. *Zool. Anz.* 20:261-267.

Werner, F. 1899. Beschreibung neuer Reptilien und Batrachier. *Zool. Anz.* 22:479-484.

Werner, F. 1917. Reptilien aus Persien (Provinz Fars). Verhandlungen der Kaiserlich-Königlichen Zoologisch-Botanischen. *Gesellschaft in Wien* 67:191-220.

Werner, Y. L. 1971. Lizards and snakes from Transjordan, recently acquired by the British Museum (Natural History). *Bull. of the British Museum* (Natural History), Zoology 21:213-256.

Werner, Y. L. 1992. Identity and distribution of Agama *stellio picea* Parker (Sauria: Agamidae), endemic to the volcanic desert of Jordan. *Zoology in the Middle East* 6:41-44.

Wettstein, O. v. and Löffler, H. 1951. Ergebnisse der österreichischen Iran-Expedition 1949/50. Sitzungsber. *Akad. Wiss. Wien, math.-nat.* Kl., Abt. (1)160:427-448.

Xyda, A. 1983. A biometric approach to the differentiation of the island populations of the lizard *Agama stellio* Rapports et Proce's Verbaux des Re´unions. *Commission Internationale pour l'Exploration Scientifique de la Mer Mediterrane´e* 28(8):113-116.

Zhao, E. M. 1998a. A new species of *Laudakia* from Xizang (Tibet) (Sauria: Agamidae). *Zoological Research*, 19(5):401-404.

Zhao, E. M. 1998b. A new species of the genus *Laudakia* from Xizang (Tibet) Autonomus Region. *Acta Zootaxonomica Sinica*, 23(4):440-444.

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

Australasian Journal of Herpetology 14:24-26.
Published 30 June 2012.

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

Two new subspecies of Frill-necked Lizards (Squamata: Sauria: Agamidae).

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Received 15 March 2012, Accepted 8 April 2012, Published 30 June 2012.

ABSTRACT

Geographical variants of the Frill-necked Lizard *Chlamydosaurus kingii* Gray, 1825 have been recognized for many years including within the pet trade in Europe and the USA. In spite of this, there has been no recognition of the various taxonomic units beyond the single described species.

Taking a conservative position, this paper reviews the monotypic genus and formally names two new subspecies, namely *Chlamydosaurus kingii pughae* subsp. nov. from New Guinea and *Chlamydosaurus kingi mickpughi* from eastern Queensland.

Keywords: Taxonomic revision; Frill-necked Lizard; new subspecies; *Chlamydosaurus*; *kingii*; *pughae*; *mickpughi.*

INTRODUCTION

One of the best known species of lizard in Australia is the Frill-necked Lizard *Chlamydosaurus kingii* Gray, 1825, even gracing the rear of the Australian 2 cent coin until it was removed from circulation in the 1990's.

Unlike any other Agamid in Australia, it's name comes from the unusual large frill around its neck, which is rarely opened and usually sits unfolded against the lizard's upper body.

Adults get to about 75 cm in total length, although specimens in excess of 90 cm are reported.

The neck frill is supported by long spines of cartilage which are connected to the jaw bones. When the lizard is frightened, it gapes its mouth, exposing a bright pink or yellow lining; the frill flares out as well, displaying brighter scales, the color of which vary geographically, but in most populations are orange to red.

In common with several other Australian genera of Agamid, this species uses bipedal motion, running on its hind legs to flee potential predators. The motion has led to the name bicycle lizard being applied to it

The frill-necked lizard is found mainly in the dry tropics regions of Australia and southern New Guinea.

In Australia it is found from Kimberley Region, Western Australia in an arc across the top of the Northern Territory south along the Queensland coast, although they are not commonly seen in the humid south-east.

While the lizard rests in trees, relying on camouflage for protection, they are rarely seen by people. However when they are active on the ground, this is when most are seen.

In other ways, these lizards are typical of the Agamid family. They are opportunistic feeders, but mainly insectivorous and reproduce by laying eggs.

Males engage in combat and as a rule are larger than females.

There have been numerous published studies on these lizards or relevant to them, including those of Badger and Netherton (2002), Beddard (1905), Bonetti (2002), Boulenger (1885, 1889), Broom (1898), Cogger (2000), de Rooij (1915), Duméril and Bibron (1837), Escoriza Boj (2005), Garman (1901), Gray (1825, 1826), Günther and Kapisa (2003), Hauschild and Bosch (1997), Hörenberg (2004, 2008), Hoser (1989), Kent (1895), Macey et. al. (2000), Manthey and Schuster (1999), Middleton et. al. (1997), Reisinger (1995), Ujvari and Madsen (2008), Ujvari et. al. (2007, 2008).

THE TAXONOMIC POSITION OF THE SPECIES *C. KINGII.*

For a long time it's been known that specimens from coastal Queensland are smaller and greyer in colouration than the nominate form from north-west Australia.

Specimens from Island New Guinea, from the Western District of PNG and in the vicinity of Merauke, Irian Jaya are also smaller than the nominate form, but have colouration more in line with specimens from north-west Australia.

In the herpetological pet trade, dealers and keepers have for a long time distinguished the regional variants.

Wells and Wellington (1985) wrote: "We herein regard *C. kingii* as a species complex and recommend taxonomic and ecological investigation."

While they may in fact be correct, I have taken a conservative position and recognized the three most obviously divergent forms as subspecies.

The reason for the treatment of the three forms as subspecies is based on the reasoning that it is assumed the intergrade populations either may occur or may have occurred in the very recent geological past, even though at the present time there is no evidence of this.

A perusal of the databases for collection of specimen records of major Australian museums yields about 958 specimens in collections and accurate locality sight records.

Included in this database of records are so-called “wide” specimens as in either erroneous records, or those arising from lizards that have obviously been transported a long way by people.

This includes records from South Australia (either misidentified *Pogona* or similar species or “vagrants”) and one record from Ambon, Indonesia for a specimen in a United States Museum.

Collection records cluster in three main regions. These are northwest Australia, including the top third of the Northern Territory and adjacent parts of the Kimberley Ranges in Western Australia. The relative scarcity of collection records for the region near the Golf of Carpentaria probably reflects a lack of collecting as opposed to a lack of Frill-necked Lizards.

There is a well-defined gap in distribution (based on collection records) commencing from the south-west of Cape York and running south, which apparently splits the western and eastern populations of the species.

This gap may be real, or it may be a reflection of a lack of collection in the region. This uncertainty is why I have opted to classify the different animals from the coastal regions of eastern Queensland as subspecies rather than full species.

In terms of the southern New Guinea population, it is clearly reproductively isolated from Australian specimens and so there are good grounds to classify it as a full species.

However I defer from this on several grounds, including the fact that in the recent geological past (well within the last 25,000 years), both Australia and New Guinea were connected by a broad land bridge and there was no known impediment to the lizards having contact. Further noted is that the species has a habitat preference for lowland savannahs and the like, which was presumably the habitat in the now inundated region of water. It should also be realized that these lizards are mobile and do invade habitats as they become available. A good example is seen when numerous lizards recolonize areas recently burnt.

On the basis of all the preceding, the New Guinea form and the coastal Queensland form are described herein as new subspecies according to the Zoological Code (Ride et. al. 1999).

CHLAMYDOSAURUS KINGII KINGII

Diagnosis: The nominate form is separated from the other two on the basis of coloration of the open, extended frill.

In this taxon it has large areas of red and orange, whereas this is not the case in the other two subspecies, which in general have silvery or greyish frills.

When *C. kingii kingii* lightens on the cheeks or inner frill, the colour is a light yellow as opposed to white.

When *Chlamydosaurus kingii pughae* subsp. nov. has white on the inner frill, it does not have white flecks on the outer frill as seen in *C. kingii mickpughi* subsp. nov..

The nominate form is also the largest of the three subspecies, although *C. kingii mickpughi* sp. nov. from coastal Queensland and nearby usually fits within the same average size-class range.

CHLAMYDOSAURUS KINGII PUGHAE SUBSP. NOV.

Holotype: A specimen in the Australian Museum, Sydney, NSW, Australia, specimen number R66770 from Boset [=Bosset], Fly River, Western District, Papua New Guinea Lat. 7° 14' S, Long. 141° 05' E. The Australian Museum is a government-owned facility that allows researchers access to its collection.

Paratypes: The first paratype is a specimen in the Australian Museum, Sydney, NSW, Australia, specimen number: R40715 from Kuru [Village], Western District, Papua New Guinea, Lat. 8°55' S, Long. 143°03' E. The second paratype is a specimen in the Australian Museum, Sydney, NSW, Australia, specimen number: R40716 from New Guinea, Wim, Western District, Papua New Guinea, Lat. 8°46' S, Long. 142°47' E.The Australian Museum is a government-owned facility that allows researchers access to its collection.

Diagnosis: This is the New Guinea form of *C. kingii.*

Chlamydosaurus kingii pughae subsp. nov. is most easily separated from the nominate Australian form on the basis of colour. *C. kingii kingii* has red and orange on its open frill, whereas *Chlamydosaurus kingii pughae subsp. nov.* have a marbled grey frill with a hint of brown.

In turn Eastern Queensland (Australian) *C. kingii mickpughi* subsp. nov. are separated from both other taxa by the white flecks in the open frill and large white patches on the cheeks and inner frill.

C. kingii mickpughi sp. nov. and *C. kingii kingii* both from Australia grow larger than the New Guinea form (*Chlamydosaurus kingii pughae* subsp. nov.) and also have a relatively larger frill than the New Guinea form.

When *Chlamydosaurus kingii pughae* subsp. nov. has white on the inner frill, it does not have white flecks on the outer frill as seen in *C. kingii mickpughi* subsp. nov..

When *C. kingii kingii* lightens on the cheeks or inner frill, the colour is a light yellow as opposed to white.

Chlamydosaurus kingii pughae subsp. nov. is only known from southern New Guinea in the region from about Merauke in Irian Jaya, eastward to the Fly River basin and then patchily distributed in suitable savannah habitat east from there.

In Europe and the USA, the most commonly kept form by hobbyists is the subspecies *Chlamydosaurus kingii pughae* subsp. nov..

Etymology: Named in honour of Mip Pugh of Geelong, Victoria, Australia, known to many as the dragon lady, in recognition of her work spanning decades breeding reptiles, most notably dragons such as Bearded Dragons, Frill-necked and others.

CHLAMYDOSAURUS KINGII MICKPUGHI SUBSP. NOV.

Holotype: A specimen in the Australian Museum, Sydney, NSW, Australia, specimen number: R10249 from Yeppon Crossing, Queensland, Australia, Lat. 23°08' S, Long. 150°44' E.

The Australian Museum is a government-owned facility that allows researchers access to its collection.

Paratypes: The first paratype is a specimen in the Australian Museum, Sydney, NSW, Australia, specimen number: R20762 from Bundaberg, Queensland, Lat. 24°52' S, Long. 152°21' E.

The Australian Museum is a government-owned facility that allows researchers access to its collection.

The second paratype is a specimen in the Natural History Museum of Los Angeles, USA, specimen number: R74375 from 6 miles south-west of Bundaberg, Queensland, Lat. 24°92’ S, Long. 152°28’ E.

The Natural History Museum of Los Angeles is a government-owned facility that allows researchers access to its collection.

The third paratype is a specimen in the California Academy of Sciences, USA, specimen number: 77531, from 15 miles South of Duaringa, Queensland, Australia, Lat. 23°86’ S, Long. 149°57’ E.

The fourth paratype is a specimen in the California Academy of Sciences, USA, specimen number: 77532, from 15 miles South of Duaringa, Queensland, Australia, Lat. 23°86’ S, Long. 149°57’ E.

The California Academy of Sciences is a government-owned facility that allows researchers access to its collection.

Diagnosis: *C. kingii mickpughi* sp. nov. is the form of *C. kingii* from the coast of north Queensland and adjacent areas. It is most easily separated from the other two subspecies by the following suite of characters: The color of the frill when extended is silverish, as opposed to containing large areas of red, brown or orange. The cheeks and inner frill have white patches (unlike the other two subspecies) and there are white flecks on the frill.

When *C. kingii kingii* lightens on the cheeks or inner frill, the colour is a light yellow as opposed to white.

When *Chlamydosaurus kingii pughae* subsp. nov. has white on the inner frill, it does not have white flecks on the outer frill as seen in *C. kingii mickpughi* subsp. nov..

In terms of size, adults are in the same size range as specimens from elsewhere in Australia, but on average larger and more robust than New Guinea specimens, now attributable to the subspecies *Chlamydosaurus kingii pughae* subsp. nov..

Etymology: Named in honor of Mick Pugh of Geelong, Victoria, Australia.

He has been a valued member of the Australian herpetological community for decades and was a foundation member of the Victorian Association of Amateur Herpetologists, taking over the role of President sometime later in the 1990's a position he has held for more than a decade.

He poured a huge amount of time and money into promotion of the society and its virtues and never sought any benefits in return.

REFERENCES CITED

Badger, D. and Netherton, J. 2002. *Lizards: A natural History of some uncommon creatures, extraordinary Chameleons, Iguanas, Geckos and more.* Voyageur Press, Stillwater, Minesota, USA:160 pp.

Beddard, F. E. 1905. A contribution to the anatomy of the frilled lizard (*Chlamydosaurus kingi*) and some other Agamidae. *Proc. Zool. Soc. London* 1905:9-22.

Bonetti, M. 2002. 100 *Sauri.* Mondadori (Milano):192 pp.

Boulenger, G. A. 1885. Catalogue of the Lizards in the British Museum (Nat. Hist.) I. Geckonidae, Eublepharidae, Uroplatidae, Pygopodidae, Agamidae. London:450 pp.

Boulenger, G. A. 1895. Remarks on the failure of certain cranial characters employed by Prof. Cope for distinguishing lizards from snakes. *Ann. Mag. nat. Hist.* (6)16:366-367.

Broom, R. 1898. On the lizards of the Chillagoe District, North Queensland. *Proc. Linn. Soc. NSW.* 22:639-645.

Cogger, H. G. 2000. *Reptiles and Amphibians of Australia* (Sixth edition). Ralph Curtis Publishing, Sanibel Island:808 pp.

de Rooij, N. D. 1915. *The Reptiles of the Indo-Australian Archipelago. I. Lacertilia, Chelonia, Emydosauria.* Leiden (E. J. Brill):xiv+384 pp.

Duméril, A. M. C. and Bibron, G. 1837. Erpétologie Générale ou Histoire Naturelle Complete des Reptiles. Vol. 4. Libr. Encyclopédique Roret, Paris:570 pp.

Escoriza Boj, D. 2005. Australia. Reptiles and Amphibians, Part 2: Desert and tropical savanna. *Reptilia* (GB) (41):52-57.

Garman, S. 1901. Some reptiles and batrachians from Australasia. *Bull. Mus. Comp. Zool.* Harvard 39:1-14.

Gray, J. E. 1825. A synopsis of the genera of reptiles and Amphibia, with a description of some new species. *Annals of Philosophy* 10:193-217.

Gray, J. E. 1826. Reptilia. Appendix in: King, P. P. *Narrative of a survey of the Intertropical and Western Coasts of Australia performed between the years 1818 and 1822.* London: John Murray 2:424-434

Günther, R. and Kapisa, M. 2003. Allochtone Populationen der Kragenechse, *Chlamydosaurus kingii* Gray, 1825, und des Papua-Wasserdrachens, *Lophognathus temporalis* (Günther, 1867), auf der Insel Biak. *Sauria* 25(2):31-35.

Hauschild, A. and Bosch, H. 1997. *Bartagamen und Kragenechsen. Natur und Tier Verlag* (Münster):95 pp.

Hörenberg, T. 2004. Ein echter Saurier im Terrarium: Die australische Kragenechse (*Chlamydosaurus kingii*). *Reptilia* (Münster) 9(50):68-73.

Hörenberg, T. 2008. *Die Kragenechse* Chlamydosaurus kingii. Natur und Tier Verlag, Münster:64 pp.

Hoser, R. T. 1989. *Australian Reptiles and Frogs.* Pierson Publishing, Sydney:238 pp.

Kent, W. S. 1895. Observations on the Frilled Lizard, *Chlamydosaurus kingii. Proc. Zool. Soc. London* 1895:712-719.

Macey, J. R., Schulte, J. A., Larson, A., Ananjeva, N. B., Wang, Y., Pethiyagoda, R. and Rastegar-Pouy, N. 2000. Evaluating trans-Tethys migration: an example using acrodont lizard phylogenetics. *Syst. Biol.* 49(2):233-256.

Manthey, U. and Schuster, N. 1999. *Agamen, 2. Aufl. Natur und Tier Verlag* (Münster):120 pp.

Middleton, S., Fitzgerald, A. and Pye, G. 1997. Captive breeding of the Frilled Lizard, *Chlamydosaurus kingii. Monitor: Journal of the Victorian Herpetological Society* 9(1):6-7.

Reisinger, M. 1995. Erfahrungen bei der Haltung und Vermehrung der Kragenechse *Chlamydosaurus kingi. Elaphe* 3(3):16-20.

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

Ujvari, B. and Madsen, T. 2008. Complete mitochondrial genome of the frillneck lizard (*Chlamydosaurus kingii*, Reptilia; Agamidae), another squamate with two control regions. *Mitochondrial DNA* 19(5):465-470.

Ujvari, B., Dowton, M. and Madsen, T. 2007. Mitochondrial DNA recombination in a free-ranging Australian lizard. *Biol. Lett.* 3:189-192.

Ujvari, B., Dowton, M. and Madsen, T. 2008. Population genetic structure, gene flow and sex-biased dispersal in frillneck lizards (*Chlamydosaurus kingii*). *Molecular Ecology* 17:3557-3564.

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

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Online journals (this issue) appear a month after hard copy publication.

Minimum print run of first printings is always at least fifty hard copies.

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

Australasian Journal of Herpetology 14:27-30.
Published 30 June 2012.

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

A four-way division of the skink genus *Chalcides* Laurenti, 1768 (Squamata: Sauria: Scincidae).

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Received 16 March 2012, Accepted 12 April 2012, Published 30 June 2012.

ABSTRACT

The Skink genus *Chalcides* Laurenti, 1768 has been the subject of detailed morphological and molecular studies.

A recent analysis by Carranza et. al. (2008) found the genus as currently understood comprised four distinct clades. This included the three species formerly included in the genus *Sphenops* Wagler, 1830, which split between two different clades within the totality of *Chalcides.*

The authors chose to merge the widely used *Sphenops* within *Chalcides* to create in effect a supergenus.

Revisiting the data of Carranza et. al. (2008) and other authors, this paper chooses the sensible alternative position and one consistent with recent splits of the closely related genus *Eumeces* (see Griffith et. al. 2000 and Schmitz et. al. 2004), to split *Chalcides* Laurenti, 1768 in four ways.

Effectively copying the phylogenetic arrangement of Carranza et. al. 2008, but including taxa not tested by them, the split is done by using existing and available names for three groups, namely *Chalcides*, *Sphenops* and *Allodactylus* Lataste, 1876.

A new genus is named and defined according to the Zoological Code, namely *Elfakhariscincus* gen. nov. for the so-called *ocellatus* species group.

Keywords: Taxonomic revision; new genus; skink; *Elfakhariscincus*; *Chalcides*; *Sphenops*; *Allodactylus*; *ocellatus*.

INTRODUCTION

The old-world genus of skinks *Chalcides* Laurenti, 1768 is found in southern Europe, northern Africa and across to nearby parts of Asia.

Component species are fairly typical of skinks in that they are small to medium sized lizards, with large smooth and shiny scales. The head is smallish to medium, the body slightly to very elongate and the neck relatively thick. They feed on a variety of items mainly including invertebrates.

The species within the genus *Chalcides* range from terrestrial species with five-digited feet to elongate burrowing species with reduced limbs and number of digits.

Due to the variable nature of the group, some generic names have been proposed for given species. Notably these include, *Sphenops* Wagler, 1830 for the burrowing form *sepsoides* (with two phenotypically similar species later added to the genus) and *Allodactylus* Lataste, 1876 for the species *Allodactylus delislii* Lataste, 1876, physically intermediate in many respects to the nominate form for *Chalcides* and the species *Lacerta ocellata* Forskal 1775, since placed in the genus *Chalcides.*

For most of the 1900's the only genera recognized were *Chalcides* and *Sphenops*, with *Allodactylus* disappearing into the synonymy of *Chalcides* almost as soon as the name was proposed.

More recently however there have been a number of phlogenys proposed for the genus *Chalcides* sensu lato, dividing the genus into up to five groups based on morphological characteristics, including Pasteur (1981) and then Caputo (2000).

Some recent molecular studies on limited numbers of taxa within the genus *Chalcides* as generally understood yielded ambiguous results that didn't in any significant way yield a dissenting position (e.g. Brandley et. al. 2005), although closer scrutiny of these results did show that while the taxon *ocellata* was close to other *Chalcides* and grouped closest to these lizards as opposed to any others, an argument could have been raised to place *ocellata* into another genus on the grounds of consistency with other genera tested.

Carranza et. al. (2008) did a broad study of *Chalcides* and *Sphenops* as popularly defined in 2008 and found that the three species assigned to *Sphenops*, namely *sepsoides*, *boulengeri* and *sphenopsiformis* all were phylogentically nestled within *Chalcides* species. More significantly, *sphenopsiformis* was placed within a separate species group within *Chalcides*.

Carranza et. al. (2008) found *Chalcides* had four well-defined phylogenetic groups, including the two containing *Sphenops* species and a third containing the type for *Chalcides.*

"*Chalcides ocellatus*' was treated as a single species, listed in their paper as a "species complex" and it alone consisted the fourth phylogenetic lineage.

Rather than divide the genus *Chalcides* along the four obvious divisions that they detected, the authors merged *Sphenops* into *Chalcides* to create one extremely large genus.

Separately and earlier the closely related genus *Eumeces* Weigmann, 1834 was reviewed by two groups of authors (Griffith et. al. 2000 and Schmitz et. al. 2004) and who both chose to split the obviously paraphyletic genus.

To maintain the obviously paraphyletic assemblage *Chalcides* is clearly inconsistent in terms of the above and therefore there is a strong argument to split the group up.

In terms of the species *ocellatus*, it is clearly a composite group of taxa (more than one species) including those forms recognized below. Therefore the arguments against creating a monotypic genus for a single species effectively evaporate.

As a result a new genus is created for the taxon *ocellatus* and all other closely related species, named and defined according to the Zoological Code (Ride et. al. 1999).

As the other three named genera have already been defined previously and the definition of the new genus for *ocellatus*, namely *Elfakharsicincus* gen. nov., separates the taxa within the new genus from all the other species, there is no need to redefine those other genera here. Therefore I merely list component species within each of the other groups for the benefit of those wanting to know which species have been assigned to which genus.

However contemporary diagnoses for each of the other genera, based on molecular data is effectively provided by Carranza et. al. (2008).

Other important published studies and publications in terms of the classification of the skinks in the genus *Chalcides sensu lato* including specifically in relation to the type species for the four genera listed below, include, Anderson (1896), Boulenger (1920), Boulenger (1887, 1890, 1896, 1898, 1918), Brown et. al. (2000), Caputo (1993, 2003, 2004), Caputo et. al. (1995, 1999, 2000), Carrenza et. a. (2008), Duméril and Bibron (1839), Forskål (1775), Giacomini (1891, 1906), Geniez et. al. (2004), Greenbaum (2005), Greenbaum et. al. (2006), Greer (1991), Greer et. al. (1998), Lanza (1957), Loveridge (1936), Mermer (1996), Pasteur (1981), Pollo (1997), Rösler and Wranik (2009), Schleich et. al. (1996), Schlüter (2006), Sindaco and Jeremcenko (2008), Smith (1935), Vigni (2006), Werner (1968).

Below the formal description of *Elfakharsicincus* gen. nov. is a list of the three other species groups (by genus name) that were formally in the genus *Chalcides.*

It should however be noted that a number of described forms, many named as subspecies, but in fact full species have been omitted from the lists. Furthermore, as indicated by Carranza et. al. (2008) and others, there are numerous undescribed species within the group of lizards formerly included within *Chalcides sensu lato.*

GENUS *ELFAKHARISCINCUS* GEN. NOV.

Type species: *Lacerta ocellata* Forskal, 1775

(Known in most contemporary texts as *Chalcides ocellatus* or the Ocellated Skink).

Diagnosis: Some authors have regarded the type species as either one species or a so-called "species complex", although recent studies by Carranza et. al. (2008) and others have confirmed that there are several species within this taxon as generally recognized.

Many have been formally described and named and those generally recognized are placed in the genus content list below.

All lizards within genus *Elfakharsicincus* gen. nov. are physically similar and have a more stout body than all other species within *Chalcides sensu lato.* In reflection of this physical reality, Caputo et. al. (2000), found they had considerably larger ova (relative size) than all (other) *Chalcides* species and produced a considerably smaller number of young (1-6), versus 2-22 in the other species.

Those numbers are notable noting that *Elfakharsicincus* gen. nov. are larger lizards and based on other variables would otherwise be expected to have larger litters.

As adults, *Elfakhariscincus* gen. nov. reach about 15-30 cm (6-12 inches) in length, with variation by location both within species and between species. They are recognizable by their small head, moderately elongated and cylindrical body and pentadactyl limbs, all of which contrasts with most other species formerly placed within the genus *Chalcides* sensu lato, which are considerably more elongate and tend to have reduced limbs and number of digits to enable them to burrow more easily.

Elfakhariscincus gen. nov. is separated from all other skinks formerly placed in the genus *Chalcides sensu lato* by having 34-44 presacral vertebrae, as opposed to 47-63 in all other species within *Chalcides* sensu lato.

Elfakhariscincus gen. nov. is further separated from all other skinks formerly placed in the genus *Chalcides sensu lato* by the following suite of characters: Up to 30 cm in length, of which the complete tail may be about half, although is sometimes less. The tail is noticeably considerably thinner than the rest of the body and also diagnostic of this genus. The loreal scale borders the second and third labials and is considerably larger than the adjacent supralabials, there are 28-38 mid-body scale rows.

Color varies considerably geographically, but ranges from buff, pale brown or grey, with or without a pattern of dark-edged occeli or short pale streaks bordered by dark pigment. The dark areas often join together to produce irregular crossbands. Some specimens have a pale dorso-lateral stripe on each side, bordered by a dark streak on the flank.

These skinks are very agile and are prefer dry to arid habitats. These lizards are often commensals of humans, liking to hide under man-made rubbish such as sheet metal, remains of broken buildings and the like. There is reason to believe that populations in many areas of the current distribution have been founded from specimens moved about by humans (Carranza et. al. 2008).

As inferred already, coloration varies between species and individuals within a species, including in terms of localities.

The genus is found in southern Europe to the Middle-east and adjacent parts of Asia and also northern Africa. The status of the species *Sphenocephalus pentadactylus* Beddome, 1870 from the Western Ghats of India is uncertain and it has only provisionally been placed in the genus *Elfakhariscincus* gen. nov..

The genus *Sphenocephalus* Agassiz, 1838 identifies an extinct genus of ray-finned fish that lived during the Cretaceous period. Therefore that name is not available for this genus of lizards.

Hoser 2012 - Australasian Journal of Herpetology 14:27-30.

Etymology: Named in honor of three brothers, Moses, Danny and Ackram El-Fahkri of Northcote, Melbourne, Victoria, Australia for numerous services to the Victorian Taxi Industry and for extremely brave efforts in fighting corruption within the Victorian Taxi Directorate (VTD) and predecessor Vicroads in the 1980's and 1990's including against corrupt VTD lawyers Terry O'Keefe, David Robby and John Connell, and their army of corrupt and dishonest "enforcement officers", better described as violent thugs, who broke every conceivable rule, including George Olsen, Roger Bowman, John Brentnall, John Perry, Len Hodgens, Gordon Alliston, Geoffrey Goodson, Derry Ashton, Andrew Pingo and Arnold Howard (see Hoser 1995 for details).

Content of Genus *Elfakhariscincus* gen. nov.

Elfakhariscincus ocellatus (Forskal, 1775) (Type species).

Elfakhariscincus bottegi (Boulenger, 1898).

Elfakhariscincus ragazzii (Boulenger, 1890).

Elfakhariscincus ebneri (Werner, 1931).

Elfakhariscincus levitoni (Pasteur, 1978).

Elfakhariscincus pulchellus (Mocquard, 1906).

Elfakhariscincus thierryi (Tornier, 1901).

Elfakhariscincus pentadactylus (Beddome, 1870).

Content of Genus *Allodactylus* Lataste, 1876

Allodactylus delislei Lataste, 1876 (Type species).

Allodactylus coeruleopunctatus (Salvador, 1975).

Allodactylus manueli (Hediger, 1935).

Allodactylus mionecton (Böttger, 1874).

Allodactylus montanus (Werner, 1931).

Allodactylus polylepis (Boulenger, 1890).

Allodactylus sexlineatus (Steindachner, 1891).

Allodactylus viridanus (Gravenhorst, 1851).

Allodactylus armitagei (Boulenger, 1920).

Allodactylus sphenopsiformis (Duméril, 1856) .

Content of Genus *Chalcides* Laurenti, 1768

Chalcides chalcides (Linnaeus, 1758) (Type species).

Chalcides guentheri Boulenger, 1887.

Chalcides mertensi Klausewitz, 1954.

Chalcides minutus Caputo, 1993.

Chalcides pseudostriatus Caputo, 1993.

Chalcides striatus (Cuvier, 1829).

Chalcides mauritanicus (Duméril and Bibron, 1839).

Content of Genus *Sphenops* Wagler, 1830

Chalcides sepsoides (Audouin, 1829) (Type species).

Chalcides bedriagai (Bosca, 1880).

Chalcides colosii (Lanza, 1957).

Chalcides boulengeri (Anderson, 1892).

Chalcides parallelus (Doumergue, 1901).

Chalcides lanzai (Pasteur, 1967).

REFERENCES CITED

Anderson, J. 1896. *A Contribution to the Herpetology of Arabia, with a preliminary list of the reptiles and batrachians of Egypt.* London, R. H. Porter:124 pp.

Beddome, R. H. 1870. Descriptions of some new lizards from the Madras Presidency. *Madras Monthly J. Med. Sci.* 1:30-35.

Boulenger, E. G. 1920. On some lizards of the genus *Chalcides. Proc. R. Soc.* Lond. B 1920:77-83.

Boulenger, G. A. 1887. *Catalogue of the lizards in the British Museum* (Natural History), second ed., vol. 3. Lacertidae, Gerrhosauridae, Scincidae, Anelytropidae, Dibamidae, Chamaeleontidae. Trustees of the British Museum, London.

Boulenger, G. A. 1890. On the varieties of *Chalcides ocellatus* Forskål. *Ann. Mag. Nat. Hist.* 3(6):444-445.

Boulenger, G. A. 1896. A list of reptiles and batrachians collected by Dr Ragazzi in Shoa and Eritrea. *Ann. Mus. Civ. Stor. Nat.* Genova (2nd Series, 16) 36:545-554.

Boulenger, G. A. 1898. Concluding report on the late Capt. Bottego's collection of reptiles and batrachians from Somaliland and British East Africa. *Ann. Mus. Civ. Stor. Nat.* Genova 38:715-723 (2nd Series, 18).

Boulenger, G. A. 1918. In Bate, D.M.A. On a new genus of extinct muscardine rodent from the Balearic Islands. *Proc. Zool. Soc. Lond.* 1918, 209-222.

Brown, R. P., Campos-Delgado, R. and Pestano, J. 2000. Mitochondrial DNA evolution and population history of the Tenerife skink *Chalcides viridanus. Mol. Ecol.* 9:1061-1067.

Caputo, V. 1993. Taxonomy and evolution of the *Chalcides chalcides* complex (Reptilia, Scincidae) with description of two new species. *Bol. Mus. Reg. Sci. Nat., Torino* 11:47-120.

Caputo, V. 2004. The cranial osteology and dentition in the scinicid lizards of the genus *Chalcides* (Reptilia, Scincidae). *Ital. J. Zool.* 71 (suppl. 2):35-45.

Caputo, V., Lanza, B. and Palmieri, R. 1995. Body elongation and limb reduction in the genus *Chalcides* Laurenti, 1768 (Squamata: Scincidae). *Trop. Zool.* 8:95-152.

Caputo, V., Sorice, M. and Crescimbeni, L. 1999. A molecular taxonomy of some Mediterranean scincid lizards, genus *Chalcides* Laurenti, 1768 (Reptilia, Scincidae). *Russ. J. Herpetol.* 6:23-32.

Caputo, V., Guarino, F. M. and Angelini, F. 2000. Body elongation and placentome evolution in the genus *Chalcides* Laurenti, 1768. *Ital. J. Zool.* 67:385-391.

Carranza, S., Arnold, E. N., Geniez, P., Roca, J. and Mateo, J. A. 2008. Radiation, multiple dispersal, and parallelism in the skinks, *Chalcides* and *Sphenops* (Squamata: Scincidea), with comments on *Scincus* and *Scinopus* and the age of the Sahara Desert. *Mol. Phylogenet. Evol.* 46:1071-1094.

Duméril, A. M. C. and Bibron, G. 1839. *Erpétologie Générale on Histoire Naturelle Complète des Reptiles.* Vol.5. Roret/Fain et Thunot, Paris:871 pp.

Forskål, P. 1775. *Descriptiones animalium, avium, amphibiorum, piscium, insectorum, vermium; quae in itinere Orientali observavit Petrus Forskål.* Mölleri, Hauniae, xxxiv+164 pp.

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

Giacomini, E. 1891. Matériaux pour l'étude du développement de *Seps chalcides. Arch. Ital. Biol.* 16:332-359.

Giacomini, E. 1906. Sulla maniera di gestazione e sugli annessi embrionali del *Gongylus ocellatus Forsk. Mem. Accad. Sci.* Bologna 6:401-445.

Greenbaum, E. 2005. Systematics of West African skinks in the *Chalcides thierryi* group: composition, distribution, and redescription of types. *Afr. J. Herpetol.* 54:17-29.

Greenbaum, E., Campbell, A. C. and Raxworthy, C.J. 2006. A revision of sub-Saharan *Chalcides* (Squamata: Scincidae), with redescriptions of two East African species. *Herpetologica* 62:71-89.

Greer, A. E. 1991. Limb reduction in squamates: identification of lineages and discussion of the trends. *J. Herpetol.* 25:166-173.

Greer, A. E., Caputo, V, Lanza, B. and Palmieri, R. 1998. Observation of limb reduction in the scincid lizard genus *Chalcides. J. Herpetol.* 32:244-252.

Griffith, H., Ngo, A. and Murphy, R. W. 2000. A cladistic evaluation of the cosmopolitan genus *Eumeces* Wiegmann (Reptilia, Squamata, Scincidae). *Russ. J. Herpetol.* 7(1):1-16.

Hoser, R. T. 1995. *The Hoser Files: The Fight against Entrenched Official Corruption.* Kotabi Publishing, Doncaster, Victoria, Australia:322 pp.

Lanza, B. 1957. Su alcuni "Chalcides" del Marocco (Reptilia, Scincidae). *Monit. Zool. Ital.* 65:87-98.

Lataste, F. and Rochebrune, T. d. 1876. *J. Zool.* 1876:237-243.

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

Mermer, A. 1996. Biological and Taxonomical Investigations on *Chalcides ocellatus* (Sauria: Scincidae) in Anatolia. *Turk. J. Zool.* 20:77-93.

Pasteur, G. 1981. A survey of the species of Old World scincid genus *Chalcides. J. Herpetol.* 15:1-16.

Pollo, C. J. 1997. *Chalcides bedriagai. In:* J. M. Pleguezuelos (ed.), *Distribución y biogeografia de los anfibios y reptiles en España y Portugal*. Asociación Herpetologica Española, Granada:193-195.

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

Rösler, H. and Wranik, W. 2009. Bemerkungen zur Ökologie und Fortpflanzung von *Chalcides ocellata* (Forskal, 1775). *Elaphe* 17(3):42-43.

Schleich, H. H., Kästle, W. and Kabisch, K. 1996. *Amphibians and Reptiles of North Africa*. Koeltz, Koenigstein:627 pp.

Sindaco, R. and Jeremcenko, V. K. 2008. *The reptiles of the Western Palearctic*. Edizioni Belvedere, Latina (Italy):579 pp.

Schlüter, U. 2006. *Der Gefleckte Walzenskink (*Chalcides ocellatus*)*. Natur und Tier Verlag (Münster):64 pp.

Schmitz, A., Mausfeld, P. and Embert, D. 2004. Molecular studies on the genus *Eumeces* Wiegmann, 1834: phylogenetic relationships and taxonomic implications. *Hamadryad* 28 (1-2):73- 89.

Smith, M. A. 1935. *The fauna of British India, including Ceylon and Burma. Reptiles and Amphibia, Vol. II. Sauria*. Taylor and Francis, London:440 pp.

Vigni, F. L. 2006. Swimming in the sand with the Ocellated Skink, *Chalcides ocellatus*. *Reptilia* (GB) (49):47-53.

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

Werner, Y. L. 1968. Distribution of the Saharan *Sphenops sepsoides* (Reptilia: Scincidae) in Israel and Jordan. *Herpetologica* 24:238-242.

Hybrid Blue-bellied Black Snake (*Panacedechis guttatus*) cross Collett's (Jaffa) Snake (*Panacedechis colletti*)

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Online journals (this issue) appear a month after hard copy publication.

Minimum print run of first printings is always at least fifty hard copies.

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

Australasian Journal of Herpetology 14:31-36.
Published 30 June 2012.

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

A reassessment of the Dibamidae, including the division of the genus *Dibamus* Duméril and Bibron, 1839 (Squamata:Sauria: Dibamidae).

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Received 25 March 2012, Accepted 1 May 2012, Published 30 June 2012.

ABSTRACT

The legless lizards in the genus *Dibamus* Duméril and Bibron, 1839 of the family Dibamidae have been of considerable taxonomic interest in recent years. Greer (1985) did a review of the South-east Asian genus, then consisting of nine species. Currently as of 2012 there are 22 described species and it is certain this number will increase.

Molecular studies of component species by Brandley et. al. (2005) found that *Dibamus* were not skinks as previously believed. This result was adopted by Townsend et. al. (2011) and other similar studies, who have in turn found the origins of the related Mexican monotypic genus *Anelytropsis* Cope, 1885 to be rooted between two divisions of *Dibamus.* All were estimated to have diverged well over 60 million years before present.

Relying on these results, the taxonomy of the component genera is revised accordingly.

Taking a conservative position, *Dibamus* is split into four genera, with the new genera *Paulwoolfus* gen. nov., *Leswilliamsus* gen. nov. and *Dalegibbonsus* gen. nov. created and defined according to the Zoological Code. In turn three subfamilies within the Dibamidae are created and diagnosed to reflect their deep historical divergences. Two subfamilies each contain clades consisting two genera each formerly placed within *Dibamus*, while the third includes the monotypic genus *Anelytropsis*.

A new subgenus *Nindibamus* subgen. nov. is created for the divergent species *Dibamus dalaiensis* Neang et. al. 2011 within *Paulwoolfus* gen. nov.

Keywords: Taxonomic revision; Dibamidae; new subfamilies; Dibiminae; Amelytropsinae; Paulwoolfinae; new genera; subgenus; *Paulwoolfus*; *Dibamus*; *Leswilliamsus*; *Dalegibbonsus; Nindibamus*.

INTRODUCTION

The fossorial and burrowing legless lizards in the genus *Dibamus* Duméril and Bibron, 1839 of the family Dibamidae have been of considerable taxonomic interest in recent years. Greer (1985) did a review of the South-east Asian genus, then consisting of nine species. Currently as of 2012 there are 22 described species and it is certain this number will increase.

Molecular studies of component species by Brandley et. al. (2005) found that *Dibamus* were not skinks as previously believed. This result was adopted by Townsend et. al. (2011) and other similar studies, who have in turn found the origins of the related Mexican monotypic genus *Anelytropsis* Cope, 1885 to be rooted between two divisions of *Dibamus.* That is, one section of *Dibamus* diverged from the other section and *Anelytropsis* at an earlier time.

All three lineages were estimated to have diverged well over 60 million years before present. The first split within *Dibamus* was nearly 80 years before present.

As a result of these findings, continued placement of obviously divergent species within the same genus is clearly not appropriate and this paper resolves the matter by summarizing a reviewing of all known species of *Dibamus* as presently defined.

The species are grouped into obvious groups of closely related taxa. These in turn are placed accordingly depending on timing of divergences as found by Townsend et. al. (2011).

Important recent publications in terms of *Dibamus* as defined to date, *Anelytropsis* and component species include, Angel (1935), Auffenberg (1980), Axtell (1958), Bauer, et. al. (1998), Bleeker (1860), Boulenger (1887a, 1887b, 1890, 1897), Brandley et. al. (2005), Bullock and Medway (1966), Campbell (1974), Cole and Gans (1997), Cope (1885), Darevsky (1992), Darevsky and Sang (1983), Das (1996, 1999, 2004), Das and Lim (2003, 2005, 2009), Das and Yaakob (2003), Diaz et. al. (2004), De Rooij (1922), Dixon and Lemos-Espinal (2010), Duméril and Bibron (1839), Dunn (1927), Ezaz et. al. (2009), Gasc (1968), Greer (1985, 1990), Grismer (2011), Hodkiss (1992), Honda et. al. (1997, 2001), Ineich (1999), Inger and Voris (1993), Iordansky (1985), Lazell 1996), Lazell and Lu (1990), Lim and Lim (1999), Liner (2007), Liu and Hu (1962), Manthey and Grossmann (1997), Mertens (1930), Miller (1996), Müller (1895), Neang et. al. (2011), Nguyen et. al. (2009), Peters (1864), Quijano et. al. (1993), Riepell (1984), Schlegel (1858), Soes (2007), Smith (1935), Smith (1921, 1935), Steindachner (1867), Stoliczka (1873), Tan (1993), Taylor (1915, 1962, 1963), Townsend et. al. (2004, 2011), Tweedie (1950), Underwood and Lee (2000), Venugopal (2010), Vidal et. al. (2008), Zaldivar-Riveron et. al. (2008) and Zhao and Adler (1993).

Relying on the phenotypic differences between these morphologically conservative lizards and a review of the literature, the taxonomy of the component genera is revised accordingly.

Taking a conservative position, *Dibamus* is now split into four genera, with the new genera *Paulwoolfus* gen. nov., *Leswilliamsus* gen. nov. and *Dalegibbonsus* gen. nov. created and defined according to the Zoological Code (Ride et. al. 1999). In turn three subfamilies within the Dibamidae are created and diagnosed to reflect their deep historical divergences. Two subfamilies each contain major clades, consisting two genera each formerly placed within *Dibamus*, while the third includes the monotypic genus *Anelytropsis*.

The subfamily Dibaminae includes the nominate genus containing 13 described species and *Leswilliamsus* gen. nov. containing the single species *Dibamus tiomanensis* Diaz, Leong, Grismer and Yaakob, 2004.

The subfamily *Paulwoolfinae* includes genera *Paulwoolfus* gen. nov. (6 species) and *Dalegibbonsus* gen. nov. (2 species).

The subfamily Anelytropsinae includes the monotypic genus *Anelytropsis*.

FAMILY DIBAMIDAE BOULENGER, 1884

Type species: *Dibamus novaeguineae* Duméril and Bibron, 1839.

Diagnosis: Small, thin, worm-like fossorial lizards. They are easily recognized by their unusually large head plates, with the rostral often covering more than half the head (alone being diagnostic for the family) and degenerate vestigial eyes. Rarely more than 15 cm snout-vent length.

All species are elongate, pencil-long animals with blunt noses, no obvious ear openings and scale covered eyes. There are no functional limbs, but there are tiny flaps near the cloaca and preanal pores.

SUBFAMILY ANELYTROPSINAE SUBFAM. NOV.

Type species: *Anelytropsis papillosus* Cope, 1885

Diagnosis: As for the family Dibimidae, but separated from all others in the family (the Asian taxa) by possessing an interorbital septum, columella cranii and a single premaxillary bone. Osteoderms are present.

These are small, thin, worm-like fossorial lizards. They are easily recognized by their unusually large head plates, with the rostral often covering more than half the head (alone being diagnostic for the family) and degenerate vestigial eyes. Rarely more than 15 cm snout-vent length.

All species are elongate, pencil-long animals with blunt noses, no obvious ear openings and scale covered eyes. There are no functional limbs, but there are tiny flaps near the cloaca and preanal pores. The tail is moderately long, with obtuse extremity. Scales are scincoid, with rounded edges, everywhere equal, including the preanal region. Color brownish flesh-color. The head is distinguishable from the body by its slightly greater width, and is slightly contracted at the position of the orbits, and continued as a distinct muzzle.

The body is cylindrical, and the tail is a little longer than one-fourth the total length. Twenty longitudinal series of scales.

The taxon (monotypic for the genus) is only known from eastern Mexico where it occurs in the States of Tamaulipas, Veracruz, San Luis Potosi, Queretaro and Hildalgo.

GENUS *ANELYTROPSIS* COPE, 1865

Type species: *Anelytropsis papillosus* Cope, 1885

Diagnosis: As above for the subfamily Anelytropsidae.

When first described by Cope in 1885, he was under the impression the taxon was a skink.

The following detail is taken from Cope's original description:

"Char. gen. Rostral plate capping muzzle, the nostril at the junction of its posterior border with the suture separating the loreal and first labial. No frontonasal nor supraorbital plates. Three plates on top of head, which should probably be identified as anterior and posterior frontal and parietal. Eye scarcely visible through the single ocular plate. Scales equal, smooth. Vent not terminal. No limbs. No preanal pores. This genus only differs from *Feylinia* Gray (= *Anelytrops* Hallow), in the arrangement of the lateral plates of the muzzle. In that genus and *Typhlosaurus*, the only other genus of the family, the rostral plate is as in *Acontias*; i. e., divided longitudinally on each side by a fissure which extends from the nostril posteriorly. Whether the internal characters differ remains to be ascertained. I give the genus the name *Anelytropsis* in order to justify the family name Anelytropids. This will produce no confusion, as the name *Anelytrops* was given by Hallowell to the genus which had previously been named *Feylinia*, and as a synonym disappears from view.

Limbless.

Char. Specif. Form slender. Tail moderately long, with obtuse extremity. Scales scincoid, with rounded edges, everywhere equal, including the preanal region. Color brownish flesh-color. The head is distinguishable from the body by its slightly greater width, and is slightly contracted at the position of the orbits, and continued as a distinct muzzle. The body is cylindrical, and the tail is a little longer than one-fourth the total length. Twenty longitudinal series of scales. The area represented by the rostral plate of *Acontias*, is invaded on each side by two labial plates, and a large loreal above them. Behind the second labial plate is a very small third, and above it is a large Ocular plate which extends upwards and forwards to a line with the superior border of the loreal. The pale spot which represents the eye is situated in the lower posterior corner. The fourth and last labial is a little larger than the second, and has a narrowly rounded posterior extremity. Above it is a small postocular, which is in contact with the posterior frontal. On the summit of the head there are three scuta. The anterior, or anterior frontal is the smallest. It forms a transverse band between the loreal and ocular of one side and those of the other. The succeeding plate, the postfrontal, is the largest. It is succeeded by the parietal, which is a transverse plate, concave in front and convex posteriorly, and which is separated from the postocular on each side by a single scale. Posterior to this scute, the scales of the body commence. There is a large symphyseal plate which is a triangle with its apex posterior and truncate. It is bounded on each side by a very large inferior labial, which is also a triangle. This is followed on the labial margin by two very small labial plates. A small body scale succeeds the symphyseal, and this is connected with the small posterior labials by a narrow plate on each side. These are followed by the body scales. Six laterally imbricated scales bound the vent in front. Total length, M.170; length of tail, .045; of head, to line connecting rictioris, .0041. The rostral, loreal and anterior twolabial scuta are marked with minute papillie, which when removed leave punctiform impressions. They are not very closely placed."

SUBFAMILY DIBAMINAE SUBFAM. NOV.

Type species: *Dibamus novaeguineae* Duméril and Bibron, 1839.

Diagnosis: Anelytropsinae sub fam. nov. is separated from this subfamily by possessing an interorbital septum, columella cranii and a single premaxillary bone and having osteoderms are present. It is the only subfamily found outside Asia, being Mexican. The other two subfamilies are from South-east Asia.

Dibaminae species are most easily separated from those within Paulwoolfinae by the relative length of the unregenerated tail. In Dibaminae this is between 15-20 per cent of the snout-vent, whereas in Paulwoolfinae it is usually 20-25 per cent in most species, except for the two species in the genus *Dalegibbonsus* gen. nov. where it's more than 40 per cent.

The relative unregenerated tail lengths also reflect in subcaudal counts that separate the two Asian subfamilies, for Dibaminae the usual number is under 50 in males and under 45 in females, versus above these numbers for Paulwoolfinae. While build of all species within the Dibaminae is similar, species within Paulwoolfinae are on average more slender than those in Dibaminae.

Dibaminae as defined herein, are known from the Andaman Islands west of the Thai/Malay Peninsula, across the Malay Peninsula, including the Thai section and most parts of Indonesia, including Irian Jaya and some of the Philippines.

Species formerly referred to *Dibamus*, with their distribution centred on Cambodia, Vietnam and China are now referred to the subfamily *Paulwoolfinae* subfam. nov., genera *Paulwoolfus* gen. nov. and *Dalegibbonsus* gen. nov..

At the present time and as far as is known from collected specimens, both subfamilies have mutually exclusive distributions.

GENUS *DIBAMUS* DUMÉRIL AND BIBRON, 1839

Type species: *Dibamus novaeguineae* Duméril and Bibron, 1839.

Diagnosis: The diagnosis for this genus is the same as for the subfamily (above), but with the following information that removes the other genus in the same subfamily: *Leswilliamsus* gen. nov. is separated from species in this genus (*Dibamus*) by having cycloid scales which are slightly notched posteriorly as an adult and flat cycloid light brown dorsal scales with cream borders as a juvenile. *Leswilliamsus* gen. nov. also differs from other *Dibamus* in having the following combination of characters: rostral sutures incomplete; nasal and labial sutures complete; scales bordering posterior edge of first infralabial 4; postocular 1; transverse scale rows just posterior to head 29, at midbody 25, proximally anterior to vent 21; subcaudals 45; snout blunt in lateral profile; presacral vertebrae 124; postsacral vertebrae 23.

Dibamus as defined herein, is known from the Andaman Islands west of the Thai/Malay Peninsula, across the Malay Peninsula, including the Thai section and most parts of Indonesia, including Irian Jaya and some of the Philippines.

Species formerly referred to *Dibamus*, with their distribution centred on Cambodia, Vietnam and China are now referred to the subfamily *Paulwoolfinae* subfam. nov., genera *Paulwoolfus* gen. nov. and *Dalegibbonsus* gen. nov..

Content of genus *Dibamus* Duméril and Bibron, 1839.

Dibamus novaeguineae Duméril and Bibron, 1839. (Type species)

Dibamus celebensis Schlegel, 1858.

Dibamus seramensis Greer, 1985.

Dibamus alfredi Taylor, 1962.

Dibamus ingeri Das and Lim, 2003.

Dibamus vorisi Das and Lim, 2003.

Dibamus dezwaani Das and Lim, 2005.

Dibamus leucurus (Bleeker, 1860).

Dibamus taylori Greer, 1985.

Dibamus booliati Das and Yaakob, 2003.

Dibamus somsaki Honda, Nabhitabhata, Ota and Hikida, 1997.

Dibamus tebal Das and Lim, 2009.

Dibamus nicobaricum (Steindachner, 1867).

GENUS *LESWILLIAMSUS* GEN. NOV.

Type species: *Dibamus tiomanensis* Diaz, Leong, Grismer and Yaakob, 2004

Diagnosis: This genus is monotypic for the taxon, *tiomanensis*.

It differs from all other species within subfamilies Dibaminae and Paulwoolfinae subfam. nov. in having cycloid scales which are slightly notched posteriorly as an adult and flat cycloid light brown dorsal scales with cream borders as a juvenile. It also differs from other Dibaminae and Paulwoolfinae subfam. nov. in having the following combination of characters: rostral sutures incomplete; nasal and labial sutures complete; scales bordering posterior edge of first infralabial 4; postocular 1; transverse scale rows just posterior to head 29, at midbody 25, proximally anterior to vent 21; subcaudals 45; snout blunt in lateral profile; presacral vertebrae 124; postsacral vertebrae 23.

This monotypic genus and species is only known from the type locality, Kampung Paya, Pulau Tioman, Pahang, West Malaysia.

Etymology: Named in honor of now deceased herpetologist, Les Williams, formerly of Ballan, Victoria, Australia for many years of valuable work as an emergency snake catcher and for assisting Snakebusters, reptile education in numerous capacities.

Content of genus *Leswilliamsus* gen. nov.

Leswilliamsus tiomanensis Diaz, Leong, Grismer and Yaakob, 2004. (Monotypic for the type species).

SUBFAMILY PAULWOOLFINAE SUBFAM. NOV.

Type species: *Dibamus montanus* Smith, 1921.

Diagnosis: Anelytropsinae sub fam. nov. is separated from this subfamily by possessing an interorbital septum, columella cranii and a single premaxillary bone and having osteoderms are present. It is the only subfamily found outside Asia, being Mexican. The other two subfamilies are from South-east Asia.

Dibaminae species are most easily separated from those within Paulwoolfinae by the relative length of the unregenerated tail. In Dibaminae this is between 15-20 per cent of the snout-vent, whereas in Paulwoolfinae it is usually 20-25 per cent in all species, except for the two species in the genus *Dalegibbonsus* gen. nov. where it's more than 40 per cent.

The relative unregenerated tail lengths also reflect in subcaudal counts that separate the two Asian subfamilies, for Dibaminae the usual number is under 50 in males and under 45 in females, versus above these numbers for Paulwoolfinae. While build of all species within the Dibaminae is similar, species within Paulwoolfinae are on average more slender than those in Dibaminae.

Paulwoolfinae subfam. nov. is known from the region encompassing Cambodia, Vietnam and southern China, but so far is not known from any part of the Thai/Malay Peninsula, Nicobar Islands or the islands of the Philippines, Malaysia or Indonesia. In other words, so far as is currently known, this subfamily has a distribution mutually exclusive of the subfamily Dibaminae, which is known only from the Thai/Malay Peninsula, Nicobar Islands and the islands of the Philippines, Malaysia or Indonesia.

Etymology: As for the genus *Paulwoolfus* gen. nov. (below).

GENUS *PAULWOOLFUS* GEN. NOV.

Type species: *Dibamus montanus* Smith, 1921.

Diagnosis: *Paulwoolfus* gen. nov. is most readily separated from the other genus in the subfamily (*Dalegibbonsus* gen. nov.) by the absence of an ash-white tail end section diagnostic for *Dalegibbonsus* gen. nov..

Other characters diagnostic for the two described species in *Dalegibbonsus* gen. nov. (which separates these taxa from *Paulwoolfus* gen. nov.) are 1 postocular, 2 scales on the edge of the infralabial, 20-24 mid-body rows, variable subcaudal counts, 115-135 presacral vertebrae, maximum snout-vent of about 18 cm, unregenerated tail length is over 40 percent of snout-vent length versus under 25 per cent for species of *Paulwoolfus* gen. nov..

The diagnosis for *Paulwoolfus* gen. nov. is otherwise for the subfamily Paaulwoolfinae subfam. nov..

Paulwoolfus gen. nov. is known from the region encompassing Cambodia, Vietnam and southern China, but so far is not known from any part of the Thai/Malay Peninsula, Nicobar Islands or the islands of the Philippines, Malaysia or Indonesia.

Etymology: Named in honor of Paul Woolf of Walloon, near Brisbane, Queensland, Australia, foundation president of the Herpetological Society of Queensland (HSQI), in recognition of his many contributions to Australian herpetology.

Content of genus *Paulwoolfus* gen. nov.

Paulwoolfus montanus (Smith, 1921).

Paulwoolfus deharvengi (Ineich, 1999).

Paulwoolfus dalaiensis (Neang, Holden, Eastoe, Seng, Ith and Grismer, 2011).

Paulwoolfus greeri (Darevsky).

Paulwoolfus kondaoensis (Honda, Ota, Hikida and Darevsky, 2001).

Paulwoolfus smithi (Greer, 1985).

SUBGENUS *NINDIBAMUS* SUBGEN. NOV.

Type species: *Dibamus dalaiensis* Neang, Holden, Eastoe, Seng, Ith and Grismer, 2011.

Diagnosis: This subgenus is monotypic for the species *N. dalaiensis*, known only from the southwestern Cardamom Mountains in Cambodia in a region that lays between the distribution of the two Asian subfamilies of Dibamidae.

Notwithstanding this fact, there remains no known sympatry between species within the two subfamilies.

This taxon is most easily separated from all Asian Dibamidae by possessing an enlarged, central,

sublabial scale as opposed to relatively similar size of those scales in all other species.

N. dalaiensis is differentiated from all other Dibamids by having the following combination

of characters: maximum SVL of 127.6 mm; tail length 18-22% of SVL; labial and nasal sutures complete; rostral suture present but incomplete; rostral pad divided into two equal parts; a single postocular; three scales bordering the posterior edge of first infralabial; an enlarged, medial, sublabial scale; 20 midbody scale rows; 22 transverse scale rows just posterior to head; 20 transverse scale rows just anterior to vent; 185-209 ventral scales; 48-52 subcaudal scales; relative size of frontal to frontanasal 1.4; and relative size of interparietal to surrounding scales 1.5. These characters were scored across all known nominal species of the Asian Dibamidae (adapted from Neang et. al. 2011).

Etymology: Named in honor of Dara Nin, of Ringwood (Melbourne), Victoria, Australia for various contributions to reptile education with company Snakebusters, Australia's best reptiles. Here I note that Dara was born in New Zealand of native Cambodian parents, so it is fitting that he have a Cambodian subgenus named in recognition of his valuable work.

Content of subgenus *Nindibamus* subgen. nov.

Paulwoolfus (*Nindibamus*) *dalaiensis* (Neang, Holden, Eastoe, Seng, Ith and Grismer, 2011).

GENUS *DALEGIBBONSUS* GEN. NOV.

Type species: *Dibamus bourreti* Angel, 1935.

Diagnosis: Specimens from this genus are most readily separated from *Paulwoolfus* gen. nov. by the ash-white tail end section, not seen in any *Paulwoolfus* gen. nov. or for that matter not seen in any species within the other subfamilies of Dibamidae.

Other characters diagnostic for the two described species within this genus are, 1 postocular, 2 scales on the edge of the infralabial, 20-24 mid-body rows, variable subcaudal counts, 115-135 presacral vertebrae, maximum snout-vent of about 18 cm, unregenerated tail length is over 40 percent of snout-vent length versus under 25 per cent for species of *Paulwoolfus* gen. nov..

The two species are known only from the region of the North Vietnam/China border (*D. bourreti*), including an inshore island, (Katba, Haifong Province), and from Hei Ling Chau and Shek Kwu Chau Islands Hong Kong (*D. bogadeki*) (Darevsky 1992).

Etymology: Named in honor of Dale Gibbons of Maiden Gully, Bendigo, Victoria, Australia for his many contributions to herpetology in Australia.

Content of genus *Dalegibbonsus* gen. nov.

Dalegibbonsus bourreti (Angel, 1935) (Type species).

Dalegibbonsus bogadeki (Darevsky, 1992).

REFERENCES CITED

Angel, F. 1935. Un lézard nouveau de la famille des dibamidés. *Bull. Mus. Nat. Hist. Nat.*, Paris (sér.2), 7:354-356.

Auffenberg, W. 1980. The herpetofauna of Komodo, with notes on adjacent areas. *Bulletin of the Florida State Museum of Biological Sciences* 25(2):39-156.

Axtell, R. W. 1958. A northward range extension for the lizard *Anelytropsis papillosus*, with notes on the distribution and habits of several other Mexican lizards. *Herpetologica* 14:189-191.

Bauer, A. M., Cogger, H. G. and Zweifel, R. G. (eds.) 1998. *Encyclopedia of Reptiles and Amphibians.* San Diego: Academic Press:162 pp.

Bleeker, P. 1860. Reptilien van Agam aangeboden door E.W.A. Ludeking. *Natuurkundig Tijdschrift voor Nederlandsch Indie*, Batavia, 20:325-329.

Boulenger, G. A. 1887a. *Catalogue of lizards in the British Museum (Natural History). Second edition. Volume III. Lacertidae,Gerrhosauridae, Scincidae, Anelytropidae, Dibamidae, Chamaeleontidae.* British Museum (Natural History), London. xii + 575 pp+Pls.I-XL.

Boulenger, G. A. 1887b. Note on some reptiles from Sumatra described by Bleeker in 1860. *Ann. Mag. Nat. Hist.* (5)20:152.

Boulenger, G. A. 1897. List of the reptiles and batrachians collected by Mr. Alfred Everett in Lombok, Flores, Sumba and Saru, with descriptions of new species. *Ann. Mag. Nat. Hist.* (6)19:503-509.

Boulenger, G. A. 1890. *The Fauna of British India, Including Ceylon and Burma*. Reptilia and Batrachia. Taylor and Francis, London, xviii:541 pp.

Brandley, M. C., Schmitz, A. and Reeder, T. W. 2005. Partitioned Bayesian Analyses, Partition Choice, and the Phylogenetic Relationships of Scincid Lizards. *Syst. Biol.* 54(3):373-390.

Bullock, J. A. and Medway, L. 1966. Observations on the Fauna of Pulau Tioman and Pulau Tulai:General Introduction. *Bulletin of the National Museum*, Republic of Singapore No. 34, March.

Campbell, H. W. 1974. *Anelytropsis, A. papillosus*. Catalogue of American Amphibians and Reptiles (156):1-2.

Cole, C. J. and Gans, C. 1997. The karyotype of *Dibamus novaeguineae* (Squamata: Dibamidae). *Herpetologica* 53(2):229-232.

Cope, E. D. 1885. A contribution to the herpetology of Mexico. I. The collection of the Comisión Científica. *Proc. Am. Phil. Soc.* 1885(22):379-404.

Darevsky, I. S. 1992. Two new species of worm-like lizard *Dibamus* (Sauria: Dibamidae), with remarks on the distribution and ecology of *Dibamus* in Vietnam. *Asiatic Herpetological Research* 4:1-12.

Darevsky, I. S. and Sang, N. V. 1983. New and little known lizards species from Vietnam. *Zoologitcheski Zhurnal* 62:1827-1837.

Das, I. 1996. The validity of *Dibamus nicobaricum* (Fitzinger in Steindachner, 1867)(Squamata: Sauria: Dibamidae). *Russian Journal of Herpetology* 3(2):157-162.

Das, I. 1999. Biogeography of the amphibians and reptiles of the Andaman and Nicobar Islands, India. in: Ota, H. (ed) *Tropical Island herpetofauna*, Origin, Current Diversity, and Conservation. *Elsevier*:43-77.

Das, I. 2004. *Lizards of Borneo*. Natural History Publications, Kota Kinabalu, Borneo.

Das, I. and Lim, K. K. P. 2003. Two new species of *Dibamus* (Squamata:Dibamidae) from Borneo. *The Raffles Bulletin of Zoology* 51(1):137-141.

Das, I. and Lim, K. K. P. 2005. New species of *Dibamus* (Squamata: Dibamidae) from Pulau Nias, Indonesia. *Russian Journal of Herpetology* (39):113-117.

Das, I. and Lim, K. K. P. 2009. A new species of *Dibamus* (Squamata: Dibamidae) from Pulau Simeuleu, Mentawai Archipelago, Indonesia. *Zootaxa* (2088):15-23.

Das, I. and Yaakob, N. S. B. 2003. A new species of *Dibamus* (Squamata: Dibamidae) from Peninsular Malaysia. *Raffles Bulletin of Zoology* 51(1):149-153.

De Rooij, N. 1922. Fauna simalurensis. Reptilia. Zool. Meded. Rijksmus. *Nat. Hist. Leiden* 6(4):217-238

Diaz, R. E., Leong, M. T., Grismer, L. L. and Yaakob, N. S. 2004. A new species of *Dibamus* (Squamata:Dibamidae) from West Malaysia. *Asiatic Herpetological Research* 10:1-7.

Dixon, J. R. and Lemos-Espinal, J. A. 2010. *Amphibians and reptiles of the state of Queretaro, Mexico*. Tlalnepantla Unam:428 pp.

Duméril, A. M. C. and Bibron, G. 1839. *Erpétologie Générale on Histoire Naturelle Complète des Reptiles*. Vol.5. Roret/Fain et Thunot, Paris:871 pp.

Dunn, E. R. 1927. Results of the Douglas Burden Expedition to the Island of Komodo. III.- Lizards from the East Indies. *American Museum Novitates* (288):1-13.

Ezaz, T., et. al. 2009. Sex Chromosome Evolution in Lizards: Independent Origins and Rapid Transitions. *Cytogenet Genome Res.* 127:249-260.

Gasc, J. P. 1968. Contribution a' l ¡ osteologie et la myologie de *Dibamus novaeguineae* Gray (Sauria, Reptilia). Discussion syste´matique. *Ann. Sci. Nat. Zool.* 10:127-250.

Greer, A. E. 1985. The relationships of the lizard genera *Anelytropsis* and *Dibamus*. *Journal of Herpetology* 19(1):116-156.

Greer, A. E. 1990. "Rediscovery" of the holotype of *Anelytropsis papillosus* Cope 1885. *Journal of Herpetology* 24(1):103-104.

Grismer, L. L. 2011. *Lizards of Peninsular Malaysia, Singapore and their adjacent archipelagos*. Edition Chimaira, Frankfurt:728 pp.

Hodkiss, I. J. 1992. Species new to Hong Kong. *Memoirs of the Hong Kong Natural Society* (19):139.

Honda, M., J., Nabhitabhata, Ota, H. and Hikida, T. 1997. A new species of *Dibamus* (Squamata: Dibamidae) from Thailand. *Raffles Bulletin of Zoology* 45(2):275-279.

Honda, M., Ota, H. Hikida, T. and Darevsky, I. S. 2001. A new species of the worm-like lizard, *Dibamus* Duméril and Bibron, 1839 (Squamata Dibamidae), from Vietnam. *Tropical Zoology* 14:119-125.

Ineich, I. 1999. Une nouvelle espèce de *Dibamus* (Reptilia, Squamata, Dibamidae) du Vietnam. *Bulletin de la Société de Zoologique de France* 124(3):279-286.

Inger, R. F. and Voris, H. K. 1993. A comparison of amphibian communities through time and from place to place in Bornean forests. *Journal of Tropical Ecology* 9:409-433.

Iordansky, N. N. 1985. The jaw apparatus and the problem of relationship between Dibamidae

and Pygopodidae (Reptilia, Squamata. *Zoologitcheski Zhurnal* 64:835-848.

Lazell, J. 1996. Geographic Distribution. *Dibamus bogadeki*. *Herpetological Review* 27(4):210-211.

Lazell, J. and Lu, W. 1990. Four remarkable reptiles from South China Sea islands, Hong Kong territory. *Asian Herpetological Research* 3:64-66.

Lim, K. K. P. and Lim, L. J. 1999. The terrestrial herpetofauna of Pulau Tioman, Peninsular Malaysia. *Raffles Bulletin of Zoology*, Supplement 6:131-155.

Liner, E. A. 2007. A Checklist of the Amphibians and Reptiles of Mexico. *Louisiana State University Occasional Papers of the Museum of Natural Science* 80:1-60.

Liu C. and Hu, S. 1962. A herpetological report of Kwangsi. *Acta Zoologica Sinica* 14, Suppl.:73-106.

Manthey, U. and Grossmann, W. 1997. *Amphibien and Reptilien Südostasiens*. Natur und Tier Verlag, Münster:512 pp.

Mertens, R. 1930. Die Amphibien und Reptilien der Inseln Bali, Lombok, Sumbawa und Flores. *Senck. Naturf. Gesell.*, Frankfurt am Main, Abhandl. 42(3):117-344.

Miller, M. R. 1966. The cochlear ducts of *Lanthanotus* and *Anelytropsis* with remarks on the familial relationship between *Anelytropsis* and *Dibamus*. *Occ. Pap. Cal. Acad. Sci.* (60):1-15.

Müller, F. 1895. Reptilien und Amphibien aus Celebes. (II. Bericht) Verh. *Naturf. Ges. Basel* 10:862-869.

Neang, T., Holden, J., Eastoe, R. S., Saveng, I and Grismer, L. L. 2011. A new species of *Dibamus* (Squamata: Dibamidae) from Phnom Samkos Wildlife Sanctuary, southwestern Cardamom Mountains, Cambodia. *Zootaxa* 2828:58-68.

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

Peters, W. 1864. Über neue Amphibien (*Typhloscincus*, *Typhlops*, *Asthenodipsas*, *Ogmodon*). *Mber. k. preuss. Akad. Wiss.*,Berlin:271-276.

Quijano, F. M., Garcia, E. H. and Ballardo, W. S. 1993. *Anelytropsis papillosus* (Mexican Blind Lizard). México: Hidalgo. *Herpetological Review* 24(2):66.

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

Riepell, O. 1984. The cranial morphology of the fossorial lizard genus *Dibamus* with a

consideration of its phylogenetic relationships. *Journal of Zoology*, London 204:289-327.

Schlegel, H. 1858. Handleiding Tot de Beoefening der Dierkunde 2. *Natuurkundige Leercursus*, Koninlijke Militarie Akademie.

Soes, M. 2007. *Dibamus taylori* bevestigd voor Nusa Penida, Indonesië. *Lacerta* 65(3):128-129.

Smith, H. M. 1935. Miscellaneous notes on Mexican lizards. *Univ. Kansas Sci. Bull.* 22:119-156.

Smith, M. A. 1921. New or little known reptiles and batrachians from southern Annam (Indo-

China). *Proceedings of the Zoological Society of London* 1921:423-440.

Smith, M. A. 1935. *The fauna of British India, including Ceylon and Burma. Reptilia and Amphibia. Vol. II.- Sauria.* Taylor and Francis, London. xiii+440 pp+1 pl.

Steindachner, F. 1867. In: *Reise der Österreichischen Fregatte Novara um die Erde in den Jahren* 1857, 1858,1859 unter den Befehlen des Commodore B. von Wüllerstorf-Urbair (Zoologie), Vol. 1, part 3 (Reptilien p.1-98). K. Gerold's Sohn/Kaiserlich-Königl. Hof- und Staatsdruckerei, Wien.

Stoliczka, F. 1873. Notes on some Andamese and Nicobarese Reptiles, with the descriptions of three new species of lizards. *J. Asiat. Soc. Bengal* 42:162-169.

Tan, F. L. 1993. *Checklist of lizards of Sabah*. Sabah Parks Trustees, Kota Kinabalu (2):18 pp.

Taylor, E. H. 1915. New species of Philippine lizards. *Philip. J. Sci.* 10:89-109.

Taylor, E. H. 1962. New Oriental reptiles. *University of Kansas Science Bulletin* 43(7):209-263.

Taylor, E. H. 1963. The lizards of Thailand. *University of Kansas Science Bulletin* 44(14):687-1077.

Townsend, T. M., Larson, A., Louis, E. and Macey, J. R. 2004. Molecular phylogenetics of Squamata: the position of snakes, amphisbaenians, and dibamids, and the root of the squamate tree. *Syst. Biol.* (53):735-757.

Townsend, T. M., Leavitt, D. H. and Reeder, T. W. 2011. Intercontinental dispersal by a microendemic burrowing reptiles (Dibamidae). *Proceedings of the Royal Society B.* online 26 January:7 pp.

Tweedie, M. W. F. 1950. Notes on Malayan reptiles, No.2. *Bull. Raffl. Mus.* No 23:191-199.

Underwood, G. and Lee, M. S. Y. 2000. The egg tooth of *Dibamus* and their bearing on possible relationships with gekkotan lizards. *Amphibia-Reptilia,* 21(4):507-511.

Venugopal, P. D. 2010. An updated and annotated list of Indian lizards (Reptilia: Sauria) based on a review of distribution records and checklists of Indian reptiles. *Journal of Threatened Taxa* 2(3):725-738.

Vidal, N., Azvolinsky, A., Cruaud, C. and Hedges, S. B. 2008. Origin of tropical American burrowing reptiles by transatlantic rafting. *Biol. Lett.* (4):115-118.

Zaldivar-Riveron, A., de Oca, A. N. M., Manriquez-Moran, N. and Reeder, T. W. 2008. Phylogenetic affinities of the rare and enigmatic limb-reduced *Anelytropsis* (Reptilia:Squamata) as inferred with mitochondrial 16S rRNA sequence data. *J. Herpetol.* 42:303-311.

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

Australasian Journal of Herpetology 14:37-64.
Published 30 June 2012.

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

Robust taxonomy and nomenclature based on good science escapes harsh fact-based criticism, but remains unable to escape an attack of lies and deception.

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Received 27 March 2012, Accepted 29 June 2012, Published 30 June 2012.

ABSTRACT

As anticipated, the taxonomic papers proposing new genera of advanced snakes in *Australasian Journal of Herpetology* issues 9-12 received the usual howls of protest from the so-called truth-haters (as they call themselves) identified in Issue 9 (Hoser 2012a).

However in spite of open public invitations to provide evidence in rebuttal of the taxonomic conclusions in more than a dozen papers, not one shred of contrary evidence has been forthcoming.

Herein is a summary of the methodology of attack by Wolfgang Wüster, Mark O'Shea and the other serial critics of all things "Hoser" in the period April to June 2012.

This includes their most recent tactics to force others not to use valid names in accordance with the ICZN's Zoological Code.

Also detailed is a fraudulent attempt to effectively steal naming rights for species, not just from Raymond Hoser, but potentially dozens of other professional herpetologists in what may well go down as the biggest attempt of intellectual property theft in the history of modern Zoology.

Furthermore a clandestine attempt by the truth-haters to dismantle the Zoological Code is publicly exposed for the first time.

Keywords: Taxonomy; evidence; fraud, ICZN; Zoological nomenclature.

INTRODUCTION

In April 2012, I published more than a dozen taxonomic papers in *Australasian Journal of Herpetology*, issues 9-12.

These papers provided evidence that served three basic functions.

1 - To rebut with relevant documentation, the false claims made by Wallach, Wüster and Broadley (2009) and repeated later by themselves and others under their control, that the *Australasian Journal of Herpetology* had not been published according to the Zoological Code (Ride et. al. 1999), meaning that the many species and genera formally defined and named within were not validly named (Hoser 2012a).

2 - To publish new descriptions of the relevant taxa in the new issues (10-12) to stabilize the nomenclature of the various previously described taxa (Hoser 2009a, 2009b, 2009c, 2009d, 2009e, 2009f, 2009h) by renaming them all in "as new" descriptions, at the same time as providing documentary proof within each hard copy journal of compliance with the Zoological Code (issues 10-12, cited herein simply as Hoser 2012b). This act was to in effect make prior false statements of non-compliance with the code effectively redundant as the new descriptions also effectively usurped the claim.

3 - To publish descriptions of new taxa (mainly at the genus level) of new snake groups as part of a global audit of the serpents to identify all obvious groups of snakes in need of being reclassified at the genus level and for whom there were no available names. The divisions relied mainly on previously published studies, both morphological and molecular and only involved groups for which evidence in favour of division was overwhelming.

In the case of each of the above, the evidence was laid out clearly.

To rebut the false claims that *Australasian Journal of Herpetology* issues 1-7 were not published as hard copy, receipts for these were published in *Australasian Journal of Herpetology* issue 9.

So far, the authors of Wallach, Wüster and Broadley (2009) have not publicly conceded they were wrong in their paper, even though the evidence of this is obvious.

They have also failed to apologise for their obviously fraudulent and unethical actions in terms of their 2009 publication, which also happened to be in violation of the Zoological Code.

However they have actively removed as best they can, all posts and links on the internet pointing to the journal and paper that exposes their original fraud.

In terms of the act of stabilizing the nomenclature of the earlier described taxa, Wallach, Wüster and Broadley have again adopted the same procedure just outlined.

That is they have actively tried to remove all online and other references to these papers.

In terms of the new descriptions of newly named taxa (for the first time), which forms the bulk of issues 10-12 of *Australasian Journal of Herpetology* (AJH), I posted on several major internet chat forums and the like details of the publication in hard copy upon release of each issue.

A month following these posts, links to the online versions of the papers were posted on the web, meaning that most people only gained access to these papers in the month of May 2012, even though all relevant papers had been published a month prior.

On all relevant forums, people were invited to offer any criticisms of the papers and threads ran many pages on many forums.

Some people reposted details of the same publications on other chat forums including non-English speaking reptile forums.

Hence in accordance with the Zoological Code, details of the publications were widely disseminated.

Noting that in terms of the global audit of the world's snakes, I had only taken taxonomic actions on groups of snakes for which the evidence was overwhelming (usually involving both molecular and morphological studies), all of which were properly cited in each paper, I did not expect any contrary evidence to emerge.

However all scientists, myself included, will only support an idea or position while the evidence does, meaning that if and when contrary information were to emerge, I may revise my position.

Criticism of these papers by the truth-haters took the usual form they have employed in the past (see Hoser 2012a). That is name-calling, false claims of "evidence free" descriptions and the like.

The "evidence free" claim is of course a total lie as seen from the evidence within the sources cited at the end of each paper!

EVIDENCE FREE CRITICISMS

It has emerged that the criticisms of the papers has been "evidence free" and "fraudulent".

Of course, the anonymity of internet chat forums and the ability of people like Wüster to post under multiple names allows hate and bullying to go unchecked and without addressing the issues on hand. The issue of course being, were the splits of existing genera actually justified?

In summary, if they were, then the new names should be used.

If the changes were not justified, then obviously the newly proposed names would simply disappear into oblivion as unused synonyms and there would be no need to get too worked up over anything.

In terms of justification of the splits of genera I dissected, my papers were supported by some very robust studies, including that of Pyron et. al. 2011 who wrote: "

"Our phylogeny also suggests paraphyly of many genera (e.g., *Crotalus*, *Enhydris*, *Nerodia*, *Rhadinophis*, *Stenophis*, *Thamnophis*, *Vipera*, *Zamenis*, etc.)"

Within that list, I had in fact split *Crotalus*, *Nerodia*, *Rhadinophis*, *Thamnophis*, *Vipera*, *Zamenis* as well as other groups identified as paraphyletic in their published phylogeny.

There were other similarly robust phylogenies published that supported my taxonomic acts, so I never expected any strong arguments against my position.

However as mentioned in Hoser (2012a), the truth-haters have never been concerned about things like evidence and would argue against anything I say, no matter how ridiculous their position would be.

In May 2012, the inevitable claims surfaced on the internet of "evidence free" descriptions, which while easily refuted by reference to my original papers, are only actually refuted (in the context of the discussion) if the person seeing the false claims actually goes to the papers themselves.

Noting that on internet chat forums, facebook and other online places where these comments were being made, the readers may not see the original papers, I decided to cut and paste relevant sections of phylogenies produced by Pyron, et. al. (2011), Castoe et. al. (2003), Guo et. al. (2011) and others to corroborate my taxonomic judgements.

I even made things easy by marking on these phylogenies where the new generic splits were made.

It is the response to this hard evidence by the truth-haters that effectively showed how devoid they were in terms of sensible arguments against the taxonomy and nomenclature within my relevant papers.

Not once did anyone offer a shred of evidence contrary to the judgements made in more than a dozen papers.

Contrary to the Zoological Code (Appendix A, Section 5), Mark O'Shea and Al Coritz (posting on facebook as "Viperkeeper") posted various bits of hate including some images on their facebook pages effectively lampooning some very good phylogenetic studies.

Those images copied here show the despicable behaviour of these people claiming to be herpetologists.

These images and their posting are of course totally contrary to the ethics recommendations of the ICZN Rules, but as shown in Hoser (2012a) these people have never had any respect for the rules!

Hence by end June 2012, it had emerged that there was no credible evidence contrary to the position taken in any of the taxonomic papers in *AJH* Issues 9-12.

In other words, the general adoption of most if not all the taxonomy and nomenclature within those papers would seem to be inevitable, although as seen for names of genera like *Broghammerus*, Hoser 2004, there would be little doubt that the truth-haters would do all they could to stop people using any "Hoser" names.

To facilitate this, Wüster in particular has used aids such as "Google alerts" enabling him to be made aware of the use of any given keywords anywhere on the internet as soon as they are posted.

Using this sort of facility he was able to harass and stop webmasters from having the word "Broghammerus" on websites for four years to 2008 and has also successfully stopped the use of the various genus names for Rattlesnakes first proposed by myself in early 2009 (Hoser, 2009f).

However the three acts detailed at the beginning of this paper clearly caused alarm to the truth-haters, most probably due to the large number of new names proposed and the fact that the earlier nomenclature had also been effectively stabilized under the code.

Therefore this time they decided to deal with their "problem" of Hoser names in another way.

Before going further, the issue is not the taxonomy behind the nomenclature that is a problem, as it has been shown to be robustly supported by numerous other professional herpetologists.

Instead it is an obsessive hatred of all things "Hoser" by Wolfgang Wüster, Mark O'Shea and the other truth-haters, as well as a secondary desire to steal my research findings to effectively rename the same taxa as they see fit, in exactly the same way Wüster and two others have tried to do with the genus *Spracklandus* Hoser, 2009, (Hoser 2009h) (which they tried to rename "*Afronaja*" later in 2009).

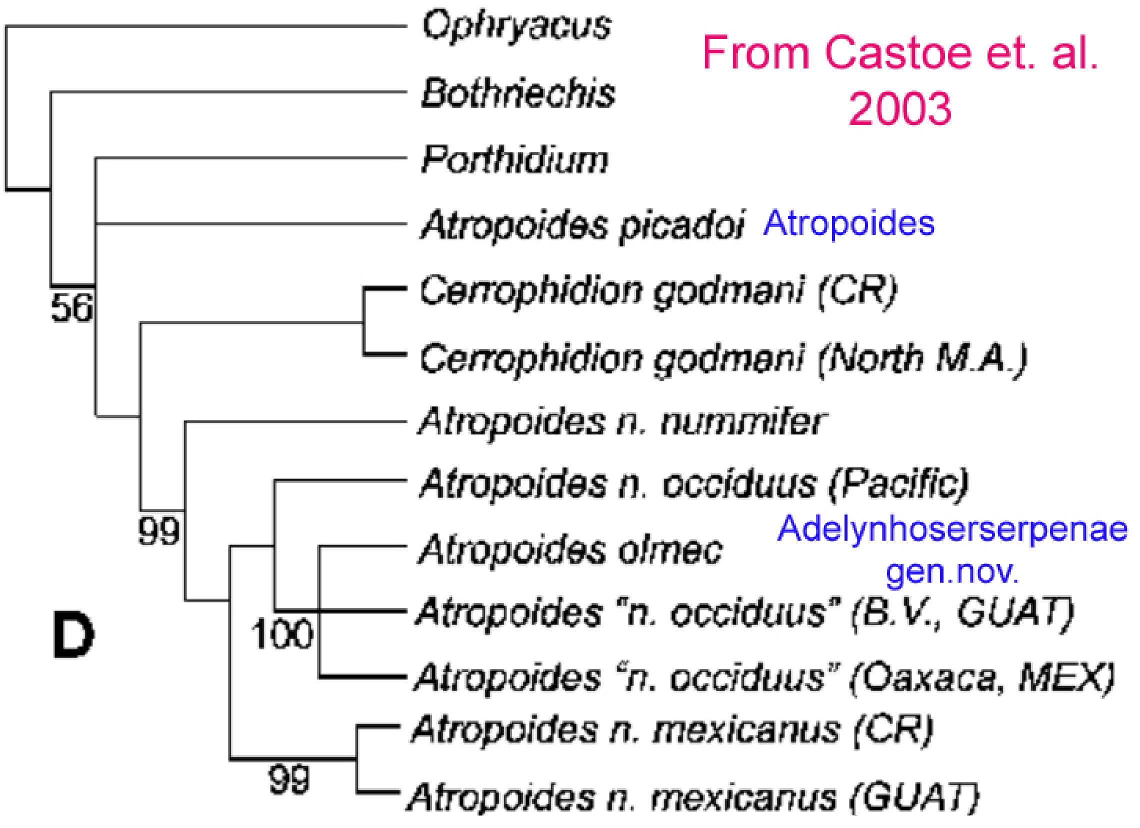
THEFT OF NAMING RIGHTS IN VIOLATION OF THE ZOOLOGICAL CODE

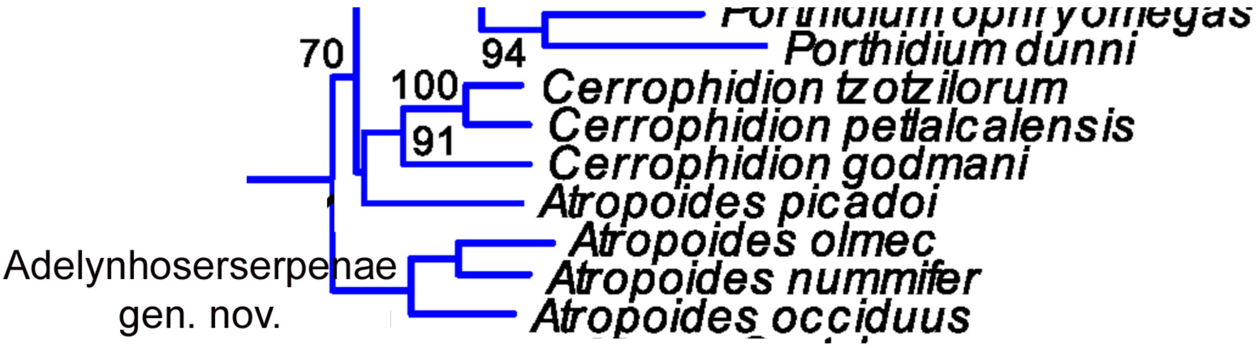
The paper Wallach, Wüster and Broadley (2009) was widely posted by the authors on the web, so I need not reproduce it here.

That's the fraudulent work they created to try to steal naming rights for the African Spitting Cobras *Spracklandus* Hoser, 2009.

However another more recent effort to subvert the Zoological Code by what appears to be the same group of truth-haters is worth copying here as it is not yet publicly available.

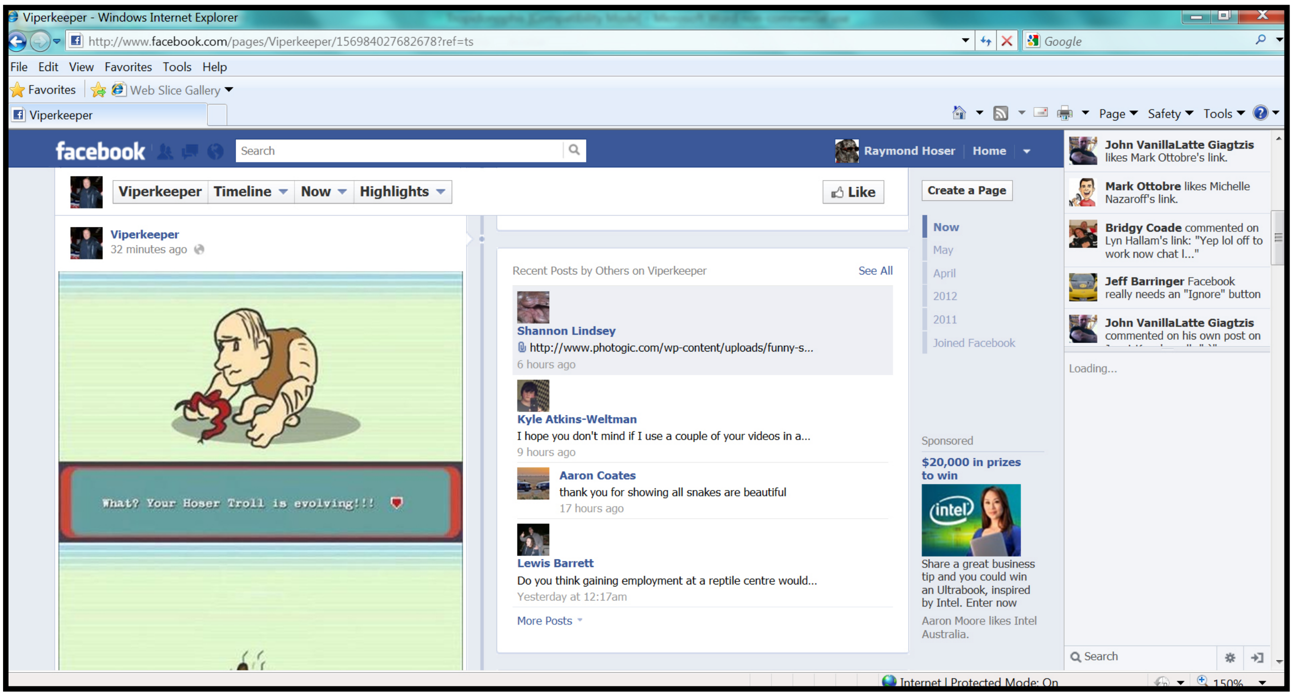
Two published phylogenies that support the taxonomic actions of Hoser 2012 in terms of the pre-existing genus *Atropoides*.

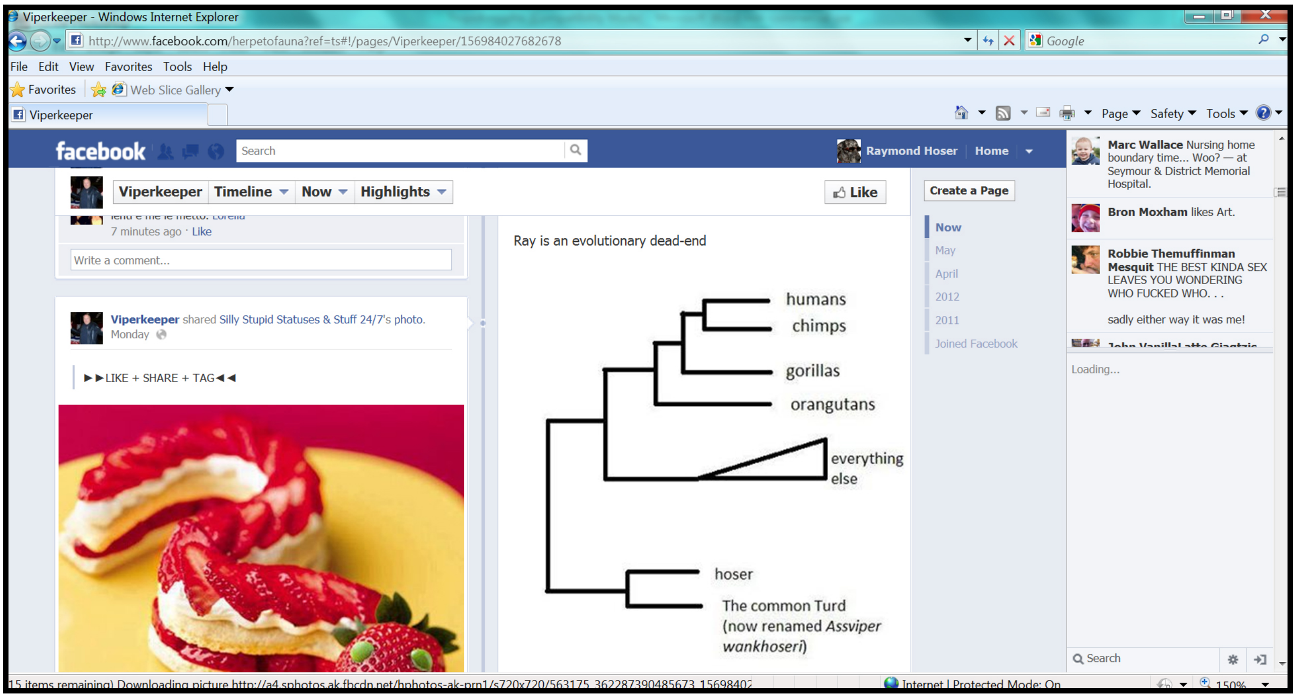




Pyron et. al. 2011

When truth haters have nothing sensible to say in terms of taxonomy, they resort to breaching the Zoological code and posting "hate".





Hoser 2012 - Australasian Journal of Herpetology 14:37-64.

At the time of writing this paper, the authors of this 2012 piece (cited herein as Kaiser 2012) have not publicly revealed themselves, save for the man e-mailing the material elsewhere (Hinrich Kaiser).

However the forensic trail clearly shows O'Shea and Wüster as being the principal movers and probably authors.

E-mails seeking to answer this question to Kaiser, O'Shea and Wüster have been unanswered.

However as the wording within the new document and claims within match exactly those made against me previously by both men, there is no harm done to either by treating this new document as being authored by them, as the only notable added variable is the widening of their anti-Hoser claims to include the later papers by myself which would be totally expected based on their prior form (the papers cited herein as Hoser 2012b).

In May 2012, posts on facebook in particular contained a number of statements attributed to the two men, which were critical of my papers in *AJH* (issues 9-12).

On 5 June 2012, an obese and little-known academic named Hinrich Kaiser (of e-mail address chalcopis@yahoo.com) sent a SPAM e-mail to an unknown but sizeable number of herpetologists globally, seeking support for a petition effectively calling for a dismantling of the Zoological Code.

That e-mail contained an effective petition by an allegedly anonymous author or authors attacking the allegedly "fraudulent" and "evidence free" papers published by myself in all my publications in the period 2000-2012, including *Australasian Journal of Herpetology* issues 1-12.

The poorly written and highly defamatory rant went on to seek support for a formal ban on the use of all names proposed by myself and others (e.g. Richard Wells, Cris Hagen and Bill McCord) since 2000, as well as at least one name proposed by Laurenti in 1768 and including well over 200 "in use" names in total as part of what appeared to be some kind of "ambit claim" to rename taxa.

This included well-accepted names in common usage such as *Broghammerus* Hoser 2004, *Leiopython hoserae* Hoser 2000 and *Morelia harrisoni* Hoser 2000, (Hoser, 2000) the latter of which according to Google on 22 June 2012, has been used at least 814,000 times on the web alone!

That result would of course be relevant to the ICZN's common-usage arguments.

However it is clear the authors of the petition were seeking a long-term aim to subvert all "Hoser names" and others, by planning to use lack of common usage as an argument against them at a later stage, including perhaps ultimately via a petition to the ICZN, which is outlined in their "call to action".

The article e-mailed, that I call here a petition, was according to Hinrich Kaiser "put together by an international group of seven respected herpetological taxonomists", but whom these persons were he has steadfastly refused to identify, and this is in spite of several requests.

As recently as 24 June 2012, in reply e-mails to Bill McCord, Kaiser refused to identify the authors of the scandalous document.

However a brief forensic analysis of the electronic trail, including Hinrich Kaiser's own facebook page showed the source of the drafting of the (at this stage ostensibly anonymous) petition to include Mark O'Shea and Wolfgang Wüster, both of whom were also listed among Hinrich Kaiser's very small number of facebook "friends".

In the case of O'Shea, a similar "complaint" was posted by him on the facebook page at:

http://www.facebook.com/#!/pages/Daily-Reptile-News/123173187727554 on 17 May 2012, (O'Shea 2012) still online as of 25 June 2012, indicating his authorship involvement of the document posted widely by Kaiser.

O'Shea made the complaint on facebook that I, Raymond Hoser had named too many species, thereby allegedly depriving others of naming rights. Noting my current total stands at dozens as opposed to the thousands of taxa named by the likes of George Boulenger, John Gray and others the complaint lacks both a valid target or merit.

O'Shea also whinged that some 13 species or genera had the word "Hoser" in their names somewhere, claiming it was some sort of crime. Again, this number pales into insignificance against taxa with for example the "Boulenger" name, showing the grievances aired by O'Shea are fuelled by hatred and mailice as opposed to any sensible scientific or procedural arguments.

Reversing earlier false complaints of Wüster, including of course Wallach, Wüster and Broadley (2009), this most recent petition complained that all my papers complied with the Zoological Code (Ride et. al. 2009) which they had this time claimed was itself now the problem.

Because they complained I had named too many taxa, they wanted a formal, legally binding ban on the use of any names I had proposed since 2000 so that they could then rename the same organisms as they saw fit and after their own friends and the like.

Such overt scientific censorship would be against the rules of the ICZN, which Wüster in particular has held in contempt for many years.

However it is appropriate that in the light of this recent action to attack my papers and those of other reputable herpetologists that I should make these actions known.

In terms of this most recent attack, the 22 page (as sent), 6,398 word attack (or the second document, a lengthy appendix of over 200 taxa that they seek to rename as they see fit) does not mention in any way the fraudulent actions of the same authors or associates (Wallach, Wüster and Broadley; David John Williams; Bryan Fry; Wulf Schleip) to date as detailed in Hoser (2012).

The complaints against my papers are generally false and baseless and are perhaps encapsulated in the heading of the attack, which reads:

"Taxonomic Decisions in Herpetology are Acceptable Only When Produced Ethically and Supported by a Body of Evidence Accumulated via the Scientific Method."

The inference of the heading and the rest of the rant, are that my own papers are "lacking evidence" or somehow lack ethics.

The claim is false, but if it were true, wouldn't be worthy of comment on their own because it would simply mean that the taxonomic conclusions within the papers would in effect be ignored by others and no one else would attempt to split the reptile groups in the way I have.

Of course the reality is quite different. As already mentioned, all the taxonomic and nomenclatural actions in my papers were made on the basis of robust and tested phylogenies published by eminent herpetologists such as Sam McDowell, Alexander Pyron and others, as well as further phylogenies produced post publication of my papers, including those of Rawlings, Rabosky, Donnellan, and Hutchinson, (2008) which confirmed my generic naming and placements of four years prior (Hoser, 2004).

In the case of the latter authors and others since, none of them would have used the name *Broghammerus* Hoser, 2004 had there been no evidence to support the idea or that my papers had been either fraudulent or lacked evidence.

Science is obviously evidence-based and so it should be and it is only on that basis that all my descriptions have been published.

Then of course, four independent peer reviewers of every paper seen in *Australasian Journal of Herpetology* also agreed that the taxonomic conclusions within them stood up to the most robust of scrutiny.

The number, (4), is notable in itself as this is double the number of reviewers used by most other "peer reviewed" journals.

By obvious extrapolation and noting that the papers published in the June/July 2012 issues of *AJH* are the last of the global audit of snakes conducted to see if any obvious new genera needed to be erected to accommodate divergent species, it can be reasonably concluded that a lack of evidence in terms of the other groups not broken up by myself or pre-existing available names was why they were not split.

If and when compelling evidence emerges in terms of the groups I have not divided, they may also be broken up, but I would assume until then, their taxonomy and nomenclature will remain stable.

Facing up to this reality, the authors Mark O'Shea and Wolfgang Wüster and the (alleged) others, have sought to have a ruling made by a band of rogue herpetologists formally stopping anyone from using the "Hoser" names and thereby allowing them the right to rename them all.

As I said before, they seek to do this in much the same manner that they have attempted with the Cobra genus *Spracklandus* Hoser, 2009.

However this time they go further, by outlandishly demanding criminal sanctions against myself and the other authors they attack, as well as a formal overriding of the Zoological Code (page 9 of their original MS Word document, last five lines).

The actions by these men is scandalous in the extreme and they should be publicly exposed for them.

By way of example, could anyone seriously consider some sort of attempt to suppress all Boulenger's 500+ reptile species descriptions just so that some disgruntled person who "missed out" could place their names on the same taxa?

More significantly and in a clear revelation of the contempt for the Zoological Code by Mark O'Shea, Wolfgang Wüster, Hinrich Kaiser and the others associated with this "petition" the false accusations within this article include fabrication of evidence, fraud and more and go further than just these sorts of false claims on myself.

In the list of taxa they seek to rename, Mark O'Shea and Wolfgang Wüster and the (alleged) others have added the works of three other herpetologists, most notably, Richard Wells and Bill McCord. Again a scandalous attempt is made to steal "naming rights" over well established taxa with names now commonly in usage.

In the case of Bill McCord, a respected veterinary surgeon based in New York, these authors have now made the false claim to a global audience that he is a high-level international wildlife trafficker putting the world's biodiversity at risk, as well as the general ambit claims of fraud, fabrication and evidence free descriptions.

While Bill McCord has denied the smuggling allegations and I accept this denial in the absence of evidence to the contrary by the "evidence free" rant, I can with greater authority refer to his allegedly "evidence free" papers that Kaiser's anonymous authors seek to suppress.

One of these McCord et. al. (2007), is republished on the internet at: http://www.iucn-tftsg.org/

wp-content/uploads/file/Articles/McCord_etal_2007a.pdf

and by any objective analysis has plenty of evidence to support the taxonomic position arrived at by the authors.

In this case it was a description of a new "Snakeneck Turtle" from Timor.

Furthermore, Gerald Kuchling and three other "experts" on the same subject published another paper effectively confirming McCord's taxonomic findings the same year (Kuchling, et. al. 2007).

Even if a reader fails to agree with the author's taxonomic position, such disagreement hardly requires formal banning of the work and threatening criminal sanctions against either the author or anyone else who chooses to use his names.

I should also add, that there is no question whatsoever that the original publication complies with the Zoological Code (Ride et. al. 1999), although Wallach, Wüster (in particular) and Broadley may again try to make the totally false claim the hard copy doesn't exist and that as an "online publication" it isn't validly published as they did with all publications in *Australasian Journal of Herpetology* Issues 1-7; see Wüster and Bernils (2011) for one of countless such examples.

As to why the Bill McCord papers drew the ire of O'Shea and Kaiser, one doesn't need to look too far. O'Shea and Kaiser conned the new East Timor Government to use their reptile photos for a series of postage stamps, including one of McCord's newly named tortoise, a species Kaiser himself would no doubt seek to rename, perhaps even after his mate Mark O'Shea.

The evidence for all this is on Mark O'Shea's website at:

http://www.markoshea.info/gifts_raotl.php

where O'Shea also poses with the "killer snake tongs" he actively promotes (O'Shea 2010).

Notably Kaiser conceded to McCord at end June 2012, that he knew at all materially relevant times that the adverse claims against McCord were totally false and fabricated.

But this fact didn't stop Kaiser from sending it via SPAM email to a global audience of peers.

The call to action in this recent petition seeks additions of taxa to be renamed by this band of misfits and based on its original and unedited contents includes the Laurenti named genus *Caudisona* (see page 8, paragraph "1"), thereby in effect putting any of the many thousands of already recognized reptile taxa names at risk of being re-named by these misfits, which would effectively trash a sizeable portion of the global herpetological nomenclature!

In his covering e-mail dated 5 June 2012 for what was in effect a globally disseminated call to arms against the established rules of zoological nomenclature, Hinrich Kaiser wrote:

"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",

stating he would be sending the article to *Herpetological Review* for publication.

However an email sent to myself on 20 June 2012 and another to Richard Wells the following day by the editor of *Herpetological Review* stated that this article would not be published by them (Hansen 2012a, 2012b).

The so-called petition by Mark O'Shea and Wolfgang Wüster and their band of misfits is in effect a piece of online hate and in itself a direct violation of the Zoological Code of Ethics (Appendix A, Section 5), but noting that these men have effectively now waged a war on this code and all the stability and common-sense it stands for, their actions are not surprising.

Even more disturbing is that the document sent by Hinrich Kaiser of e-mail address chalcopis@yahoo.com is a draft copy I was not supposed to see.

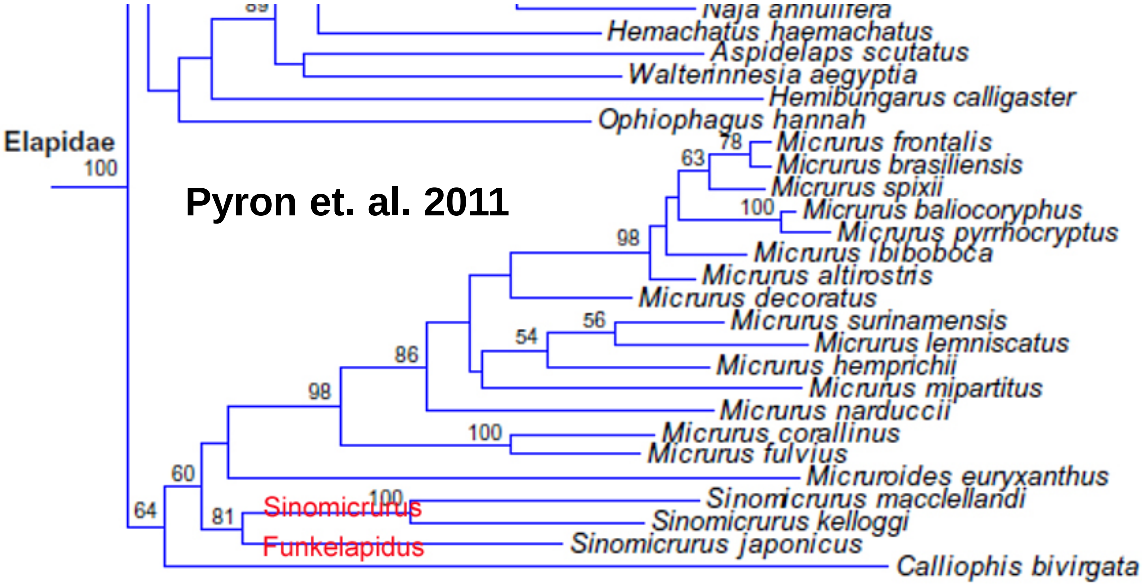
Noting that I am the prime subject of the raft of false claims being made, one would have thought that as matter of scientific rigor and procedural fairness, I'd have been the first to be contacted in terms of the claims so as to allow me the right to either confirm or rebut the contents.

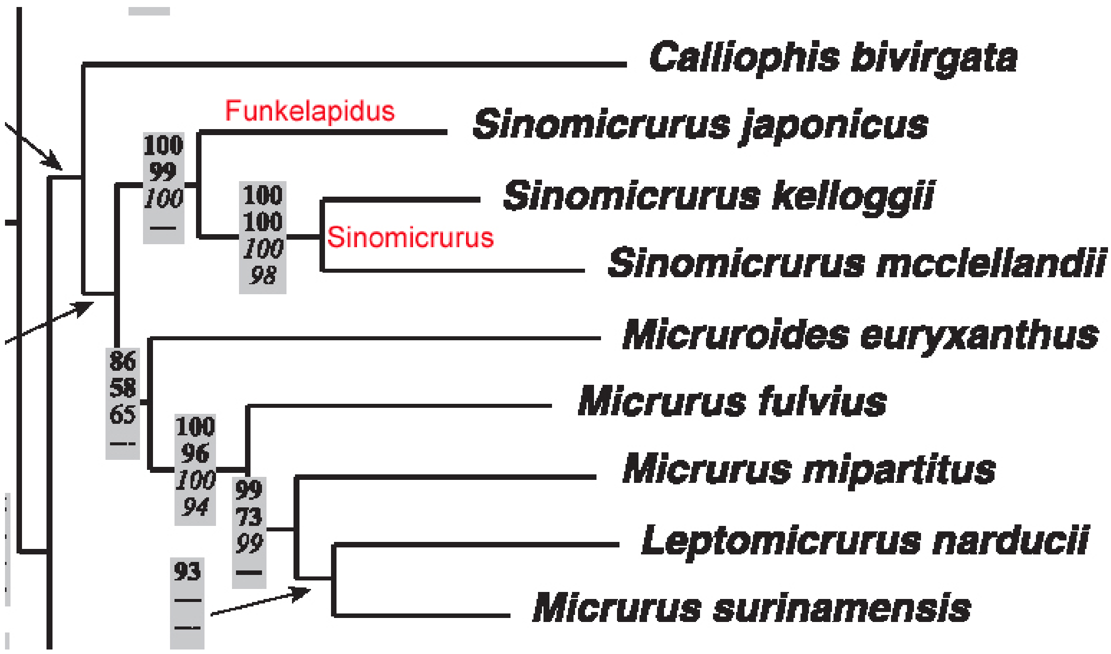
The failure of Hinrich Kaiser and his band of misfits to follow this most basic of procedure reflects adversely on any scientific or moral credibility they may have previously had.

Hinrich Kaiser's own lack of ethics is further shown in the sequence of events following my own obtaining of this hateful rant.

Both myself and Richard Wells e-mailed Kaiser on 20 June, as did McCord. Kaiser chose to reply to McCord but not answering

Two published phylogenies that support the taxonomic actions of Hoser 2012 in terms of the pre-existing genus *Sinomicrurus*.





A second phylogeny, similar to Slowinski et. al. 2011, from a third paper.

the questions McCord had put.

He chose not to respond to the e-mails from myself or Wells.

I merely asked Kaiser for an original of the documents, as well as for the names of the seven alleged herpetologists. That was the totality of my request.

Wells asked similar questions.

That Kaiser is willing to circulate such unmitigated rubbish in such a clandestine way and by deliberate avoidance of basic fact checking and the like, shows his own complete contempt for the scientific method of establishing truth.

THE SPECIFIC CLAIMS

In terms of the hateful document by the truth-haters my first instinct was to ignore it in total.

The document simply had no merit whatsoever!

These people hate the truth, so shoving it in their face publicly to correct their lies actually achieves very little.

They don't come out and say "sorry for defaming you".

In the period 1998 to present, the behavior of Wüster in particular has become well-known and apologies for getting things wrong don't ever come from him!

However, failure by myself to rebut in print the false claims by the truth-haters has in the past been treated by them as "proof" their claims against me are true.

The best example of this was when I delayed rebutting the false claims by Wallach, Wüster and Broadly (2009) due to the fact that I was a long way from home doing educational snake shows and this was treated by them as proof their false claims had merit.

Hence I have chosen to publish a response herein to these latest false allegations, lest I be accused of endorsing their warped ideas.

The claims made against me are made within a great deal of diatribe and "padding" repeating the general unsubstantiated claims all my papers are fraudulent, contain fabricated evidence or are "evidence free" interspersed with other claims against me that effectively contradict the main ones, including that my papers have evidence "lifted" from other people's papers and this is somehow a problem.

The claims made are herein summarized and my appropriate responses given below:

"Australian reptile keeper Raymond Hoser".

The inference is that a person who keeps live reptiles is unsuitable to publish taxonomic papers. This is rejected in the first instance. Would the truth-haters prefer someone with no experience with reptiles to publish papers on reptile taxonomy?

Secondly and the authors are well aware of this, my involvement and expertise with reptiles goes way beyond being a mere "keeper" or some other person's who's expertise is no more than cleaning feces from a cage.

"the deliberate scooping of other authors known to be working on the same taxon (discussed by Aplin 1999 and Wüster et al. 2001),"

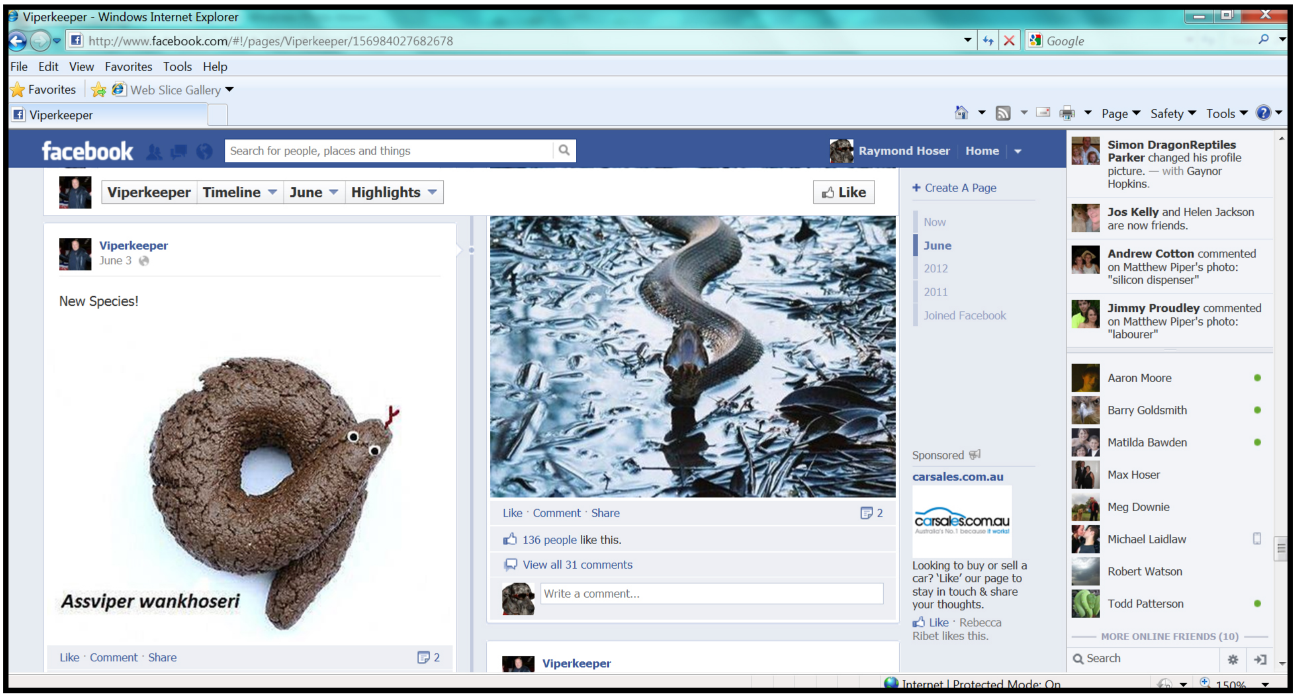
The claims are false.

Aplin (2009) (as cited) never claimed I knowingly stole other people's work. Wüster (2001) made this false claim and it has been shown to be false several times since including by Hoser (2012a).

"the invention of evidence, such as claimed mitochondrial DNA data when no laboratory work had been carried out (Williams et al. 2006)"

Another false claim. The citation to a fraudulent paper by convicted serial wildlife smuggler David John Williams of 2006 does not make the lie true. If the claim of fabrication of mitochondrial evidence is to be peddled, it should be against those who published the papers I have cited, such as Pyron et. al., Guo, et. al., Castoe et. al. and others.

In relation to false claims of mitochondrial evidence, I should



Because serial trolls have no common sense arguments, they resort to abuse, in yet more violations of the Zoological Code.

also mention that truth-hater Wulf Schleip made a false claim of possessing mitochondrial evidence to justify his erection of three new species of *Leiopython* in New Guinea in the abstract for the relevant paper, but a reading of the full paper showed he had no such mitochondrial evidence and none even existed! (see Schleip 2008).

In summary truth-hater Wulf Schleip created taxonomic confusion by erecting three species for which he did not have a shred of evidence!

Hoser has named taxa without evidence

This has been rebutted earlier.

Hoser has engaged in "the mass-harvesting of clades with potential for naming as genera from published phylogenetic studies"

To the extent that all snakes were subjected to audit, the claim has a factual basis and is true and correct! I also note my "mass-harvesting of clades with potential for naming as genera from published phylogenetic studies" implies there was in fact evidence to support my taxonomic actions.

This makes the other "evidence free" claims against my descriptions false.

Furthermore all taxonomic reviews do as matter of course look for obviously unnamed species or groups and names them if and when found. Mine was not the first such audit and will not be the last, whether in terms of snakes or any other higher vertebrates.

"all names are patronyms"

This is broadly correct and no apology is required.

A patronym is a scientific name after a person or thing (like a pet dog), as opposed to one describing the animal in some way, usually using the dead language Latin.

There are several sensible reasons for this. Firstly and most importantly the Zoological Code allows this. Secondly the practice is widespread, acceptable and effectively a standard in modern zoology. It is not as if I am somehow a renegade in using patronyms. Thirdly, the alternative is naming via a Latinized description of the taxon. The only benefit of this course of action is on the presumption that the reader knows and understands the dead language Latin. Outside of the taxonomist community, most people on the planet have no understanding of Latin. More significant is the rule of homonymity; that is no two organisms can have the same scientific name. When the Linnean system of nomenclature was devised there was little conflict in terms of names as the total number of described species taxa was only numbered in the few thousand. Now with an estimated million or more metazoan organisms formally named it has become nearly impossible to coin a descriptive Latin name for a taxon without finding it already occupied by another organism.

In fact I even found difficulty assigning some patronyms on the basis of prior occupation by another organism or group, meaning some were simply not used.

I also note that running an argument against a person's taxonomy or nomenclature on the alleged basis of use of patronyms shows how devoid of merit their case really is!

PS The complaint about naming more than one species after a given person also lacks merit.

Here's a few examples from the many thousands of patronyms in use: *Boiga wallachi* Das, 1998, *Leptotyphlops broadleyi* Wallach and Hahn, 1997, *Nothophryne broadleyi* Poynton, 1963, *Elapsoidea broadleyi* Jakobsen, 1997, *Leptopelis broadleyi* Poynton, 1985, *Dipsadoboa broadleyi* Rasmussen, 1989, *Atheris Broadleyi* Lawson, 1999, *Platysaurus broadleyi* Branch and Whiting, 1997, *Pelusios broadleyi* Bour, 1986, *Lygodactylus broadleyi* Pasteur, 1995, *Ptychadena broadleyi* Stevens, 1972 (has anyone yet suggested banning naming things after Donald Broadley?) or *Oedura coggeri* Bustard, 1966; *Oxydactyla coggeri* Richards and Menzies, 2004; *Ctenotus coggeri* Sadlier, 2005; *Hydrophis coggeri* Kharin, 1984; *Emoia coggeri* Brown, 1991; *Lampropholis coggeri* Ingram, 1991; *Geomyersia coggeri* Greer, 1992; *Mixophyes coggeri* McDonald, Richards and Alfred, 2008 (has anyone yet suggested banning naming things after Hal Cogger?) or *Rhynchophis boulengeri* Mocquard, 1897; *Neolamprologus boulengeri* (Steindachner, 1909); *Cylindrophis boulengeri* Roux, 1911; *Mantidactylus boulengeri* (Methuen, 1920); *Hynobius boulengeri* (Thompson, 1912); *Atelopus boulengeri* Peracca, 1904; *Cryptobatrachus boulengeri* Ruthven, 1916; *Scinax boulengeri* (Cope, 1887); *Morethia boulengeri* (Ogilby, 1890); *Scutiger boulengeri* (Bedriaga, 1898); *Pseudepidalea boulengeri* (Lataste, 1879); *Gephyromantis boulengeri* Methuen, 1919; *Cornufer boulengeri* Boettger, 1892; *Epipedobates boulengeri* (Barbour, 1909); *Amblycephalus boulengeri* Angel, 1920; *Liolaemus boulengeri* Koslowsky, 1896; *Lepidiolamprologus boulengeri* (Steindachner, 1909); *Bryconaethiops boulengeri* Pellegrin, 1900; *Trachyboa boulengeri* Peracca, 1910; *Lamprologus boulengeri* (Steindachner, 1909); *Boulengerinia* Dollo, 1886 and many other *boulengeri* species noting that no one ever suggested too many were named after Mr. George Boulenger!

Or if scraping the bottom of the barrel, *Elseya irwini* Cann, 1997 and *Crikey steveirwini* Stanisic, 2009, both named in honour of Steve Irwin, who ripped off the original Crocodile Hunter Mick Pitman's trademark name "The Crocodile Hunter" and then made a fortune in unspeakable acts of animal cruelty that was broadcast on international TV.

"Without exception, Hoser's taxonomic decisions were published in outlets whose evaluation processes, if they exist, are not designed to safeguard scientific rigor."

The claim is rejected. All *AJH* papers were reviewed by at least four qualified persons.

Other papers I have published that are subject to the same ambit claim by the truth-haters are in peer reviewed journals over which I had no editorial control or influence.

Secondly, if the papers and the actions within fail scientific rigor (as falsely alleged), then the taxonomic conclusions and nomenclature will never be used. That would be the end of the matter and is how the content of the many thousands of papers lacking merit published over the past 200 years in the peer reviewed literature have ended up.

There has never been the need for a campaign to invoke criminal sanctions on people who choose to use valid scientific names!

However, assuming the recent "Hoser" papers have scientific rigor, then the taxonomy used within will come into general usage. This is what the truth-haters know and fear!

"the stated goal (e.g., Hoser 2012f:3, 2012i:45) to fulfill the minimal requirements of the International Code of Zoological Nomenclature"

This quote is taken out of context. The quote is made in the context of advising truth-haters not to make false claims that the journals don't comply with the code so that they can destabilize the nomenclature in violation of the Zoological Code, exactly as Wallach, Wüster and Broadly (2009) did!

"In the case of each taxonomic decision a trail of evidence is either lacking, fabricated, or lifted from others,"

The first two claims are rejected. The third is entirely true when relevant! Reliance on other people's data when making taxonomic decisions is entirely appropriate in many cases and I make no apologies for this. Failure to rely on important relevant studies when making taxonomic judgements would be negligent and reckless and that is not how I operate.

I note that in the ambit claim in the passage above, there is no evidence to support the first two false allegations.

I also note that the claim I have "lifted from others" implicitly states that there must have been evidence to lift, thereby refuting a central claim against my papers!

Hoser 2012 - Australasian Journal of Herpetology 14:37-64.

"Hoser has also shown his unwillingness and inability to engage in a mature scientific discourse"

The claim is totally false, but does accurately reflect the position of the truth-haters Wüster, O'Shea and most notably Kaiser himself, who has refused to answer e-mails from two of three targets of his rant that contacted him.

Hoser (2012) constitutes a proper response to a decades worth of lies and abuse from truth-haters Wüster, O'Shea, Williams and Schleip.

In terms of mature scientific discourse, I note the widely posted images I lifted from the facebook page of Wüster's close friend Al Coritz (republished here), in breach of the Zoological Code.

"he has repeatedly failed to take up offers to respond to criticism of his publications in the same journals that published this criticism (Hoser 2012a; van Aken and van der Voort 2001)."

The claim is false. The references cited contradict the claim attributed to them!

"scientists know to exercise care and caution in order to properly judge the merits of the material they choose to incorporate into a study."

Agreed!

That's why as a scientist I incorporated the various studies cited in each paper. If I had made an error of scientific judgement in terms of reliance on studies cited, the truth-haters should have addressed this instead of raising unspecified and false claims against me.

In tacit agreement with my actual methodology (as opposed to false claims) the truth-haters wrote: "These two lines of evidence are required for taxonomic investigations. They act as a base for further research, so later work does not have to begin the evidence-collection process *de novo*." and then "The third line of evidence is the existing scientific literature", which I have apparently committed the "crime" of relying on to support my own conclusions.

"For instance, Hoser's (2009c) reclassification of the rattlesnakes, widely ignored everywhere else, led to the Sociedade Brasileira de Herpetologia changing the name of the neotropical rattlesnake in the *Lista Brasileira de Répteis* from the universally accepted *Crotalus durissus* to *Caudisona durissa* as part of its efforts to maintain a neutral stance, with the result that both names are now circulating in parallel in the Brazilian literature (Wüster and Bérnils 2011)."

The above claims failed to mention that the Hoser rattlesnake reclassification was not "ignored" after publication. In fact the contrary was true, the names appearing widely in third party publications as well as on the CNAH website, with site owner Joseph Collins being a vocal supporter of my rattlesnake taxonomy (Hoser 2009g, Hoser 2012a, p. 53 for the facsimile of an incoming e-mail by Joseph Collins).

However after Wallach, Wüster and Broadly (2009) falsely alleged that the names were not validly published under the Zoological Code, widespread usage of the names was effectively stopped due to the deliberate confusion they created in violation of the Zoological Code.

By the way, *Caudisona* is not a "Hoser name". It is in fact a Laurenti name from 1768, so it is even more disturbing that the truth-haters seek to stop use of a valid scientific name with a pedigree in excess of 240 years!

The fact the truth-haters seek to stop use of a 240 year-old name is mentioned in the context of the final demand of the truth-haters in their document (see below), where they seek to assert re-naming rights on all reptile species.

"Taxonomists are relegated to "redescribing" taxa whose validity they established, but that were named pre-emptively in acts of mass-naming or in deliberate acts of intellectual kleptoparasitism (e.g., Aplin and Donnellan 1999; Rawlings et al. 2008)."

The above is copied herein as part of the truth-haters rant and not because it applies in my case. I note however that the claim is made against me and then ostensibly supported by two cited references. However neither of the references contain anything remotely resembling the claim attributed to them. In other words the claim fails as fraudulent on the basis that the cited references don't support it. This means the document by the truth-haters is produced with a veneer of truthfulness and verification when in fact there is none!

There are numerous similar cases in the same rant, which I have not detailed herein on the grounds of tedium.

"Applications of herpetological taxonomy. Confusion about names may cause genuine harm in endeavors relying upon accurate taxonomy and the correct identification of organisms."

This is true, but applies against the truth-haters and not for them.

By way of example, in the Australian context failure to correctly identify regional variants of Brown Snakes (*Pseudonaja* spp.) and their different bite pathologies has caused deaths otherwise avoidable. My accurate diagnosis of the regional subspecies of *P. textilis* in *AJH* Issue 11 is an important step in reducing this mortality.

I raise this to show how the truth-haters twist things around to make them appear the opposite of the reality.

"Science and the public. The public trust in science is eroded when information lacking evidence is presented as fact and permeates what is assumed to be a scientific discourse. The often-strident tone of exchanges surrounding unethical and unscientific taxonomic acts (Borrell 2007) further diminishes the entire discipline in the eyes of the public."

Agreed, this argument goes to the core of the danger of the truth-haters rants. Evidence free criticism of scientific papers brings so-called scientists into disrepute.

I note also the evidence free claims of these same truth-haters (in particular Wüster) that the Hoser venomoids have regenerated venom and their placement of such false and ostensibly scientific claims on the popular website Wikipedia, (see the Wikipedia page Wüster has created for "Raymond Hoser" and all the obvious false statements he has posted there, via the publicly available "edit history").

"Following the *intent* of the Code and its stated mission of promoting "standards, sense, and stability for animal names in science" may require overriding the *letter* of the Code".

This is a call by the truth-haters to scrap the Zoological Code. It is ironic that after years of falsely claiming my papers were a problem because I (allegedly) failed to comply with the Zoological Code, they now complain they are a problem because they DO comply with the code!

They are also attacking the code directly.

"we propose that a 9-member herpetological consortium with rotating, global representation is formed to establish a *List of Available Names in Herpetology*."

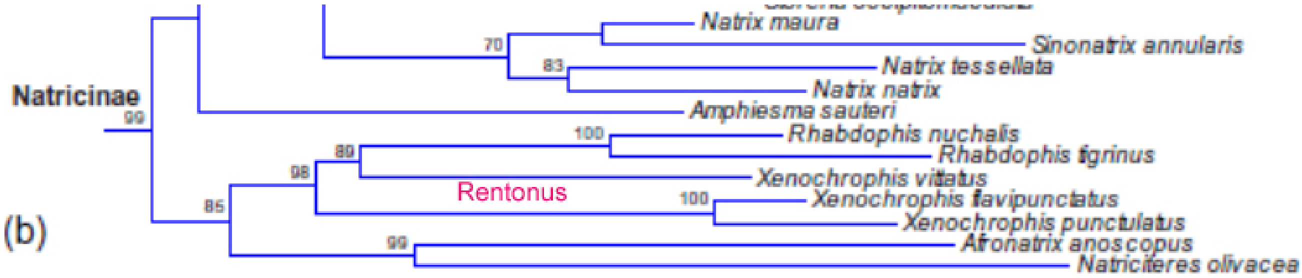
This is simply a grab for power by the truth-haters and their self-appointed "consortium".

They seek to usurp the ICZN, to assert naming rights on all previously named reptiles, to rename all species as they see fit, shamelessly ripping off the work of other zoologists and in violation of a Zoological Code that's operated for more than 200 years!

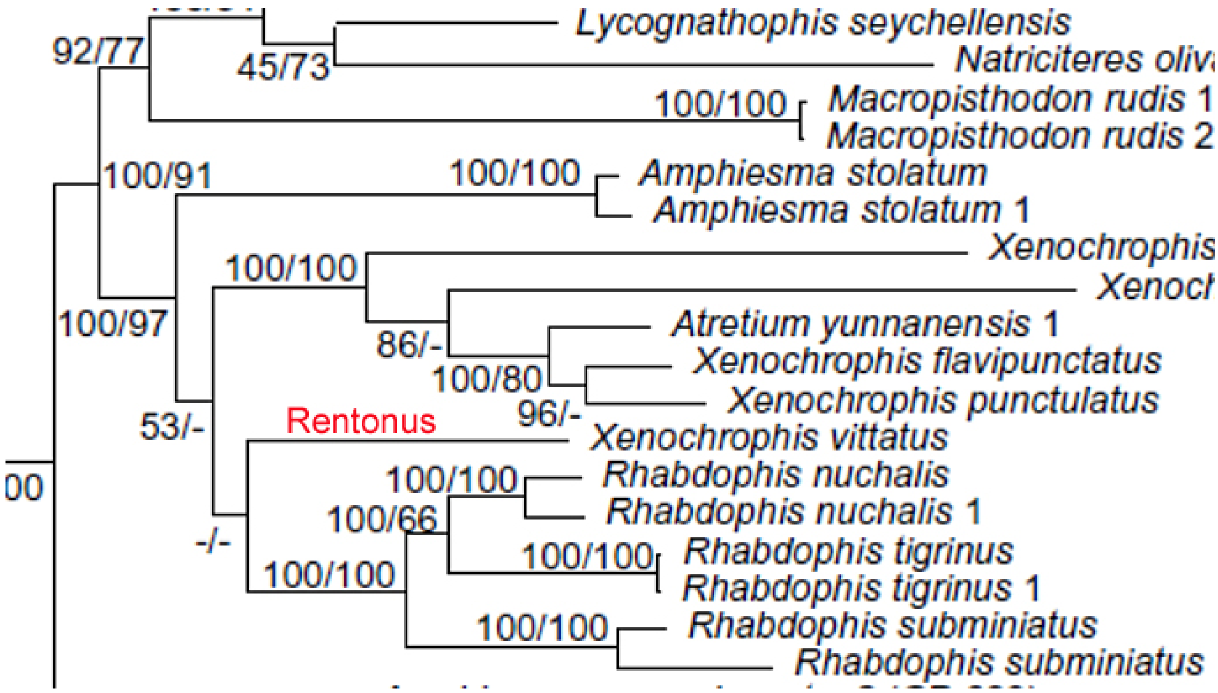
REFERENCES CITED

Aplin, K. P. and S. C. Donnellan. 1999. An extended description of the Pilbara death adder, *Acanthophis wellsi* Hoser (Serpentes: Elapidae), with notes on the desert death adder, *A.*

Two published phylogenies that support the taxonomic actions of Hoser 2012 in terms of the pre-existing genus *Xenochrophis*.



Pyron et. al. 2011



A second published phylogeny similar to that of Pyron et. al. (above).

pyrrhus Boulenger and identification of a possible hybrid zone. *Rec. W. Austral. Mus.* 19:277-298.

Castoe, T. A., Chippindale, P., Campbell, J., Ammerman, L. K. and Parkinson, C. L. 2003. Evolutionary Relationships of the Middle American Jumping Pitvipers (Genus *Atropoides*) and Phylogeography of the *Atropoides nummifer* complex. *Herpetologica*, 49:421-432.

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

Hoser, R. T. 2000. A revision of the Australasian pythons. *Ophidia Review* 1(1):7-27.

Hoser, R. T. 2004. A reclassification of the Pythoninae including the description of two new Genera, two new species and nine new subspecies. *Crocodilian* 4(3/4):21-40. (online via links from http://www.herp.net).

Hoser, R. T. 2009a. One or two mutations doesn't make a new species … The taxonomy of Copperheads (*Austrelaps*)(Serpentes:Elapidae). *Australasian Journal of Herpetology* 1 (2009):1-28. (1 January).

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

Hoser, R. T. 2009c. A new genus and a new species of skink from Victoria. *Australasian Journal of Herpetology* 3 (2009):1-6. (4 February).

Hoser, R. T. 2009d. Eight new taxa in the genera *Pseudonaja* Gunther 1858, *Oxyuranus* Kinghorn 1923, and *Panacedechis* Wells and Wellington 1985 (Serpentes:Elapidae). *Australasian Journal of Herpetology* 4 (2009):1-27. (9 February).

Hoser, R. T. 2009e. Pain makes venomous snakes bite humans. *Australasian Journal of Herpetology* 5 (2009):1-21. (10 February).

Hoser, R. T. 2009f. A reclassification of the Rattlesnakes; species formerly exclusively placed in the Genera *Crotalus* and *Sistrurus*. *Australasian Journal of Herpetology* 6 (2009):1-21. (9 March).

Hoser, R. T. 2009g. Two e-mails to Joseph Collins, CNAH, (including his reply) dated 12 March 2009.

Hoser, R. T. 2009h. A reclassification of the True Cobras; species formerly referred to the genera *Naja*, *Boulengerina* and *Paranaja*. *Australasian Journal of Herpetology* 7 (2009):1-15. (23 March).

Hoser, R. T. 2012a. Exposing a fraud! *Afronaja* Wallach, Wüster and Broadley, 2009 is a junior synonym of *Spracklandus* Hoser, 2009! *Australasian Journal of Herpetology* 9:1-64.

Hoser, R. T. 2012b. *Australasian Journal of Herpetology* Issues 10-12, (64 pp., 64 pp. 76 pp.).

Kaiser, H. 2012. SPAM email sent to Harold G. Cogger and many others on 5 June 2012, 19:03:34 -0700 (PDT), and two MS Word attachments, anonymous rants attacking Raymond Hoser, Richard Wells and William McCord, calling for a general abandonment of the Zoological Code.

Kuchling, G., Rhodin, A. G. J., Ibarrondo, B. R. and Trainor, C. R. 2007. A New Subspecies of the Snakeneck Turtle *Chelodina mccordi* from Timor-Leste (East Timor) (Testudines: Chelidae). *Chelonian Conservation and Biology* 6(2):213-222.

McCord, W., Joseph-Ouni, M. and Hagen, C. 2007. A New Species of *Chelodina* (Testudines: Chelidae) from Eastern Timor Island (East Timor). *Reptilia*:53-57.

O'Shea, M. 2010. Post at: http://www.markoshea.info/gifts_raotl.php

O'Shea, M. 2012. Post at: http://www.facebook.com/#!/pages/Daily-Reptile-News/123173187727554 on 17 May.

Pyron, R. A., et. al. 2010. The phylogeny of advanced snakes (Colubroidea), with discovery of a new subfamily and comparison of support methods for likelihood trees. *Mol. Phylogenet. Evol.* 58:329-342.

Rawlings, L. H., Rabosky, D. L., Donnellan, S. C. and Hutchinson, M. N. 2008. Python phylogenetics: inference from morphology and mitochondrial DNA. Biol. J. Linn. Soc. 93:603-619.

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

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

van Aken, G. and van der Voort, M. 2001. From the editors. *Litt. Serpentium* 21:66.

Wallach, V., Wüster, W. and Broadley, D. G. 2009. In praise of subgenera: taxonomic status of cobras of the genus *Naja* Laurenti (Serpentes: Elapidae). *Zootaxa* 2236: 26-36 (2009), online paper downloaded from http://www.mapress.com/zootaxa/2009/f/zt02236p036.pdf on 27 September 2009, via http://www.mapress.com/zootaxa/taxa/Reptilia.html.

Wüster, W. and Bérnils, R. S. 2011. On the generic classification of the rattlesnakes, with special reference to the Neotropical *Crotalus durissus complex* (Squamata: Viperidae). *Zoologia* 28: 417-419.

Note 1: This citation list excludes those not referred to directly and specifically within this response paper, noting those others are cited in the Kaiser petition published herein.

Note 2: As per what's written at the top of the appendix list of target taxa and the document itself, I took the liberty of bolding taxa that should be excluded from the "hit list" (as requested implicitly) and indicated why. I also added four clearly invalid taxa omitted from the list as described by Wallach et. al. (2009) and Schleip (2008) giving reasons.

In order to show the content of the list as sent out by Kaiser, my corrected and added list is printed herein!

http://www.facebook.com/permalink.php?id=123173187727554&story_fbid=397980823580121
Daily reptile news
May 17 at 9:18pm
In my opinion this new list makes a mochary of people who spent their lives working with these animals. It has been done for recognition only and in no way to benefit the hobby, community or Herpetology as a science and I only hope no one looks at it with any seriousness. The post below is Via Mark O'Shea

Chris' post below caused me to look at hoser's page and low, he had conveniently posted a list of the new genera and subgenera (genera, not mere species!) he had named in the 12 issues of his own AJH journal. I counted them and there were 61! That may be more than the great herpetologists of the 19th-20th century managed in an entire career, luminaries like Fitzinger or Boulenger or inveterate namers like Gray, and Hoser adds a note that this does not include genera he named prior to the inception of AJH.

The full list of AJH genera is below and if I am not mistaken most of them are patronyms, named in honour of some person rather than the geographic origin or some distinguishing characteristic of the taxa, and guess what, no less than 13 are named for his family, including his dog, the name hoser appearing 12 times in the list, how pompously egotistical is that!

All his friends (yes he does have some), former Snakebusters employees and a few people who ought to know better (Rob Sprackland, Dr Funk, Tom Crutchfield, Allen Greer) are 'honoured' too. I just think it is a good job Mrs Hoser is not a fan of ancient crooner Engelbert Humperdinck, else who knows what we would get.

When we talk about leaving pollution for future generations that might not just mean nuclear waste, weapons stockpiles, lakes of poisonous chemicals or massive piles of non-biodegradable car tyres, it may just well mean dozens and dozens of pointless hoser names.

Below is the list - why don't you play find the hoser, if you get all 13 you get a prize, something named after you!

Laugh, I almost did!
I would have if I didn't know he is serious, he believes the rest of the herpetological community in every country on this planet should be force-fed his names like a paté foie gras goose!

Subject: Fwd: Point of View needs your help
From: scott_eipper@hotmail.com
Date: Mon, 18 Jun 2012 17:12:41 +1000
To: envirodata@hotmail.com

Nature 4 You
0419 328 251
Scott_eipper@hotmail.com <mailto:Scott_eipper@hotmail.com>

Begin forwarded message:
From: Hal Cogger <h.cogger@bigpond.com <mailto:h.cogger@bigpond.com>>
Date: 15 June 2012 8:03:59 PM AEST
To: Scott Eipper <scott_eipper@hotmail.com <mailto:scott_eipper@hotmail.com>>
Subject: Fwd: Point of View needs your help
Hi Scott - this is the email I told you about - Hal

———— Original Message ————
Subject: Point of View needs your help**Date:** Tue, 5 Jun 2012 19:03:34 -0700 (PDT)**From:** Hinrich Kaiser <chalcopis@yahoo.com> <mailto:chalcopis@yahoo.com>**Reply-To:** Hinrich Kaiser <chalcopis@yahoo.com> <mailto:chalcopis@yahoo.com>**To:** Hinrich Kaiser <chalcopis@yahoo.com> <mailto:chalcopis@yahoo.com>
Dear Friends,

I am acting as secretary for the purpose of neutral dissemination of the attached Point of View manuscript, put together by an international group of seven respected herpetological taxonomists. We send this message and its attachments to you with some urgency, and we request your participation.

As you may know, some authors circumvent conventional scientific processes in herpetology and publicize names not for the purposes of science but for their own aggrandizement. Please view examples of this by downloading Issue 12 of the “Australasian Journal of Herpetology” at <http://www.smuggled.com/AJHIP1.htm>. We consider this practice unscientific, unethical, and a form of scientific fraud. If we, as professionals, stand idly by while this fraud is perpetrated, then we ourselves become complicit.

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.

We also hope that this issue, and maybe our ideas for a solution, will be discussed in the Annual Meetings of ASIH, HL, and SSAR at the upcoming World Congress of Herpetology, where we will gladly make ourselves available to answer questions. Please feel free to contact me should you wish to learn the identities of the contributors.

Thank you for your time and support,

Hinrich

Hinrich Kaiser PhD FLS
Associate Professor, Department of Biology, Victor Valley College
Research Collaborator, National Museum of Natural History
Member, International Advisory Board, Foundation for Post-Conflict Development

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From: envirodata@hotmail.com
To: chelodina@aol.com; austwildlife@telstra.com; ap_dudley@yahoo.com.au; stefano.alcini@libero.it; chris@harrispartners.com.au; h.cogger@bigpond.com; j.cann@optusnet.com.au; patrickc@qm.qld.gov.au; contactus@gondwanareptileproductions.com; m+80cu7cd4000000sp1whg003o0auhspnq232@reply.facebook.com; drtjhawkeswood@calodema.com; scott_eipper@hotmail.com; glenn.shea@sydney.edu.au; viper007@live.com.au; vkharin@imb.dvo.ru; m+83rjvng000000sp1whg002iwmb52ovh21w@reply.facebook.com; mikeswan@bigpond.com.au; steve@biolink.com.au; rwrossco@gmail.com; uetz@vcu.edu
Subject: A Paper to Nail to the Dunny Door
Date: Mon, 18 Jun 2012 18:53:08 +1000
Hi Bill,

Have a look at what I just received- which I have named *“A Pathetic Justification of Intellectual Theft by Professional Herpetologists - An Introduction to Hypocritical Self-Serving Bullshit By an Anonymous Pack of Morons”*

Outside of the fact that you have been more or less accused of wildlife smuggling (!), and that both you and I have been wrongly accused of what is implied criminal fraud, I find the most disturbing aspect of the **retrospective** suppression of lawfully (and I might add, ETHICALLY) published names particularly abhorrent. They may believe that accusing Hoser of fraud or whatever automatically justifies them doing the same to me, but I can assure you or anyone else that they are making a grave mistake in doing so. I don’t know who is really behind this document, but rest assured my lawyers will find out.

As for what has been said of Hoser well, I’ll leave it to Hoser to explain his own actions - although I strongly suspect that he is their main target.

You may note that they have dared not to accuse me directly with any specific discussions of my contributions because they know full well that all my articles are validly published and Available under the Code, and that none are derived from any fraudulent, unethical or unscientific practices - which is something that CANNOT be said of certain so-called professional herpetologists that are likely involved in this smear. However, what I did do of course was publish on matters that the morons in herpetological taxonomy have no knowledge of at all, and the suppression of my efforts will of course make it possible for the real intellectual thieves to steal MY work.

Anyway Bill, I would be pleased to get your thoughts on this appalling document. I should point out that Cogger’s involvement would appear merely as a recipient (like who knows how many others), so it should not be assumed that he is an author at this stage.

It will be most interesting to see the final list of signatories that it will attract - and to help them out to beef up their authorship targets, I might circulate their manuscript in the brothels of Kings Cross where quite a large number of appropriately qualified signatories may be found, considering the nature, intent and content of their snotty little piece of shit.

As always Bill, my best regards to you and yours

Richard

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Notes: The following document (at this stage anonymously authored) but circulated on 5 June 2012 by Hinrich Kaiser, is published herein as received and not altered in any way.

The appendix sent with the document is also published elsewhere in this journal, including all originally listed taxa, but with comments added in the “comments” column as requested and with the addition of four taxa.

POINT OF VIEW

In the 21st Century, Taxonomic Decisions in Herpetology are Acceptable Only When Produced Ethically and Supported by a Body of Evidence Accumulated via the Scientific Method

Rapid publication and quick dissemination of scientific information has been a successful trend across all research fields, including herpetology, over the last decade. For taxonomists, this trend can be both curse and blessing: whereas many emerging electronic or rapid-print journals are reputable, rigorously scientific in their approach, thoroughly peer-reviewed, and edited well, nonprofessional herpetological sources of taxonomic decisions exist, whose unclear mission interferes with authoritative scientific structures. If the taxonomy presented in such sources is allowed to diffuse into scientific herpetology and the public realm unchecked, then the underpinnings of herpetological science are undermined by misinformation. While this can have profound effects on how professional herpetologists conduct their craft (“science for science’s sake”), it also creates serious repercussions for applied science (“science for the greater good”). If we, as professional herpetologists, desire to maintain the scientific community’s trust, and wish to attest to the institutions and the public we serve that we deserve their material support (see the discussion in Carraway 2009), can we stand idly by and permit taxonomic facts to be produced unethically (e.g., ASIH 2009, SSAR 2012, Steneck 2007) or without conforming to the standards of science? In our point of view, the answer is a clear “no.” Herpetologists, and scientists in general, must be accountable when our activities have the broad practical applications they have today (see below). We believe this commitment includes taking an active role as a community in monitoring the ethics and the evidence displayed when taxonomic decisions are publicized.

In the corner of science occupied by taxonomic herpetologists, three main tasks define the workload: (1) Generate hypotheses of group membership (e.g., a genus, a species, a clade) or relationship (e.g., sister taxa) using legally available, willingly shared, primary sources (e.g., existing or new collections of specimens including whole animals, tissues, and DNA sequences) and the available literature; (2) test hypotheses via data analysis; (3) submit proposed taxonomic decisions (e.g., generic realignments, new species, elevation of subspecies to full species rank) to peer-reviewed journals in the form of a manuscript that displays the data and gives a full accounting of the rationale underlying proposed decisions. These three transparent steps assure that names and arrangements of taxa are properly grounded in evidence.

We have become concerned that, especially since the year 2000, unreliable taxonomic works from questionable sources have emerged with increasing frequency (see Appendix 1), short-cutting or circumventing these three steps. Names proposed therein have negative ramifications; they unnecessarily destabilize taxonomy, but also confound conservation efforts, medical herpetology, academic processes, grant administration, and how the public views science as a whole. As scientists, it is part of our mandate to safeguard the processes by which we develop the provisional truths in our area of expertise. It is therefore a scientist’s duty to take a stand against unscientific and unethical taxonomic information, lest we allow disinformation to incorrectly falsify evidence-based hypotheses (Carraway 2009). We therefore propose to reject taxonomic decisions that can objectively be classed as unethical, fraudulent, or lacking evidence, beginning with publications dated 1 January 2000 (Appendix 1).

How bad can it be?-We have selected two specific examples to bolster our assertion that unscientific, unethical, or fraudulent taxonomy poses a serious threat to herpetological research and its applications. These cases are among the most notorious in the last decade for having violated the ethical and procedural considerations we outline above, and in each case their ramifications have been discussed in the professional literature. Moreover, in both cases the damage to taxonomy itself is dwarfed by the repercussions for conservation and species management, and how herpetological science is viewed in the public eye. Unfortunately, no broader conclusions of how to address these challenges have emerged from the discussions. Therefore, these cases serve as suitable anchor points for the discussion of acceptable scientific procedures leading to taxonomic decisions that follows below.

McCord et al. (2007b) published the description of a new species of snake-necked turtle (genus *Chelodina*). This paper was released in a British hobbyist journal and presented unsuitable evidence in a species description designed to beat a parallel effort (see Note in Proof in Kuchling et al. 2007). Other than the problems with the science and the ethics explained by Kuchling et al. (2007), it also seems that the specimens on which the species description was based (one preserved juvenile designated as the holotype and two living specimens designated as paratypes) were illegally exported from Timor-Leste (Manuel Mendes, Director of National Parks, Government of Timor-Leste, pers. comm.), were illegally imported into the United States (it is currently illegal to import CITES II-listed species into the United States from Timor-Leste, a non-CITES signatory nation; T. Van Norman, Chief, Branch of Permits, U.S. Fish and Wildlife Service, in litt.), and were deposited in the American Museum of Natural History (AMNH) using documentation that gave the appearance of legitimacy (D. Kizirian, Curatorial Associate, AMNH, pers. comm.). The

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problems caused by the new name included whether and how to adjust species management decisions, with respect to CITES as well as in terms of local laws, and some confusion was caused among regional wildlife managers. The manner in which the specimens were procured and the work was produced exposed apparently illegal activities, which places herpetological taxonomy in a bad light. In summary, this paper violated most of the acceptable principles discussed below, and the proposed taxonomic decision was neither based on sufficient evidence nor on ethical principles.

Since 1 January 2000, Australian reptile keeper Raymond Hoser has named one family, 34 tribes, 32 subtribes, 43 genera, 29 subgenera, 20 species, and 36 subspecies of reptiles, covering Old World and New World venomous snakes as well as pythons and skinks (Appendix 1). Startlingly, these names constitute 58% of all genus-group names and 13% of all species-group names for snakes in the period 2000-12. These invariably single-author works have included (1) the deliberate scooping of other authors known to be working on the same taxon (discussed by Aplin 1999 and Wüster et al. 2001), (2) the naming of allopatric populations without evidence, (3) the invention of evidence, such as claimed mitochondrial DNA data when no laboratory work had been carried out (Williams et al. 2006), (4) the repeated description of the same taxon as new (e.g., *Leiopython albertisi barkeri* was first described by Hoser [2000a], re-described as *L. albertisi barkerorum* by Hoser [2009a], and again by Hoser [2012b]), and, more recently and ongoing, (5) the mass-harvesting of clades with potential for naming as genera from published phylogenetic studies (e.g., the majority of papers produced by Hoser in 2012, cited below). In the last case, new genera were named by splitting established monophyletic groups, sometimes into monotypic genera, irrespective of levels of branch support for any given tree topology. Furthermore, it is becoming apparent that names are coined and issued not for the purpose of science but for their author's aggrandizement: all names are patronyms, and a majority includes the author's surname, or the names of his relatives, employees, or even pets.

Without exception, Hoser's taxonomic decisions were published in outlets whose evaluation processes, if they exist, are not designed to safeguard scientific rigor. Most recently (e.g., Hoser 2009a-e, 2012a-ac), Hoser has published in the *Australasian Journal of Herpetology* (*AJH*), a publication that features only taxonomic decisions and is edited, produced, and mailed by Hoser with the stated goal (e.g., Hoser 2012f:3, 2012i:45) to fulfill the minimal requirements of the International Code of Zoological Nomenclature (hereafter, the Code). In the case of each taxonomic decision a trail of evidence is either lacking, fabricated, or lifted from others, and the text usually includes information irrelevant to the taxonomy, such as polemics against taxonomic herpetologists (e.g., Hoser 2012a; see Aplin 1999; Borrell 2007; Schleip 2008; Schleip and O'Shea 2010; Wallach et al. 2009; Williams et al. 2006; Wüster et al. 2001), wildlife officials (e.g., Hoser 2012f:12), or even sitting judges in courts of law (e.g. Hoser 2012i:45). In attacks on the journal *Zootaxa* (e.g., Hoser 2012a) and correspondence peppered with invective (A. M. Bauer, pers. comm.), Hoser has also shown his unwillingness and inability to engage in a mature scientific discourse (*sensu* Stehr and Simmons 1979; Battalio 1998), such as through publication in *Zootaxa* or another scientific outlet, and he has repeatedly failed to take up offers to respond to criticism of his publications in the same journals that published this criticism (Hoser 2012a; van Aken and van der Voort 2001).

A Matter of Process.-Works violating scientific principles in herpetology most commonly involve taxonomy and nomenclature. Whereas taxonomy is considered to be a scientific endeavor, nomenclature is a tool to stabilize the use of names corresponding to particular taxonomic findings (*sensu* Mayr 1969, Simpson 1961; but see Crother 2009, who argued that names represent hypotheses of relationship). The Code and the rulings of the International Commission of Zoological Nomenclature (ICZN) traditionally safeguard the process of nomenclature, but unfortunately these safeguards do not extend to the taxonomic processes by which names are established in the first place. As ICZN commissioner Douglas Yanega expressed (Yanega 2009), "I think the present system by which we name species is not policed effectively and has loopholes and ambiguities. For example, scientific names can be published in journals without peer review. Although that freedom is fine, the reality effectively permits taxonomic vandals to plagiarize others or publish without scientific merit." This is the area of herpetology where problems have arisen: when the Code protects names produced via unethical or evidence-free processes. Taxonomy and nomenclature are interdependent and related as follows (Burbrink et al. 2007): "Taxonomy is informed by phylogenetics, and this information is used in the naming of biodiversity (nomenclature) and in the organization of named groups (classification). All systems of classification and nomenclature that are based on evolutionary hypotheses (phylogeny) provide ranks and names for only monophyletic groups." The interdependent relationship of phylogeny, taxonomy, nomenclature, and classification, means that when evidence is missing the taxonomy, nomenclature, and classification will be unethically rendered and may turn out to be based on fraud. The following paragraphs are intended to define the process by which legitimate taxonomic decisions are made and to propose a solution to this dilemma.

Evidence.-Gathering information in science must be a careful, deliberate, and comprehensive effort that produces a transparent chain of evidence. To infer taxonomic hypotheses, three lines of evidence are generally accepted. First, evidence is collected through field- and laboratory work, which begins with samples (e.g., whole specimens, animal parts, tissue samples) from known phenotypes collected in nature with precisely known provenance. These samples are deposited in institutions where their curation makes them accessible to other researchers for subsequent hypothesis testing.

Second, evidence is sourced from samples in museum collections or from published genetic information (e.g., GenBank), which were ultimately obtained in accordance with the manner described above. In the case of museum specimens whose provenance is not precisely known, or whose phenotypic characteristics were not detailed well in life, scientists know to exercise care and caution in order to properly judge the merits of the material they choose to incorporate into a study.

These two lines of evidence are required for taxonomic investigations. They act as a base for further research, so later work does not have to begin the evidence-collection process *de novo*. For example, storage of sequence data in GenBank makes these data readily available online. If no GenBank records are listed in support of a taxonomic decision derived from DNA sequence data, then the decision is unacceptable. In the case of morphological studies, a list of specimens of a proposed taxon and the comparative material examined is a standard requirement; therefore, without the use and listing of comparative material (Cifelli and Kielan-Jaworonowska 2005:651) the proposed taxonomic arrangement must be rejected. In each case, the mandated display of the evidence ensures reproducibility, *which is one of the hallmarks of science*.

The third line of evidence is the existing scientific literature, the body of knowledge produced prior to a new research effort. Investigation of the literature on the taxonomic group of interest can provide direction and perhaps impose constraints on the limits of proposed nomenclatural changes.

Deliberate and transparent use of these three lines of evidence allows taxonomic herpetologists to create and present a trail of evidence to infer taxonomic hypotheses. The description of a new taxon, for example, draws on all three lines of evidence by supporting the phenotypic or genotypic distinctiveness of the

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putative taxon and by ascertaining through comparative specimen or literature work that no other taxa are identical to the one whose name is being proposed. Thus, a new name can only be coined when evidence, which unequivocally supports the proposed decision, is presented for the readership's assessment.

Science is an objective endeavor as long as scientific decisions are constrained by evidence. Evidence may lead to a conclusion that warrants nomenclatural intervention (e.g., a new taxon name). If evidence is absent, then there cannot be nomenclatural intervention. If there is nomenclatural intervention without evidence, then this can readily be identified as unacceptable and unscientific. Any taxonomic decisions shown to be unscientific must be considered invalid, and any names borne from such methodology must be considered unavailable in the accounts of nomenclature. *If names of questionable provenance are considered valid, then the scientific system is broken.*

Dissemination.-We believe that proposals for taxonomic decisions require an assessment by a team of qualified taxonomic herpetologists. This process includes the careful preparation of a manuscript on the part of the author(s) that outlines the evidence leading to a justified conclusion. This process includes the editorial process, during which competent scientists prepare reviews. While there is no need to strictly limit the vehicles for the dissemination of taxonomic decisions, it is in the best interest of authors and the science they serve to select journals that provide the important peer review and editorial feedback. Those avoiding this process can readily be identified as working outside acceptable rules of science and taxonomy (see below).

Taxonomic herpetology vis-à-vis the Code.-As in every scientific discipline, taxonomic herpetology is subject to testable hypotheses and reproducible methods, and researchers are trained to use generally accepted scientific and ethical fundamentals. However, the dual track of research task (identification, classification) and book-keeping (nomenclature) gives taxonomy a special identity among the sciences and makes scientific misconduct simpler to carry out, more visible, and more damaging. Whereas it has already been stated (e.g., Dayrat 2005; Dubois 2007, 2008) that taxonomy and nomenclature are separate disciplines and that the latter is not a science but a tool, neither discipline can exist without the other: activities in nomenclature are supposed to be rooted in evidence leading to the taxonomic decisions requiring nomenclatural changes (see Cifelli and Kielan-Jaworowska 2005; Hansell and Chant 1973; La Salle et al. 2009; M¹kol and Gabryœ 2005).

As for nomenclatural tasks, the set of rules for the creation and application of zoological names is laid down in the Code. The Code assists the taxonomic scientists at the back end of completed research to provide rules for how a name is properly administered. It is here that the Code, grown from a scientific need, fails to adhere to the science it supports. For example, according to Article 13.1.1 of the Code, a name to become available must be "accompanied by a description or definition which contains characters that are purported to differentiate the taxon," (ICZN 1999) regardless of their diagnostic usability (also see Dubois 2007) or even their existence (see Articles 18, 23.3.7; ICZN 1999). Therefore, the inclusion of taxonomic characters in support of a taxonomic decision may be viewed as only *pro forma*. Even as taxonomists endeavor to carefully follow the evidence (e.g., by listing the minutiae of species descriptions; M¹kol and Gabryœ 2005), such evidence is not required by the Code. Yet whereas the Code does not help in the production of sound taxonomic decisions, the Code's *Principle of Priority* (Article 23; ICZN 1999) is the dictum that governs the availability of taxonomic names, whether derived by proper scientific procedures or through fraud and unethical conduct. This is an instance of the proverbial tail wagging the dog. The process makes biological systematics prone to abuse by authors who publish taxonomic works for the "clear purpose of trying to 'immortalize'" themselves (Dubois 2008:859), such as in the examples above. Such actions are well known in the biological sciences (for a discussion, see Borrell 2007, Dubois 2008, Evenhuis 2008). The introduction of "phantom names" (Vences et al. 1999) seriously affects scientific work.

Does unethical, unscientific, or fraudulent taxonomy matter?-Flimsy or inconsistent taxonomic evidence in the description of new taxa often results in unwarranted descriptions, increases the synonymy load, and impedes information retrieval. Dubois (2008:859) calls them a "burden for biodiversity studies" as they not only cause "taxonomic noise" (Evenhuis 2008) but also have negative impacts on serious taxonomic research. Malicious taxonomy impedes the process and perception of taxonomy in a variety of ways:

(1) Information retrieval. For instance, Hoser's (2009c) reclassification of the rattlesnakes, widely ignored everywhere else, led to the Sociedade Brasileira de Herpetologia changing the name of the neotropical rattlesnake in the *Lista Brasileira de Répteis* from the universally accepted *Crotalus durissus* to *Caudisona durissa* as part of its efforts to maintain a neutral stance, with the result that both names are now circulating in parallel in the Brazilian literature (Wüster and Bérnils 2011).

(2) Communication. Fear of taxonomic piracy creates an atmosphere of mistrust, discouraging communication about unnamed taxa, thus delaying research and even conservation action (Oliver and Lee 2010).

(3) Bona fide taxonomic research. Unethical and unscientific taxonomic acts have several impacts on taxonomic research. For example, scientists are forced to include in their task load fictional taxonomic accounts in hard-to-locate publications during routine literature inquiries on synonyms, and they must find and examine type material in potentially difficult-to-access collections. This is not only unnecessarily time- and resource-consuming, it also dilutes scientific effort with unscientific materials. On account of unethical taxonomic acts, graduate students may have to reformulate thesis proposals or thesis conclusions, and their forthcoming publications may be scooped. Grant applicants' proposals may intersect with a nonsense taxonomic publication and result in needless delays to ascertain the veracity of the taxonomic information presented. Institutional managers may be unable to follow the mix of validly and fraudulently proposed names. Taxonomists are relegated to "redescribing" taxa whose validity they established, but that were named pre-emptively in acts of mass-naming or in deliberate acts of intellectual kleptoparasitism (e.g., Aplin and Donnellan 1999; Rawlings et al. 2008).

(4) Applications of herpetological taxonomy. Confusion about names may cause genuine harm in endeavors relying upon accurate taxonomy and the correct identification of organisms. Particular areas of concern include the production and use of antivenoms for venomous snakes (Fry et al. 2003; Williams et al. 2011; Wüster and McCarthy 1996), and the assessment and protection of threatened taxa and the direction of conservation efforts (Georges and Thomson 2010; Georges et al. 2007; Pillon and Chase 2007). This is a matter of life and death in the case of clinical toxinology, when name changes spread in media outlets by attention-seeking authors may cause uncertainty among medical personnel as to which antivenom to use given that the name has changed (Sutherland 1999). Wholesale nomenclatural changes at the genus-group level, especially among medically important snakes, must be carefully considered because of the confusion that can arise when the names of relevant species become inconsistent with those on antivenom products.

(5) Science and the public. The public trust in science is eroded when information lacking evidence is presented as fact and permeates what is assumed to be a scientific discourse. The often-strident tone of exchanges surrounding unethical and

unscientific taxonomic acts (Borrell 2007) further diminishes the entire discipline in the eyes of the public.

Although the ICZN has the plenary power (see Article 78ff; ICZN 1999) to rule upon such names and nomenclatural acts, the Commission has not done so because the *Code of Ethics* in the appendix of the Code is not a mandatory part of the Code (see seventh issue of the *Code of Ethics,* appendix of the Code) and, therefore, not applicable to pending rulings. Furthemore, the Commission sees the remits of nomenclature and taxonomy as entirely separate, despite the profound influence that nomenclature can have on the pursuit of taxonomic research. Following the *intent* of the Code and its stated mission of promoting “standards, sense, and stability for animal names in science” may require overriding the *letter* of the Code in certain instances. As outlined above, it is clear that rigorous application of the Principle of Priority has the consequence of rewarding authors of unscientific, unethical, and fraudulent publications, and forces others to adopt their names. We believe that herpetological systematists and editors should agree to reject the names listed in Appendix 1 for the purposes of the Principle of Priority and consider them unavailable. The same position should be adopted vis-à-vis future instances when names are being coined as part of unscientific, unethical, or fraudulent publications.

A call to action.- In the USA and elsewhere, “fabrication, falsification, or plagiarism in proposing, performing, or reviewing research, or in reporting research results” (Steneck 2007) is defined as scientific misconduct, a serious offense in science that may lead to prosecution (for discussion see Benos et al. 2004; Stoneking 2011). We believe that the *laissez-faire* attitude espoused by some, namely that the “business of names” will sort itself out over time, is unhelpful at a time when scientific applications (points 1-5 above) depend on evidence-based names, solidly supported by taxonomic research, in the here and now. Dayrat (2005) legitimately asked whether other scientific disciplines would so readily cite works that contain inaccurate or false data. It is our point of view, shared by the individuals listed in Appendix 2, that given the clear mandate of scientists to follow a trail of evidence, the intent of the Code as a book-keeping tool, and the law’s position regarding fraud, herpetologists must identify, publicize, and reject any names in taxonomic herpetology beginning on 1 January 2000 that were proposed in a manner that is fraudulent, unethical, or lacking evidence (Appendix 1). While this is an arbitrary date, we consider it a suitably clear point in time at which to begin the rigorous defense of taxonomic integrity in herpetology.

Furthermore, pursuant to Article 79 of the Code, we propose that a 9-member herpetological consortium with rotating, global representation is formed to establish a *List of Available Names in Herpetology.* This consortium, with the consultation of experts in specialty fields when necessary, will also assess all taxonomic decisions proposed outside the peer-reviewed literature, beginning with 1 January 2000. The consortium will operate transparently and with due speed to ascertain conformity with the criteria outlined above, and members’ votes and rationales will be made public monthly, online, in a universally accessible manner (such as through the *Reptile Database* and *Amphibians of the World* websites). This mechanism will not only be suitable to address the topics detailed above, but it will also streamline taxonomic output and assist in the administration of the Code upon release of its 5th Edition, which will purportedly allow the entirely electronic dissemination of taxonomic decisions for the creation of names in taxonomy and could conceivably exacerbate the problems we describe herein.

Literature Cited

Aplin, K. P. 1999. ‘Amateur’ taxonomy in Australian herpetology - help or hindrance? Monitor 10:104-109.

Aplin, K. P., and S. C. Donnellan. 1999. An extended description of the Pilbara death adder, *Acanthophis wellsi* Hoser (Serpentes: Elapidae), with notes on the desert death adder, *A. pyrrhus* Boulenger and identification of a possible hybrid zone. Rec. W. Austral. Mus. 19:277-298.

ASIH (American Society of Ichthyologists and Herpetologists). 2009. Code of Ethics. Accessed at www.asih.org/files/bog_book_2009_6_24_09.pdf on 21 May 2012.

Battalio, J. T. 1998. The Rhetoric of Science in the Evolution of American Ornithological Discourse. Praeger Publishing, Santa Barbara, California, USA.

Benos, D. J., J. Fabres, J. Farmer, J. P. Gutierrez, K. Hennessy, D. Kosek, J. H. Lee, D. Olteanu, T. Russell, F. Shaikh, and K. Wang. 2005. Ethics and scientific publication. Adv. Physiol. Educ. 29:59-74.

Borrell, B. 2007. The big name hunters. Nature 446:253-255.

Burbrink, F. T., B. I. Crother, and R. Lawson. 2007. The destabilization of North American colubroid snake taxonomy. Herpetol. Rev. 38:273-278.

Carraway, L. N. 2009. Ethics for and responsibilities of authors, reviewers and editors in science. Am. Midl. Nat. 161:146-164.

Cifelli, R. L., and Z. Kielan-Jaworowska. 2005. Diagnosis: differing interpretations of the ICZN. Acta Paleonotol. Polon. 50:650-652.

Crother, B. I. 2009. Are standard names lists taxonomic straightjackets? Herpetologica 65:129-135.

Dayrat, B. 2005. Towards integrative taxonomy. Biol. J. Linn. Soc. 85:407-415.

Dubois, A. 2007. Naming taxa from cladograms: a cautionary tale. Mol. Phylogenet. Evol. 42:317-330.

——. 2008. A partial but radical solution to the problem of nomenclatural taxonomic inflation and synonymy load. Biol. J. Linn. Soc. 93:857-863.

Evenhuis, N. L. 2008. The “*Mihi itch*” - a brief history. Zootaxa 1890:59-68.

Fry, B. G., K. D. Winkel, J. C. Wickramaratna, W. C. Hodgson, and W. Wüster. 2003. Effectiveness of snake antivenom: species and regional venom variation and its clinical impact. J. Toxicol. Toxin Rev. 22:23-34.

Georges A., and S. Thomson. 2010. Diversity of Australasian freshwater turtles, with an annotated synonymy and keys to species. Zootaxa 2496:1-37.

Georges, A., R. Walsh, R. J. Spencer, M. Welsh, and H. B. Shaffer. 2007 The Bellinger *Emydura*. Challenges for Management. Report to NSW National Parks and Wildlife Service, Sydney, by the Institute for Applied Ecology, University of Canberra, Canberra, Australia.

Hansell, R. I. C., and D. A. Chant. 1973. A method for estimating relative weights applied to characters by classical taxonomists. Syst. Zool. 22:46-49.

Hoser, R. T. 2000a. A revision of the Australasian pythons. Ophidia Rev. 1:7-27.

——. 2000b. A new species of snake (Serpentes: Elapidae) from Irian Jaya. Litteratura Serpentium 20(6):178-186.

——. 2001. A current assessment of the status of the snakes of the genera *Cannia* and *Pailsus*, including descriptions of three new subspecies from the Northern Territory and Western Australia, Australia. Boydii - J. Herpetol. Assoc. Queensland. July 2001:26-60.

——. 2002a. An overview of the taipans, genus: (*Oxyuranus*) (Serpentes: Elapidae) including the description of a new subspecies. Crocodilian - J. Victorian Assoc. Amat. Herpetol. 3:43-50.

——. 2002b. Death adders (genus *Acanthophis*): an updated overview, including description of 3 new island species and 2 new Australian subspecies. Crocodilian - J. Victorian Assoc. Amat. Herpetol. 4(1):5-11, 16-22, 24-30.

——. 2003a. A new subspecies of elapid (Serpentes, Elapidae), from New Guinea. Boydii - J. Herpetol. Assoc. Queensland. Autumn 2003:2-4.

——. 2003b. The rough-scaled snakes, genus *Tropidechis* (Serpentes: Elapidae), including the description of a new species from far north Queensland, Australia. Crocodilian - J. Victorian Assoc. Amat. Herpetol. 4(2):11-14.

——. 2003c. A new species of elapid (Serpentes: Elapidae), from western New South Wales. Crocodilian - J. Victorian Assoc. Amat. Herpetol. 4(2):19-26.

——. 2004. A reclassification of the Pythoninae including the description of two new genera, two new species and nine new subspecies. Crocodilian - J. Victorian Assoc. Amat. Herpetol. 4(3):31-37 and 4(4):21-40.

——. 2005. A new subspecies of *Strophurus intermedius* (Squamata: Gekkonidae) from South Australia. Boydii - J. Herpetol. Assoc. Queensland. Spring 2005:14-15.

——. 2009a. Creationism and contrived science: A review of recent python systematics papers and the resolution of issues of taxonomy and nomenclature. Australasian J. Herpetol. 2:1-34.

——. 2009b. Eight new taxa in the genera *Pseudonaja* Gunther [sic] 1858, *Oxyuranus* Kinghorn 1923, and *Panacedechis* Wells and Wellington 1985 (Serpentes: Elapidae). Australasian J. Herpetol. 4:1-27.

——. 2009c. A reclassification of the rattlesnakes; species formerly exclusively placed in the genera *Crotalus* and *Sistrurus*. Australasian J. Herpetol. 6:1-21.

——. 2009d. A reclassification of the true cobras; species formerly referred to the genera *Naja*, *Boulengerina* and *Paranaja*. Australasian J. Herpetol. 7:1-15.

——. 2009e. A new genus and a new species of skink from Victoria. Australasian J. Herpetol. 3:1-6.

——. 2012a. Exposing a Fraud! *Afronaja* Wallach, Wuster and Broadley 2009, is a junior synonym of *Spracklandus* Hoser 2009! Australasian J. Herpetol. 9:1-64.

——. 2012b. An updated review of the pythons including resolution of issues of taxonomy and nomenclature. Australasian J. Herpetol. 10:2-32.

——. 2012c. A new genus of Jumping Pitviper from Middle America (Serpentes: Viperidae). Australasian J. Herpetol. 10:33-34.

——. 2012d. A reassessment of the higher taxonomy of the Viperidae. Australasian J. Herpetol. 10:35-48.

——. 2012e. A reassessment of the higher taxonomy of the Elapidae. Australasian J. Herpetol. 10:49-63.

——. 2012f. A classification of the rattlesnakes; species formerly exclusively referred to the genera *Crotalus* and *Sistrurus* and a division of the elapid genus *Micrurus*. Australasian J. Herpetol. 11:2-24.

——. 2012g. A new genus of pitviper (Serpentes: Viperidae) from South America. Australasian J. Herpetol. 11:25-27.

——. 2012h. Two new genera of water snake from North America. The subdivision of the genera *Regina* Baird and Girard, 1853 and *Nerodia* Baird and Girard, 1853 (Serpentes: Colubridae: Natricinae). Australasian J. Herpetol. 11:29-31.

——. 2012i. The description of a new genus of West Australian snake and eight new taxa in the genera *Pseudonaja* Gunther [sic], 1858, *Oxyuranus* Kinghorn, 1923 and *Panacedechis* Wells and Wellington, 1985 (Serpentes: Elapidae). Australasian J. Herpetol. 11:32-50.

——. 2012j. A new genus of Asian pitviper (Serpentes: Viperidae). Australasian J. Herpetol. 11:51-52.

——. 2012k. A taxonomic revision of the *Vipera palaestinae* Werner, 1938 species group, with the creation of a new genus and a new subgenus. Australasian J. Herpetol. 11:53-55.

——. 2012l. A reassessment of the burrowing asps, *Atractaspis* Smith, 1849 with the erection of a new genus and two tribes (Serpentes: Atractaspidae). Australasian J. Herpetol. 11:56-58.

——. 2012m. A taxonomic revision of the Colubrinae genera *Zamenis* and *Orthriophis* with the creation of two new genera (Serpentes: Colubridae). Australasian J. Herpetol. 11:59-64.

——. 2012n. A new genus of coral snake from Japan (Serpentes: Elapidae). Australasian J. Herpetol. 12:3-5.

——. 2012o. A revision of the Asian pitvipers, referred to the genus *Cryptelytrops* Cope, 1860, with the creation of a new genus *Adelynhoserea* to accommodate six divergent species (Serpentes: Viperidae: Crotalinae). Australasian J. Herpetol. 12:6-8.

——. 2012p. A division of the South-east Asian ratsnake genus *Coelognathus* (Serpentes: Colubridae). Australasian J. Herpetol. 12:9-11.

——. 2012q. A new genus of Asian snail-eating snake (Serpentes: Pareatidae). Australasian J. Herpetol. 12:12-15.

——. 2012r. The dissolution of the genus *Rhadinophis* Vogt, 1922 (Serpentes: Colubrinae). Australasian J. Herpetol. 12:16-17.

——. 2012s. Three new species of *Stegonotus* from New Guinea (Serpentes: Colubridae). Australasian J. Herpetol. 12:18-22.

——. 2012t. A new genus and subgenus of snakes from the South African region (Serpentes: Colubridae). Australasian J. Herpetol.12:23-25.

——2012u. A division of the African genus *Psammophis* Boie, 1825 into 4 genera and four further subgenera. Australasian J. Herpetol. 12:26-31.

—— 2012v. A division of the African tree viper genus *Atheris* Cope, 1860 into four subgenera (Serpentes: Viperidae). Australasian J. Herpetol. 12: 32-35.

—— 2012w. A new subgenus of giant snakes (anaconda) from South America (Serpentes: Boidae). Australasian J. Herpetol. 12:36-39.

—— 2012x. A review of the South American snake genera *Leptodeira* and *Imantodes* including three new genera and two new subgenera (Serpentes: Dipsadidae: Imantodini). Australasian J. Herpetol. 12:40-47.

—— 2012y. A review of the North American garter snakes genus *Thamnophis* Fitzinger, 1843 (Serpentes: Colubridae). Australasian J. Herpetol. 12:48-53.

—— 2012z. A three-way division of the New World genus *Lampropeltis* Fitzinger, 1843. Australasian J. Herpetol. 12:54-57.

—— 2012aa. A review of the taxonomy of the European colubrid snake genera *Natrix* and *Coronella*, with the creation of three new monotypic genera (Serpentes: Colubridae). Australasian J. Herpetol. 12:58-62.

—— 2012ab. A new genus and new species and new subspecies of skink from Victoria. Australasian J. Herpetol. 12:63-64.

—— 2012ac. Divisions of the Asian colubrid snake genera *Xenochrophis*, *Dendrelaphis* and *Boiga* (Serpentes: Colubridae). Australasian J. Herpetol. 12:65-76.

ICZN (International Commission of Zoological Nomenclature). 1999. International Code of Zoological Nomenclature. The International Trust for Zoological Nomenclature, London, United Kingdom.

Kuchling, G., A. G. J. Rhodin, B. R. Ibarrondo, and C. R. Trainor. 2007. A new subspecies of the snakeneck turtle *Chelodina mccordi* from Timor-Leste (East Timor) (Testudines: Chelidae). Chelonian Conserv. Biol. 6:213-222.

M¹kol, J. and G. Gabryœ. 2005. Intuition or fixed criteria - about standards in species description. Genus 16:503-511.

Mayr, E. 1969. Principles of Systematic Zoology. McGraw-Hill, New York, USA.

McCord, W. P., and M. Joseph-Ouni 2007. A new species of

Chelodina (Testudines: Chelidae) from southwestern New Guinea (Papua, Indonesia). Reptilia (GB) 52:47-52.

McCord, W. P., J. Cann, and M. Joseph-Ouni. 2003. A taxonomic assessment of *Emydura* with description of new subspecies from Queensland, Australia. Reptilia (GB) 27:59-63.

McCord, W. P., M. Joseph-Ouni, and C. Hagen. 2007a. A new subspecies of *Chelodina mccordi* (Testudines: Chelidae) from Eastern Rote Island, Indonesia. Reptilia (GB) 52:58-61.

McCord, W. P., M. Joseph-Ouni, and C. Hagen. 2007b. A new species of *Chelodina* (Testudines: Chelidae) from eastern Timor Island (East Timor). Reptilia (GB) 52:53-57.

Oliver, P. M. and M. S. Y. Lee. 2010. The botanical and zoological codes impede biodiversity research by discouraging publication of unnamed new species. Taxon 59:1201-1205.

Pillon, Y., and M. W. Chase. 2007. Taxonomic exaggeration and its effects on orchid conservation. Conserv. Biol. 21:263-265.

Rawlings, L. H., D. L. Rabosky, S. C. Donnellan, and M. N. Hutchinson. 2008. Python phylogenetics: inference from morphology and mitochondrial DNA. Biol. J. Linn. Soc. 93:603-619.

Schleip, W. D. 2008. Revision of the genus *Leiopython* Hubrecht 1879 (Serpentes: Pythonidae) with the redescription of taxa recently described by Hoser (2000) and the description of new species. J. Herpetol. 42:645-667.

Schleip, W. D., and M. O'Shea. 2010. Annotated checklist of the recent and extinct pythons (Serpentes: Pythonidae), with notes on nomenclature, taxonomy, and distribution. Zookeys 66:29-78.

Simpson, G. G. 1961. Principles of Animal Taxonomy. Columbia University Press, New York, USA.

SSAR (Society for the Study of Amphibians and Reptiles). 2012. SSAR ethics statement. Accessed at http://ssarherps.org/pages/ethics.php on 21 May 2012.

Stehr, N., and A. Simmons. 1979. The diversity of modes of discourse and the development of sociological knowledge <http://www.springerlink.com/content/h10817417724m915/>. J. Gen. Philos. Sci. <http://www.springerlink.com/content/0925-4560/> 10:141-161.

Steneck, N. H. 2007. Introduction to the responsible conduct of research. Office of Research Integrity, U.S. Government Printing Office, Washington, DC, USA.

Stoneking, C. 2011. Hoaxing, forging, trimming and cooking: the cases and causes of scientific fraud. The Triple Helix Lent 2011:24-25.

Sutherland, S. K. 1999. Concern over the choice of anti-venom for "false king brown snake" bites and a plea for a name change. Med. J. Austral. 170:187.

van Aken, G., and M. van der Voort. 2001. From the editors. Litt. Serpentium 21:66.

Vences, M., F. Glaw, and W. Böhme. 1999. A review of the genus *Mantella* (Anura, Ranidae, Mantellinae): taxonomy, distribution and conservation of Malagasy poison frogs. Alytes 17 (1-2):3-72.

Wallach, V., W. Wüster, and D. G. Broadley. 2009. In praise of subgenera: taxonomic status of cobras of the genus *Naja* Laurenti (Serpentes: Elapidae). Zootaxa 2236:26-36.

Wells, R. W. 2002a. Taxonomic notes on some Australian freshwater turtles of the genera *Chelodina* and *Elseya* (Reptilia: Chelidae). Austral. Biodiv. Rec. 2002(2):1-30.

——. 2002b. Taxonomy of the genus *Acanthophis* (Reptilia: Elapidae) in Australia. Austral. Biodiv. Rec. 2002(5):unpaginated.

——. 2002c. Taxonomy of the genus *Pseudonaja* (Reptilia: Elapidae) in Australia. Austral. Biodiv. Rec. 2002(7):1-41.

——. 2002d. Some taxonomic changes to the genus *Lampropholis* (Reptilia: Scincidae) from Australia. Austral. Biodiv. Rec. 2002(8):1-24.

——. 2002e. A new subspecies of *Carettochelys* (Reptilia: Carettochelydidae) from Northern Australia - *Carettochelys insculpta canni* ssp. nov. Austral. Biodiv. Rec. 2002(1):1-7.

——. 2007a. Some taxonomic and nomenclatural considerations on the Class Reptilia in Australia. A new genus of the family Chelidae from Eastern Australia. Austral. Biodiv. Rec. 2007(3):1-13.

——. 2007b. Some taxonomic and nomenclatural considerations on the class Reptilia in Australia. The genus *Cyclodomorphus* Fitzinger, 1843 with a new interpretation of the *Cyclodomorphus branchialis* species-group. Austral. Biodiv. Rec. 2007(4):1-23.

——. 2007c. Some taxonomic and nomenclatural considerations on the class Reptilia in Australia. A review of species in the genus *Aprasia* Gray 1839 (Aprasiaidae), including the description of a new genus. Austral. Biodiv. Rec. 2007(6):1-17.

——. 2007d. Some taxonomic and nomenclatural considerations on the class Reptilia in Australia. The sea snakes of Australia. An introduction to the members of the families Hydrophiidae and Laticaudidae in Australia, with a new familial and generic arrangement. Austral. Biodiv. Rec. 2007(8):1-124.

——. 2009a. Some taxonomic and nomenclatural considerations on the class Reptilia in Australia. A new species of freshwater turtle in the genus *Wollumbinia* Wells 2007 (Reptilia: Chelidae) from Eastern Australia. Austral. Biodiv. Rec. 2009(1):1-12.

——. 2009b. Some taxonomic and nomenclatural considerations on the class Reptilia in Australia. A review of the genera *Eulamprus* and *Glaphyromorphus* (Scincidae), including the description of new genera and species. Austral. Biodiv. Rec. 2009(3):1-96.

——. 2010. Some taxonomic and nomenclatural considerations on the class Reptilia in Australia. Comments on the genus *Lampropholis* and related genera in the family Scincidae. Austral. Biodiv. Rec. 2010(1):1-22.

——. 2012. Some taxonomic and nomenclatural considerations on the Reptilia of Australia. A reclassification of the genus *Lerista* (Scincidae), including the descriptions of new genera. Austral. Biodiv. Rec. 2012(1):1-361.

Williams, D. J., W. Wüster, and B. G. Fry. 2006. The good, the bad and the ugly: Australian snake taxonomists and a history of the taxonomy of Australia's venomous snakes. Toxicon 48:919-930.

Williams, D. J., J.-M. Gutiérrez, J. J. Calvete, W. Wüster, K. Ratanabanangkoon, O. Paiva, N. I. Brown, N. R. Casewell, R. A. Harrison, P. D. Rowley, M. O'Shea, S. D. Jensen, K. D. Winkel, and D. A. Warrell. 2011. Ending the drought: new strategies for improving the flow of affordable, effective antivenoms in Asia and Africa. J. Proteomics 74:1735-1767.

Wüster, W., and R. S. Bérnils. 2011. On the generic classification of the rattlesnakes, with special reference to the neotropical *Crotalus durissus* complex (Squamata: Viperidae). Zoologia 28:417-419.

Wüster, W., and C. J. McCarthy. 1996. Venomous snake systematics: implications for snakebite treatment and toxinology. In C. Bon, and M. Goyffon (eds.), Envenomings and their Treatments, pp. 13-23. Fondation Mérieux, Lyon, France.

Wüster, W., B. Bush, J. S. Keogh, M. O'Shea, and R. Shine. 2001. Taxonomic contributions in the "amateur" literature: comments on recent descriptions of new genera and species by Raymond Hoser. Litt. Serpentium 21:67-79.

Yanega, D. 2009. Careers Q&A: incoming member of the International Commission on Zoological Nomenclature (ICZN) in London. Nature 460:423.

Editor's end note (Raymond Hoser):
No words have been altered in any way!
(Font and pagination have been).

Note: Below is the preliminary "hit list" of taxa Hinrich Kaiser and his not very anonymous friends seek to rename as they see fit, and in violation of the Zoological code. This list has been commented on in end column in bold in terms of those taxa validly named according to the Zoological Code and with appropriate evidence.

Appendix 1. List of taxa produced without a trail of evidence and thereby unacceptable in principle to the herpetological community. We recommend rejection of all listed taxa with the exception of those listed in bold print for the reason provided in the comment column.

Taxon	Taxon Level	Citation	Comment
Abilenea	gen. nov.	Wells 2007c	Validly named with evidence
Acanthophiina	subtrib. nov.	Hoser 2012e	Validly named with evidence
Acanthophis antarcticus cliffrosswellingtoni	ssp. nov.	Hoser 2002b	Validly named with evidence
Acanthophis groenveldi	sp. nov.	Hoser 2002b	Validly named with evidence
Acanthophis macgregori	sp. nov.	Hoser 2002b	Validly named with evidence
Acanthophis wellsei donnellani	ssp. nov.	Hoser 2002b	Validly named with evidence
Acanthophis yuwoni	sp. nov.	Hoser 2002b	Validly named with evidence
Adelynhoserea	gen. nov.	Hoser 2012o	Validly named with evidence
Adelynhoserserpenae	gen. nov.	Hoser 2012c	Validly named with evidence
Adelynhoserserpenina	subtrib. nov.	Hoser 2012d	Validly named with evidence
Adelynhoserserpinini	trib. nov.	Hoser 2012d	Validly named with evidence
Adrasteia	gen. nov.	Wells 2002d	Validly named with evidence
Adrasteiascincus	nom nov.	Wells 2010	Validly named with evidence
Afronaja	gen. nov.	Wallach et. al.	Invalid junior synonym
Agkistrodonini	trib. nov.	Hoser 2012d	Validly named with evidence
Agressiserpens	gen. nov.	Wells 2002b	Validly named with evidence
Aipysurini	trib. nov.	Hoser 2012e	Validly named with evidence
Alcisius	gen. nov.	Wells 2012	Validly named with evidence
Allengreerus	gen. nov.	Hoser 2009e	Validly named with evidence
Allengreerus delicata jackyhoserae	ssp. nov.	Hoser 2012ab	Validly named with evidence
Allengreerus ronhoseri	sp. nov.	Hoser 2009e	Validly named with evidence
Antaresia maculosus brentonoloughlini	ssp. nov.	Hoser 2004	Validly named with evidence
Antaresia saxacola campbelli	ssp. nov.	Hoser 2000a	Validly named with evidence
Antaresiina	subtrib. nov.	Hoser 2012b	Validly named with evidence
Aphroditia	gen. nov.	Wells 2012	Validly named with evidence
Aspidites melanocephalus adelynensis	ssp. nov.	Hoser 2000a	Validly named with evidence
Aspidites melanocephalus davieii	ssp. nov.	Hoser 2000a	Validly named with evidence
Aspidites melanocephalus rickjonesii	ssp. nov.	Hoser 2009a	Validly named with evidence
Aspidites ramsayi neildavieii	ssp. nov.	Hoser 2009a	Validly named with evidence
Aspidites ramsayi panoptes	ssp. nov.	Hoser 2000a	Validly named with evidence
Aspidites ramsayi richardjonesi	ssp. nov.	Hoser 2000a	Validly named with evidence
Aspiditesina	subtrib. nov.	Hoser 2012b	Validly named with evidence
Aspidomorphina	subtrib. nov.	Hoser 2012e	Validly named with evidence
Atractaspini	trib. nov.	Hoser 2012l	Validly named with evidence
Australiasis funki	sp. nov.	Hoser 2012b	Validly named with evidence
Binghamus	subgen. nov.	Hoser 2012f	Validly named with evidence
Bitisini	trib. nov.	Hoser 2012d	Validly named with evidence
Bothriechisina	subtrib. nov.	Hoser 2012d	Validly named with evidence
Bothrocophiina	subtrib. nov.	Hoser 2012d	Validly named with evidence
Bothropina	subtrib. nov.	Hoser 2012d	Validly named with evidence
Bothropoidina	subtrib. nov.	Hoser 2012d	Validly named with evidence
Broghammerini	trib. nov.	Hoser 2012b	Validly named with evidence
Broghammerus	gen. nov.	Hoser 2004	Validly named with evidence
Broghammerus reticulatus dalegibbonsi	ssp. nov.	Hoser 2004	Validly named with evidence
Broghammerus reticulatus euanedwardsi	ssp. nov.	Hoser 2004	Validly named with evidence
Broghammerus reticulatus haydenmacphiei	ssp. nov.	Hoser 2004	Validly named with evidence
Broghammerus reticulatus neilsonnemani	ssp. nov.	Hoser 2004	Validly named with evidence
Broghammerus reticulatus patrickcouperi	ssp. nov.	Hoser 2004	Validly named with evidence
Broghammerus reticulatus stuartbigmorei	ssp. nov.	Hoser 2004	Validly named with evidence
Brucerogersus	gen. nov.	Hoser 2012y	Validly named with evidence
Calloselasma	trib. nov.	Hoser 2012d	Validly named with evidence
Cannia aplini	sp. nov.	Hoser 2001	Validly named with evidence
Cannia burgessi	sp. nov.	Hoser 2001	Validly named with evidence
Cannia newmani	sp. nov.	Hoser 2001	Validly named with evidence
Carettochelys insculpta canni	ssp. nov.	Wells 2002e	Validly named with evidence
Cerastini	trib. nov.	Hoser 2012d	Validly named with evidence
Cerrophidionina	subtrib. nov.	Hoser 2012d	Validly named with evidence
Charkespiersonserpens (Macmillanus) jackyhoserae	sp. nov.	Hoser 2012ac	Validly named with evidence
Charlespiersonserpens	gen. nov.	Hoser 2012ac	Validly named with evidence
Charlespiersonserpens (Downieea) papuensis lizelliottae	ssp. nov.	Hoser 2012ac	Validly named with evidence
Charlespiersonserpens gastrostictus tyeipperi	ssp. nov.	Hoser 2012ac	Validly named with evidence
Chelodina gunaleni	sp. nov.	McCord / Joseph-Ouni 2007	Validly named with evidence
Chelodina mccordi roteensis	ssp. nov.	McCord et al. 2007a	Validly named with evidence
Chelodina timorensis	sp. nov.	McCord et al. 2007b	Validly named with evidence
Chondropython viridis adelynhoserae	ssp. nov.	Hoser 2009a	Validly named with evidence
Chondropython viridis shireenae	ssp. nov.	Hoser 2004	Validly named with evidence
Costinisauria couperi	gen. nov.	Wells	Validly named with evidence
Cottonus	subgen. nov.	Hoser 2009c	Validly named with evidence
Crossmanus	subgen. nov.	Hoser 2012x	Validly named with evidence
Crotalina	subtrib. nov.	Hoser 2012d	Validly named with evidence
Crutchfieldus	subgen. nov.	Hoser 2009c	Validly named with evidence
Cummingea	gen. nov.	Hoser 2009c	Validly named with evidence
Cybelia	gen. nov.	Wells 2012	Validly named with evidence
Dannyleeus	subgen. nov.	Hoser 2012qn	Validly named with evidence
Daraninus	subgen. nov.	Hoser 2012g	Validly named with evidence
Demansiini	trib. nov.	Hoser 2012e	Validly named with evidence
Dendroaspini	trib. nov.	Hoser 2012e	Validly named with evidence
Denisonini	trib. nov.	Hoser 2012e	Validly named with evidence
Dorisious	gen. nov.	Hoser 2012ac	Validly named with evidence
Downieea	subgen. nov.	Hoser 2012ac	Validly named with evidence
Dugitophis	gen. nov.	Wells 2002c	Validly named with evidence
Echiini	trib. nov.	Hoser 2012d	Validly named with evidence
Edwardsus	subgen. nov.	Hoser 2009c	Validly named with evidence
Eipperus	gen. nov.	Hoser 2012u	Validly named with evidence
Eksteinus	gen. nov.	Hoser 2012z	Validly named with evidence
Elapsoidini	trib. nov.	Hoser 2012e	Validly named with evidence
Elliottus	subgen. nov.	Hoser 2012u	Validly named with evidence
Elseya dorriani	gen. nov.	Wells 2002a	Validly named with evidence
Elseya jukesi	sp. nov.	Wells 2002a	Validly named with evidence
Emydura macquarii emmotti	ssp. nov.	McCord et al. 2003	Validly named with evidence

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Emydura macquarii nigra	ssp. nov.	McCord et al. 2003	Validly named with evidence
Ephalophina	subtrib. nov.	Hoser 2012e	Validly named with evidence
Eristicophina	subtrib. nov.	Hoser 2012d	Validly named with evidence
Euanedwardsserpens	gen. nov.	Hoser 2012p	Validly named with evidence
Funkelapidus	gen. nov.	Hoser 2012n	Validly named with evidence
Funkus	gen. nov.	Hoser 2012h	Validly named with evidence
Furinini	trib. nov.	Hoser 2012e	Validly named with evidence
Gaia	gen. nov.	Wells 2012	Validly named with evidence
Ginafabaserpenae	gen. nov.	Hoser 2012x	Validly named with evidence
Goldneyia	gen. nov.	Wells 2012	Validly named with evidence
Gregshwedoshus	gen. nov.	Hoser 2012y	Validly named with evidence
Guystebbinsus	gen. nov.	Hoser 2012aa	Validly named with evidence
Helioscincus	gen. nov.	Wells 2002d	Validly named with evidence
Hemachatusina	subtrib. nov.	Hoser 2012e	Validly named with evidence
Hemiaspini	trib. nov.	Hoser 2012e	Validly named with evidence
Homoroselapidae	fam. nov.	Hoser 2012e	Validly named with evidence
Homoroselapini	trib. nov.	Hoser 2012e	Validly named with evidence
Hoplocephalina	subtrib. nov.	Hoser 2012e	Validly named with evidence
Hoseraspea	gen. nov.	Hoser 2012l	Validly named with evidence
Hoseraspini	subtrib. nov.	Hoser 2012l	Validly named with evidence
Hoserea	gen. nov.	Hoser 2009c	Validly named with evidence
Hoserelapidea	gen. nov.	Hoser 2012f	Validly named with evidence
Hoserelapidea	subgen. nov.	Hoser2012f	Validly named with evidence
Hulimkai	gen. nov.	Hoser 2012i	Validly named with evidence
Hulimkini	trib. nov.	Hoser 2012e	Validly named with evidence
Hydrelapini	trib. nov.	Hoser 2012e	Validly named with evidence
Hydrophiina	subtrib. nov.	Hoser 2012e	Validly named with evidence
Jackyhoserea	gen. nov.	Hoser2012g	Validly named with evidence
Jackyhoserina	subtrib. nov.	Hoser 2012d	Validly named with evidence
Jackyhoserini	trib. nov.	Hoser 2012d	Validly named with evidence
Jackyhosernatrix	gen. nov.	Hoser 2012aa	Validly named with evidence
Jackypython	subgen. nov.	Hoser 2009a	Validly named with evidence
Karma	gen. nov.	Wells 2009b	Validly named with evidence
Katrinahoserea	gen. nov.	Hoser 2012r	Validly named with evidence
Katrinahoserserpenea	gen. nov.	Hoser 2012q	Validly named with evidence
Katrinahoserserpenea	subgen. nov.	Hoser 2012q	Validly named with evidence
Katrinina	subtrib. nov.	Hoser 2012b	Validly named with evidence
Katrinus	gen. nov.	Hoser 2000a	Validly named with evidence
Katrinus fuscus jackyae	ssp. nov.	Hoser 2004	Validly named with evidence
Krishna	gen. nov.	Wells 2012	Validly named with evidence
Laidlawus	subgen. nov.	Hoser 2012k	Validly named with evidence
Leiopython albertisi barkeri	ssp. nov.	Hoser 2000a	Validly named with evidence
Leiopython albertisi bennetti	ssp. nov.	Hoser 2000a	Validly named with evidence
Leiopython biakensis	sp. nov.	Schleip 2008	No evidence
Leiopython fredparkeri	sp. nov.	Schleip 2008	No evidence
Leiopython hoserae	sp. nov.	Hoser 2000a	Validly named with evidence
Leiopython huonensis	sp. nov.	Schelip 2008	No evidence
Lenhoserus	gen. nov.	Hoser 2000a	Validly named with evidence
Lokisaurus	gen. nov.	Wells 2012	Validly named with evidence
Loveridgelapina	subtrib. nov.	Hoser 2012e	Validly named with evidence
Lukefabaserpens	gen. nov.	Hoser 2012x	Validly named with evidence
Macmillanus	subgen. nov.	Hoser 2012ac	Validly named with evidence
Maconchieus	gen. nov.	Hoser 2012x	Validly named with evidence
Magmellia	gen. nov.	Wells 2009b	Validly named with evidence
Mariolisus	gen. nov.	Hoser 2012h	Validly named with evidence
Marrunisauria	gen. nov.	Wells 2012	Validly named with evidence
Martinekea	gen. nov.	Hoser 2012m	Validly named with evidence
Maticorini	trib. nov.	Hoser 2012e	Validly named with evidence
Matteoea	gen. nov.	Hoser 2009c	Validly named with evidence
Maxhoserboa	subgen. nov.	Hoser 2012w	Validly named with evidence
Maxhoservipera	gen. nov.	Hoser 2012k	Validly named with evidence
Maxhoserviperina	subtrib. nov.	Hoser 2012d	Validly named with evidence
Michaelnicholsus	subgen. nov.	Hoser 2012t	Validly named with evidence
Micropechiina	subtrib. nov.	Hoser 2012e	Validly named with evidence
Micropechiini	trib. nov.	Hoser 2012e	Validly named with evidence
Morelia harrisoni	sp. nov.	Hoser 2000a	Validly named with evidence
Morelia macburniei	sp. nov.	Hoser 2004	Validly named with evidence
Morelia mippughae	sp. nov.	Hoser 2004	Validly named with evidence
Morelia wellsi	sp. nov.	Hoser 2012b	Validly named with evidence
Moreliina	subtrib. nov.	Hoser 2012b	Validly named with evidence
Mullinsus	subgen. nov.	Hoser 2009c	Validly named with evidence
Mulvanyus	gen. nov.	Hoser 2012ac	Validly named with evidence
Najina	subtrib. nov.	Hoser 2012e	Validly named with evidence
Ndurascincus	gen. nov.	Wells 2002d	Validly named with evidence
Neilsimpsonus	subgen. nov.	Hoser 2012x	Validly named with evidence
Neilsonnemanus	subgen. nov.	Hoser 2012y	Validly named with evidence
Notechiina	subtrib. nov.	Hoser 2012e	Validly named with evidence
Notopseudonaja	gen. nov.	Wells 2002c	Validly named with evidence
Notopseudonajini	trib. nov.	Hoser 2012e	Validly named with evidence
Oceanius	gen. nov.	Wells 2007d	Validly named with evidence
Ophiophagini	trib. nov.	Hoser 2012e	Validly named with evidence
Oxyuranini	trib. nov.	Hoser 2012e	Validly named with evidence
Oxyuranus scutellatus adelynhoserae	ssp. nov.	Hoser 2009b	Validly named with evidence
Oxyuranus scutellatus andrewwilsoni	ssp. nov.	Hoser 2009b	Validly named with evidence
Oxyuranus scutellatus barringeri	ssp. nov.	Hoser 2002a	Validly named with evidence
Oxyus	gen. nov.	Hoser 2012jm	Validly named with evidence
Pailsus rossignolii	sp. nov.	Hoser 2000b	Validly named with evidence
Panacedechis papuanus trevorhawkeswoodi	ssp. nov.	Hoser 2009b	Validly named with evidence
Parahydrophina	subtrib. nov.	Hoser 2012e	Validly named with evidence
Parapistocalamini	trib. nov.	Hoser 2012e	Validly named with evidence
Pelamiina	subtrib. nov.	Hoser 2012e	Validly named with evidence
Piersonina	subtrib. nov.	Hoser 2012d	Validly named with evidence
Piersonus	gen. nov.	Hoser 2009c	Validly named with evidence
Pillotus	subgen. nov.	Hoser 2009c	Validly named with evidence
Placidaserpens	gen. nov.	Wells 2002c	Validly named with evidence
Porthidiumina	subtrib. nov.	Hoser 2012d	Validly named with evidence
Proatherini	trib. nov.	Hoser 2012d	Validly named with evidence
Pseudechini	trib. nov.	Hoser 2012e	Validly named with evidence
Pseudocerastina	subtrib. nov.	Hoser 2012d	Validly named with evidence
Pseudocerastini	trib. nov.	Hoser 2012d	Validly named with evidence
Pseudonaja affinis charlespiersoni	ssp. nov.	Hoser 2009b	Validly named with evidence
Pseudonaja elliotti	sp. nov.	Hoser 2003c	Validly named with evidence
Pseudonaja gowi	sp. nov.	Wells 2002c	Validly named with evidence
Pseudonaja guttata whybrowi	ssp. nov.	Hoser 2009b	Validly named with evidence
Pseudonaja textilis cliveevatti	ssp. nov.	Hoser 2009b	Validly named with evidence
Pseudonaja textilis jackyhoserae	ssp. nov.	Hoser 2009b	Validly named with evidence
Pseudonaja textilis leswilliamsi	ssp. nov.	Hoser 2009b	Validly named with evidence
Pseudonaja textilis pughi	ssp. nov.	Hoser 2003a	Validly named with evidence
Pseudonaja textilis rollinsoni	ssp. nov.	Hoser 2009b	Validly named with evidence
Pseudonajini	trib. nov.	Hoser 2012e	Validly named with evidence
Pughus	subgen. nov.	Hoser 2012y	Validly named with evidence
Rattlewellsus	gen. nov.	Hoser 2012f	Validly named with evidence
Rawlingspython	subgen. nov.	Hoser 2009a	Validly named with evidence
Rayhammondus	subgen. nov.	Hoser 2012u	Validly named with evidence

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Rentonus	gen. nov.	Hoser 2012ac	Validly named with evidence
Rhiannodon	gen. nov.	Wells 2009b	Validly named with evidence
Rhinocerophiina	subtrib. nov.	Hoser 2012d	Validly named with evidence
Richardwellsus	gen. nov.	Hoser 2012m	Validly named with evidence
Sayersus	subgen. nov.	Hoser 2009c	Validly named with evidence
Sharonhoserea	gen. nov.	Hoser 2012aa	Validly named with evidence
Shireenhoserus	gen. nov.	Hoser 2004	Validly named with evidence
Simoselapini	trib. nov.	Hoser 2012e	Validly named with evidence
Slatteryus	subgen. nov.	Hoser 2012u	Validly named with evidence
Smythus	subgen. nov.	Hoser 2009c	Validly named with evidence
Spectrascincus	gen. nov.	Wells 2012	Validly named with evidence
Spracklandus	gen. nov.	Hoser 2009d	Validly named with evidence
Stegonotus adelynhoserae	sp. nov.	Hoser 2012s	Validly named with evidence
Stegonotus lenhoseri	sp. nov.	Hoser 2012s	Validly named with evidence
Stegonotus sammacdowelli	sp. nov.	Hoser 2012s	Validly named with evidence
Strophurus intermedius burrelli	ssp. nov.	Hoser 2005	Validly named with evidence
Sutini	trib. nov.	Hoser 2012e	Validly named with evidence
Swileserpens	gen. nov.	Hoser 2012t	Validly named with evidence
Toxicocalamina	subtrib. nov.	Hoser 2012e	Validly named with evidence
Trimeresurusini	trib. nov.	Hoser 2012d	Validly named with evidence
Troianous	subgen. nov.	Hoser 2012f	Validly named with evidence
Tropidechis sadlieri	sp. nov.	Hoser 2003b	Validly named with evidence
Tropidolaemusini	trib. nov.	Hoser 2012d	Validly named with evidence
Tychisimia	gen. nov.	Wells 2012	Validly named with evidence
Vermicellini	trib. nov.	Hoser 2012e	Validly named with evidence
Wellsus	gen. nov.	Hoser 2009d	Validly named with evidence
Whybrowus	subgen. nov.	Hoser 2012y	Validly named with evidence
Wollumbinia	gen. nov.	Wells 2007a	Validly named with evidence
Wollumbinia dorsii	sp. nov.	Wells 2009a	Validly named with evidence
Wondjinia	gen. nov.	Wells 2012	Validly named with evidence
Woolfvipera	subgen. nov.	Hoser 2012v	Validly named with evidence
Zeusius	gen. nov.	Wells 2007b	Validly named with evidence
Zeusius melanops gillami	ssp. nov.	Wells 2007b	Validly named with evidence
Zeusius melanops swani	ssp. nov.	Wells 2007b	Validly named with evidence
Zeusius sternfeldi	sp. nov.	Wells 2007b	Validly named with evidence

Date: Tue, 19 Jun 2012 22:23:05 -0700
Subject: Re: False and defamatory material about myself - potential submisison of paper to Herp Review - To the editor.
From: herpreview@gmail.com
To: viper007@live.com.au

Dear Mr. Hoser:

As a general statement, inasmuch as we do not presently have any paper such as you described scheduled for publication, any and all submissions to *HR* undergo external peer review before acceptance for publication. We do not publish personal attacks, as our track record over the last 40+ years should clearly demonstrate.

Sincerely yours,

Robert Hansen
On Tue, Jun 19, 2012 at 9:42 PM, Snake Man Snakebusters <viper007@live.com.au <mailto:viper007@live.com.au>> wrote:
To the editor - Herpetological Review,
Dear Sir,
It has been drawn to my attention that a person we believe to be Mr Wolfgang Wuster and some associates are circulating a false and defamatory article about myself and three other herpetologists with a view to publishing it in some form in Herpetological Review. The draft I have seen also effectively also calls for an abandonment of the Zoological Code as it now stands with the potential to abolish all scientific names proposed since 2000 allowing these men the right to rename the same taxa as they please (refer also to Australasian Journal of Herpetology - Issue 9 - **Exposing a fraud! Afronaja Wallach, Wuster and Broadley is a junior synonym of Spracklandus Hoser, 2009)** for an indication of what I mean.
Can you please confirm that you will not publish any false and defamatory material about myself and the others in Herp Review or other SSAR publications or any other material that may destabilize existing and established nomenclature.
Also can you please confirm that should you publish any material in any way critical of myself or my publications, by these or any other “authors” that I will be given right of reply in the same journal at the same time and of equal word count, and likewise for others named in the draft document in circulation, including Bill McCord and Richard Wells.
You should also be aware that myself and the others adversely named in the draft documents are considering taking legal action for libel against the said authors and a Mr. Hinrich Kaiser, the latter of whom has either directly or indirectly sent this “manuscript” to many hundreds of recipients.
Thanking you for your help in this matter.
Raymond Hoser - Australia.

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Phones: 9812 3322
0412 777 211

Subject: RE: Submission
Date: Thu, 29 Mar 2012 12:49:57 +0100
From: s.nikolaeva@nhm.ac.uk
To: viper007@live.com.au
Yes, please, you can send everything to my address.

Dr Svetlana Nikolaeva

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The Natural History Museum London SW7 5BD
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s.nikolaeva@nhm.ac.uk <mailto:s.nikolaeva@nhm.ac.uk>
<http://www.nhm.ac.uk/hosted-sites/iczn/code/index.jsp>

From: Snake Man Snakebusters [mailto:viper007@live.com.au]
Sent: 29 March 2012 12:34
To: Svetlana Nikolaeva
Subject: RE: Submission

Thanks for the e-mail.
Is it OK for us to send the relevant publications (not the submission) as copies to your address?
Thanks

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Phones: 9812 3322
0412 777 211

Subject: RE: Submission
Date: Thu, 29 Mar 2012 12:22:25 +0100
From: s.nikolaeva@nhm.ac.uk
To: viper007@live.com.au
Dear Dr Hoser,
Please send your submission as an attached MS Word file. Send copies of relevant publications as email attachments as well, but please note that our server cannot handle excessively large files, and if your attachments are over 10 mb in total, send them in separate emails or using FTPs. Please use iczn@nhm.ac.uk <mailto:iczn@nhm.ac.uk> address for your submission.

Please do not hesitate to contact me if you have any further questions.

Best wishes

Svetlana

Dr Svetlana Nikolaeva

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<http://www.nhm.ac.uk/hosted-sites/iczn/code/index.jsp>

From: Snake Man Snakebusters [mailto:viper007@live.com.au]
Sent: 29 March 2012 10:43
To: iczn
Subject: Submission

Dear Phil, or whom it may concern, I intend sending you a submission re the proposed suppression of a genus name.

Is this correct address to send it to and is it best to send,
1 - as an attached MS Word file,
and
2 - the relevant publications referred to in the submission in hard copy at the same time your address, at:
c/o The Natural History Museum, Cromwell Road, London SW7 5BD, U.K.
PS I have read your submission guidelines on the web at:
<http://iczn.org/content/instructions-authors>
and am familiar with the Bull ZN.

All the best
Raymond Hoser

DRAFT SUBMISSION TO THE ICZN DATED 2012

Case.

Proposed conservation of *Spracklandus* Hoser 2009 and formal suppression of *Afronaja* Wallach, Wüster and Broadley 2009.

Raymond Hoser, Snakebusters - Australia's best reptiles, PO Box 599, Doncaster, Victoria, 3114, Australia.

Abstract.

The purpose of this application is to conserve usage of *Spracklandus* Hoser 2009 for the African Spitting Cobras in accordance with Article 23.1 of the code and for the ICZN to make a formal suppression of the junior synonym *Afronaja* Wallach, Wüster and Broadley 2009 under article 78.2.3 of the code. The commission is asked to formally suppress the junior synonym due to the conduct of the authors and associates, in particular Wüster, this conduct including their manner of widespread promotion of the junior synonym, which will cause instability in the future unless the commission rules on the matter expediently.

Keywords.

Nomenclature; reptilia, elapidae, spitting cobras, taxonomy, *Spracklandus*, *Afronaja*.

1. In the period January to March 2009, Raymond Hoser (this author) published seven issues of *Australasian Journal of Herpetology* (AJH), Hoser 2009a, Hoser 2009b, Hoser 2009c, Hoser 2009d, Hoser 2009e, Hoser 2009f, Hoser 2009g. Most contained articles of a taxonomic nature, proposing new names and combinations for reptilian taxa including, skinks, pythons, crotalids and elapids.
2. In accordance with Article 8 of the 2000 Rules of the ICZN (ICZN 1999), known herein as "the code", there were over 100 identical "hard copy" originals of each published in print form on double sided white gloss paper at time of publication and they were circulated widely.
3. In accordance with Recommendation 8A of the code, copies of each issue of AJH issues 1-7 were lodged with *Zoological Record* and also major public libraries in Australia, as well as obvious interested persons, including taxonomists and those who had taxa named in their honour. See for examples, Cumming (2009), Currie (2009), Henderson (2009), Hua (2009), *Zoological Record* (2009a, 2009b).
4. Copies of each issue of AJH 1-7 were also offered to anyone else interested, this being done by several means, including on the website linked from http://www.herp.net which offered original hard copies or copies online, identified as being a different publication via a different ISSN number. Advice of publications was also disseminated via various internet sites and forums (e.g. Hoser 2009h).
5. When demand for hard copy originals exceeded those in stock, as in supplies of originals were exhausted, photocopies were sent to persons requesting copies.
6. The same journal was published in identical format, fonts, pagination, etc, online an average of ten days post publication of the print copies in accordance with recommendation 8A of the code.
7. The publications were accessible via the website at: http://www.herp.net
8. This "online" publication post-dated receipt of hard copies by major libraries and others shown by return correspondence from these places to the publisher.
9. There has never been any genuine confusion in terms of the fact that the only relevant publication in terms of the code has been the hard copy one.
10. Issue 7 of AJH published in March 2009, formally placed the African Spitting Cobras into a newly erected genus, *Spracklandus*, with the type species being *Naja nigricollis* Reinhardt 1843. There is no earlier available genus name for these snakes, other than *Naja*, for which there is another type species, being an Asiatic cobra.
11. On 29 April 2009, Van Wallach requested via e-mail a hard copy of AJH issue 7 (Wallach 2009a). He was sent a photocopy in Accordance with Recommendation 8A of the code, which he received and acknowledged as a copy on 9 May 2009 (Wallach 2009b).
12. On about 27 September 2009, Wallach, Wüster and Broadley published a paper in *Zootaxa*, alleging that AJH issues 1-7 were not publications in accordance with the code. Their claims as published, was based on statements that they had done a search for original hard copies and in terms of AJH Issue 7, only found one in a Library in Australia. They then said they "concluded" that no other originals existed and that therefore AJH failed to comply with the code. They further said that any other hard copies in existence were printed after the publication date "on demand" and therefore not published according to the code. A secondary claim, interpolated with the first was that AJH Issues 1-7 were in fact only "online" publications and therefore not valid according to the code.
13. Wüster peddled the claims against AJH issue 7 widely, including on internet forums, including for example Wüster 2009a, 2009b.
14. Wüster was advised of the erroneous claim in the paper Wallach, Wüster and Broadley (2009) by Hoser on an online forum on 27 September (Hoser 2009i).
15. Wüster read and replied to Hoser 2009j on the forum on 28 September 2009 (Wüster 2009b), meaning that he was aware from that date on of the error of the claim that AJH Issue 7 was not published according to the code.
16. Hoser reaffirmed the position to Wüster on 3 October on the same forum (Hoser 2009j), posing relevant questions to Wüster, but as of March 2012, he has failed to provide relevant answers.
17. The same advice, that AJH Issue 7 was validly published according to the code was provided by a recipient of an original of that journal, namely Richard Wells on 7 December 2009 (Wells 2009).
18. Ignoring the advice of Hoser 2009i and Hoser 2009j that corrected the mistake published by Wallach, Wüster and Broadley (2009), Wüster has continued to actively promulgate the view that AJH Issue 7 was not published according to the code and that therefore *Spracklandus* is not a valid or available name according to the code.
19. Wüster and Bérnils (2011) ignored the correcting statements of Hoser 2009i and Hoser 2000j and Wells 2009 and repeated the claims made in Wallach, Wüster and Broadley 2009, including that all issues of AJH Issues 1-7 were not validly published according to the code.
20. Hoser 2012a, provided documentary evidence to show that all relevant issues of AJH had been validly published under the code and that the conclusions of Wallach, Wüster and Broadley (2009) were in fact false. Hoser 2012a, further showed that

Wallach, Wüster and Broadley 2009, had either known their claims were false at the time of publication, or alternatively were reckless to have published them without having made obvious and appropriate inquiries.

21. To substantiate the claims in Hoser 2012a, the author provided copies of receipt documents from places including *Zoological Record*, for various issues of AJH, including issue 7.
22. The claims of Wallach, Wüster and Broadley (2009) have been reposted widely, including in published papers, including Schleip and O'Shea 2010 (both close friends of Wüster), creating further potential instability in terms of the nomenclature of the Spitting Cobras.
23. To stabilize the nomenclature of the other taxa described in AJH issues 1-7, Hoser published new papers in 2012, (Hoser 2012a, 2012b, 2012c, 2012d, 2012e) that named all relevant taxa identified in issues 1-7 of AJH, meaning the only issue remaining for those taxa is that of publication date as opposed to taxon names.
24. As a result, the only name now subject to the claims made by Wallach, Wüster and Broadley (2009) in terms of potentially not being available under the code on the basis of the false claims by Wallach et. al. and in dispute by them is *Spracklandus* Hoser 2009.
25. Based on the material presented in Hoser 2012a, it is self-evident that AJH issue 7 was in fact validly published under the code.
26. It is also clear that Wallach, Wüster and Broadley were reckless in their publishing claims in relation to AJH not being validly published, based on their failure to ask relevant questions of the author or publisher of AJH Issue 7, or even to make simple checks of likely repositories of originals of AJH Issue 7, including *Zoological Record*.
27. Hoser 2012a, also provided evidence to show that Wüster and associates, including Schleip have a substantial prior history spanning over 10 years, of making false claims in relation to taxonomic and nomenclatural matters, specifically in relation to names proposed by Hoser.
28. Hoser 2012a recounted a historical case, where Wüster and others generated more than 4,000 "fake" votes online in order to enable a friend, the convicted wildlife smuggler, David John Williams to win a free holiday in a competition run by a major hotel chain (see Williams 2008). This recount was to show the power Wüster and associated people have in improperly manipulating the opinions of large numbers of people.
29. Hoser 2012a provided evidence to show that Schleip, a colleague of Wüster had lied in a preamble in a taxonomic paper naming allegedly new *Leiopython* taxa (see Schleip 2007a, 2007b, 2008a, 2008b, 2008c).
30. Hoser 2012a recounted another incident where Wüster and Williams were a party to the fraudulent alteration of an online paper in the period 1998-2000 to make false claims in relation to Hoser breaching the ICZN code in 2000 (see three versions of the same paper posted on the web, cited herein as Williams and Starkey 1999a, 1999b and 1999c).
31. Hoser 2012a provided evidence detailing continual editing and meddling by Wüster of internet information sites, including reptile databases and Wikipedia to present to others misleading, deceptive and totally false information.
32. More recently, in June 2012, associates of Wüster (as identified from their personal "facebook" pages screen dumped on 25 June 2012) have commenced a campaign to use a loophole in Article 79 of the Code to effectively over-ride the essential "Article 23" of the code ("Principle of priority") to set themselves up as small group of gate-keepers as to whom will get naming rights on reptile taxa, with a view to re-naming all taxa formally described by Hoser and any other person they take a dislike to, or for that matter, any other taxon they would like to see their own names attached to (Kaiser et. al. 2012).
33. Kaiser et. al. 2012, repeat and make numerous false and defamatory claims against Hoser, (easily shown as such) in their open letter and "a call to action", including that Hoser papers are "fraudulent, unethical, or lacking evidence". None of these claims have a shred of factual evidence to support them as best demonstrated by viewing the primary sources, that being the papers themselves, including for example Hoser 2012f.
34. Kaiser et. al. 2012, point to their success in stopping people using names proposed by Hoser to date, in particular those for Rattlesnakes, the basis of their success being Wüster's earlier false claims that the names were not validly published or available under the code.
35. Among the dozens of names Kaiser et. al. 2012 (appendix list) seek to suppress in favor of their own planned "renamings" is *Broghammerus* Hoser, 2004, (and others) used by herpetologists to date many thousands of times, as easily shown by doing a "Google" search for the term. Wüster's similar actions over the past decade have held the code in contempt and the current course of action seeks to undermine the code and nomenclatural stability further.
36. The undeniable published record shows that without a ruling by the ICZN, Wüster will continue to engage in unethical conduct that will destabilize nomenclature and in violation of the central rules of the code.
37. In accordance with the code, *Spracklandus* has a clear date priority over *Afronaja* (Article 23 of the code). As both genera have the same type species, *Afronaja* must be a junior synonym for *Spracklandus*.
38. The International Commission on Zoological Nomenclature is accordingly asked by Raymond Hoser to:

    (1) Affirm that *Australasian Journal of Herpetology* Issue 7, was in fact published in accordance with the code as were all other issues of the Journal as published before and since then up to and including end July 2012 (to Issue 15).

    (2) Therefore affirm that the genus name *Spracklandus* Hoser 2009, should be applied to the type species *Naja nigricollis* Reinhardt 1843.

    (3) Therefore affirm that all names published in *Australasian Journal of Herpetology* are available under the code, assuming the taxa so named are deemed worthy of such recognition by others and no other available names have priority.

    (3) Use its plenary powers and publish a ruling to suppress for nomenclatural purposes the name "*Afronaja*" as applied in the paper by Wallach, Wüster and Broadley (2009) for the type species *Naja nigricollis* Reinhardt 1843, in order to maintain nomenclatural stability.

References

Cumming, F. 2009. Email to Raymond Hoser. 20 March.

Currie, M. 2009. Letter to Raymond Hoser, LEGAL DEPOSIT RECEIPT OF SERIAL PUBLICATION, Title Australasian Journal of Herpetology, no 2 - no 6 (2009). 20 March.

Henderson, S. 2009. Re Zoological Records. E-mail to Tom Cotton dated 13 October.

Hoser, R. T. 2009a. One or two mutations doesn't make a new species … The taxonomy of Copperheads

Hoser 2012 - Australasian Journal of Herpetology 14:37-64.

(*Austrelaps*)(Serpentes:Elapidae). *Australasian Journal of Herpetology* 1 (2009):1-28. (1 January).
Hoser, R. T. 2009b. Creationism and contrived science: A review of recent python systematics papers and the resolution of issues of taxonomy and nomenclature. *Australasian Journal of Herpetology* 2 (2009):1-34. (3 February).
Hoser, R. T. 2009c. A new genus and a new species of skink from Victoria. *Australasian Journal of Herpetology* 3 (2009):1-6. (4 February).
Hoser, R. T. 2009d. Eight new taxa in the genera *Pseudonaja* Gunther 1858, *Oxyuranus* Kinghorn 1923, and *Panacedechis* Wells and Wellington 1985 (Serpentes:Elapidae). *Australasian Journal of Herpetology* 4 (2009):1-27. (9 February).
Hoser, R. T. 2009e. Pain makes venomous snakes bite humans. *Australasian Journal of Herpetology* 5 (2009):1-21. (10 February).
Hoser, R. T. 2009f. A reclassification of the Rattlesnakes; species formerly exclusively placed in the Genera *Crotalus* and *Sistrurus*. *Australasian Journal of Herpetology* 6 (2009):1-21. (9 March).
Hoser, R. T. 2009g. A reclassification of the True Cobras; species formerly referred to the genera *Naja*, *Boulengerina* and *Paranaja*. *Australasian Journal of Herpetology* 7 (2009):1-15. (23 March).
Hoser, R. T. 2009h. Post on http://www.venomlist.com/forums/index.php?showtopic=24325&st=20 on 30 March 2009.
Hoser, R. T. 2009i. Post on forum at: http://www.sareptiles.co.za/forum/viewtopic.php?f=83&t=17849 on 27 September 2009.
Hoser, R. T. 2009j. Post on forum at: http://www.sareptiles.co.za/forum/viewtopic.php?f=83&t=17849 on 3 Oct 2009.
Hoser, R. T. 2012a. Exposing a fraud! *Afronaja* Wallach, Wüster and Broadley 2009, is a junior synonym of *Spracklandus* Hoser 2009! *Australasian Journal of Herpetology* 9 (3 April 2012):1-64.
Hoser, R. T. 2012b. An updated review of the pythons including resolution of issues of Taxonomy and Nomenclature. *Australasian Journal of Herpetology*, 10:2-32.
Hoser, R. T. 2012c. A reclassification of the Rattlesnakes: species formerly referred exclusively referred to the Genera *Crotalus* and *Sistrurus* and a division of the elapid genus *Micrurus*. *Australiasian Journal of Herpetology*, 11:2-24.
Hoser, R. T. 2012d. The description of a new genus of West Australian Snake and eight new taxa in the genera *Pseudonaja* Gunther, 1858, *Oxyuranus* Kinghorn, 1923 and *Panacedechis* Wells and Wellington, 1985 (Serpentes: Elapidae). *Australasian Journal of Herpetology*, 11:32-50.
Hoser, R. T. 2012e. A new genus and new species and new subspecies of skink from Victoria (Squamata:Scincidae). *Australiasian Journal of Herpetology*, 12:63-64.
Hoser, R. T. 2012f (composite citation). *Australasian Journal of Herpetology* issues 9-14.
Hua, K. 2009. Letter to Raymond Hoser, Australasian Journal of Herpetology 1 (2009) issue. 27 February.
International Commission on Zoological Nomenclature (ICZN) 1999, *International Code of Zoological Nomenclature* (Fourth Edition), International Trust for Zoological Nomenclature, The Natural History Museum - Cromwell Road - London SW7 5BD - UK: 306 pp. Also online at: <http://www.iczn.org/iczn/index.jsp>.
Kaiser, H. et. al. 2012. SPAM email with attached MS Word files titled “Point of view” and “Appendix 1” sent globally on or about 17 June 2012.
Schleip, W. et. al. 2007a - Numerous edits to Wikipedia page for “Leiopython” as hosted at: http://en.wikipedia.org/wiki/Leiopython, including the linked edit history for that page as downloaded on 12 December 2008.
Schleip 2007b. Website and all pages hosted on the internet server “www.leiopython.de”, as downloaded on 24 June 2007 (Note: The site remained essentially unchanged until late 2008 - see Schleip 2008c below).
Schleip, W. 2008a. Revision of the Genus *Leiopython* Hubrecht 1879 (Serpentes: Pythonidae) with the Redescription of Taxa Recently Described by Hoser 2012a (2000) and the Description of New Species. *Journal of Herpetology* 42(4): 645-667.
Schleip, W. 2008b. Website and all pages hosted on the internet server after 10 December 2008 to end December 2008, including revisions at: “www.leiopython.de”.
Schleip, W. 2008c. Website and all pages hosted on the internet server on 7 December 2008 at: “www.leiopython.de”.
Schleip, W. D., and O’Shea, M. 2010. Annotated checklist of the recent and extinct pythons (Serpentes, Pythonidae), with notes on nomenclature, taxonomy, and distribution. Zookeys; (66): 29-80. Published online 4 November 2010. doi: 10.3897/zookeys.66.683 <http://dx.crossref.org/10.3897%2Fzookeys.66.683>.
Wallach, V. 2009a. E-mail to Raymond Hoser dated 29 April.
Wallach, V. 2009b. E-mail to Raymond Hoser dated 9 May.
Wells, R. W.. 2009. Post on webforum at: http://herpetoblog.wordpress.com/2009/04/02/taxonomic-traumas-for-cobras-and-rattlesnakes/ 7 December.
Williams, D. J. 2008. Two posts dated 14 February 2008 at: http://www.reptileforums.co.uk/snakes/87176-support-new-guinea-snakebite-research-2.html and also posted at the same time at “aussiepythons.com” and numerous other internet chat forums.
Williams, D. J. and Starkey, B. A. 1999a. ‘Comments on the Genus *Pailsus* (Hoser, 1998)’, Undated document from the internet site http://www.uq.edu.au/~ddbfry/index.html:5 pp (note the url) - “Version 1” dated 1 November 1998 (date only at foot of document).
Williams, D. J. and Starkey, B. A. 1999b. ‘Comments on the Genus *Pailsus* (Hoser, 1998)’, Undated document from the internet site Kingsnake.com “ at: http://www.Kingsnake.com/toxinology/snakes/taxonomy.html (note the url) and later “The Venomous Snake Forum” January 29, 2001 at 01:50:13: pp. “Version 2”. (Actually published in this altered form in January 2001)
Williams, D. J. and Starkey, B. A. 1999c. ‘Comments on the Genus *Pailsus* (Hoser, 1998)’, Undated document from the internet site Kingsnake.com “The Venomous Snake Forum” January 30, 2001 at 02:12:58:5 at: http://www.Kingsnake.com/forum/venom/messages/31762.html (note the url) - Version 3. (Actually published in this altered form in January 2001)
Wüster, W. 2009a. Post on chat forum at: http://herpetoblog.wordpress.com/2009/04/02/taxonomic-traumas-for-cobras-and-rattlesnakes/ on 23 September 2009.
Wüster, W. 2009b. Post on chat forum at: http://www.sareptiles.co.za/forum/viewtopic.php?f=83&t=17849 on 28 September.
Wüster, W. and Bérnils, R.S. 2011. On the generic classification of the rattlesnakes, with special reference to the Neotropical *Crotalus durissus complex* (Squamata: Viperidae). Zoologia 28: 417-419.
Zoological Record 2009a. Australasian Journal of Herpetology 1-5 2009. Email dated 24 February.
Zoological Record 2009b. Australasian Journal of Herpetology 6 2009. Email dated 27 March.
Zoological Record (Anonymous) 2009c. Abstracts posted online at: http://www.organismnames.com/RSS/13669.xml

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