

ISSUE 35, PUBLISHED 20 JULY 2017

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

Australasian Journal of Herpetology



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Australasian Journal of Herpetology

Issue 35, 20 July 2017

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Photos: Raymond Hoser.

Australasian Journal of Herpetology ®

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

The inevitable break-up of the Australian legless lizard genera *Delma* Gray, 1831 and *Aprasia* Gray, 1839, formal descriptions of 13 well-defined Pygopodid species, as well as a further improvement in Pygopodid taxonomy and nomenclature.

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Received 2 October 2016, Accepted 10 March 2017, Published 20 July 2017.

ABSTRACT

The Australian legless lizards of the family Pygopodidae have been subject of several major taxonomic reviews by very competent herpetologists.

The result has been an excellent understanding of most species groups, generic level classifications and divergences between these entities.

However until now, the species within the genus *Delma* Gray, 1831 *sensu lato* as understood to date have been placed in this group based on superficial morphological similarities.

Molecular studies published in the post 2000 period have shown divergences within this genus (*sensu lato*) being wider than between other long recognized genera of Australian Pygopodids (e.g. *Pygopus* Merrem, 1820 and *Paradelma* Kinghorn, 1926).

To correct this anomaly, the genus *Delma*, as defined in texts such as Cogger (2014) is divided appropriately into seven genus level groups of similar divergences as seen for the delineation of other previously defined genera of Pygopodids.

Names are available for three genera, and four new genus groups are formally named herein.

Two subgenera are also named.

Following on from several molecular studies and direct observations of many hundreds of specimens from relevant areas, this paper also formally describes 11 well defined and geographically separated species within the genus *Delma* as defined in texts such as Cogger 2014 as well as two regionally distinct forms of the Common Scalyfoot *Pygopus lepidopodus* Lacépède, 1804.

With three exceptions, all are supported by previously published molecular data as cited herein. The remainder are all divided by barriers which similarly affect other reptiles for which molecular work has been done and time divergences at the species level previously established (as cited).

The genus *Aprasia* Gray, 1831, long known to consist of four main species groups is formally divided at the genus level four ways on the basis of divergences of at least 15 MYA, with two formally named for the first time.

Furthermore the Pygopodidae is formally divided into four well-defined tribes, three further subdivided into three, two and two subtribes, two of these being named for the first time at the family level of classification. In summary there are now 17 recognized genera within the Pygopodidae.

Keywords: Taxonomy; lizards; *Delma*; *Nisara*; *Pseudodelma*; *Aclys*; *Abilaena*; *Pletholax*; *Aprasia*; *Lialis*; *Pygopus*; *Cryptodelma*; *Ophidiocephalus*; *Paradelma*; *Pygopodid*; Australia; new tribe; Aprasiaini; Pygopusini; Lialisini; Sloppopini; new subtribe; Aprasiaina; Pletholaxina; Ophidiocaphalina; Pygopusina; Paradelmaina; Sloppopina; Crottyopina; new genus; *Crottyopus*; *Sloppopus*; *Wellingtonopus*; *Wellsopus*; *Brettbarnettus*; *Maryannmartinekea*; new subgenus *Gracileopus*; *Honlamopus*; new species; *megleesae*; *cummingae*; *jamesbondi*; *stevebennetti*; *grahamrichardsoni*; *shanekingi*; *brianbarnetti*; *kylienaughtonae*; *michaelguiheneufii*; *richardwarneri*; *robwatsoni*; *brettbarnetti*; *woolfi*.

INTRODUCTION

Nearly all herpetologists in Australia are familiar with the abundant legless lizards in the genus *Delma* Gray, 1831 as defined in texts such as Cogger (2014) or Wilson and Swan (2013), these being the most widely used identification manuals in Australia as of 2017.

Because they are defined in these and numerous other similar texts, there is no need for a background summary of these lizards here.

Outside of the relatively small group of herpetologists who have worked on the taxonomy of these lizards, they remain a largely unknown group in that they are small, innocuous and common, but not of interest in terms of the reptile keeping fraternity or worth any dollar value.

Hence there is relatively little published on the group and doing a literature audit on the group was not difficult.

Also when most specimens are seen or caught by herpetologists, they are tentatively identified by way of an educated guess (e.g. "it is a *Delma*") and not much more is said.

Notwithstanding this and in part due to the large numbers that end up in museum collections as inadvertently killed "baby snakes", taxonomists have been able to identify and name a significant number of species and in all probability most of them.

Outside of the genus *Delma sensu lato*, the other species of Pygopodid are generally larger or more distinctive and so genera have been erected for each obvious group and there appear to be no as yet obviously unnamed genus level groups.

Exceptional to this is the genus *Aprasia* Gray, 1839, quite properly recently split into two by Richard Wells in 2007 (Wells, 2007) along obvious phylogenetic lines.

That genus (*Aprasia*) *sensu lato* also consisted of morphologically similar, small and innocuous species.

In terms of the divergence of the two main groups of species in *Aprasia sensu lato*, the divergence of the genus *Abilaena* Wells, 2007 from *Aprasia*, estimated at about 15 million years by Jennings *et al.* (2003) is taken as a baseline level by which to divide the genus *Delma sensu lato* into relevant species groups.

All of the seven obvious species groups defined within this paper sits outside this time frame, as in a greater time divergence.

One of these unnamed groups known presently as the *Delma nasuta* Kluge, 1974 group (identified herein as *Wellingtonopus gen. nov.*) is believed to have diverged from its nearest relatives about 15 MYA. The second group which already has an available name (*Pseudodelma* Fischer, 1882), diverged from its nearest relatives (*Delma* Gray, 1831 *sensu stricto*) about 19 MYA. The rest diverged at about 20 MYA or earlier based on the results of Jennings *et al.* (2003), clearly making all worthy of genus level recognition.

The need to split the genus *Delma sensu lato* has also been repeatedly referred to by the cited earlier authors.

For example, Shea (1991) wrote of the *Delma impar* group of species, the following:

"These two species, together with *D. torquata*, share the derived character state of only two pre-anal scales, and may constitute a species group, the *D. impar* group, occurring in southeastern Australia, especially in basaltic soils."

These comments predated the molecular studies of the following two decades that confirmed this view.

The name *Pseudodelma* Fischer (1882) is available for that group and is therefore applied within this paper.

Shea (1991) also wrote of another group within the genus "*Delma*" as recognized at the time:

"They appear to comprise a species group, the *D. tincta* group, diagnosable by the usual presence of only a single elongate upper temporal scale bordering the parietals, a character otherwise common in *Delma* only in *D. plebeia*."

In the absence of a formal name for the group, this paper formally erects the genus *Wellsopus gen. nov.*

to accommodate the relevant species.

Much the same applies in terms of Maryan *et al.* (2015a), who wrote in the PRINO (peer reviewed in name only) journal *Zootaxa*:

"Based on phylogenetic affinities and shared morphologies, a *D. australis* species-group is proposed to accommodate *D. australis*, *D. torquata* and the new species (*D. hebessa*) described herein."

That group is herein assigned to the genus *Crottyopus gen. nov.*

While *Zootaxa* is NOT peer reviewed in any accepted sense of the term, the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999), does not preclude such publications and acts within them from being nomenclaturally available. Hence the taxon described as "*Delma hebessa*" is recognized herein as validly named and is treated as such herein.

At the species level, numerous authors have published revisions of the genus *Delma sensu lato*, either in full or in part, including for example Kluge (1974), Maryan *et al.* (2007, 2015a), Shea (1987, 1991), Storr (1987) and Wells and Wellington (1985), all of whom named one or more species within the genus as currently recognized.

On top of these results, the results of phylogenetic studies have also been published including those of Jennings *et al.* (2003) and more recently that of Brennan (2014).

Both these studies identified potentially unnamed species, which were confirmed by myself after inspecting specimens from the relevant localities. Further unnamed species-level taxa have also become apparent over the past 3 decades of fieldwork in many parts of Australia, including a population from the East Pilbara until now referred to the species *D. elegans* Kluge, 1974.

As the conservation and management of all reptiles depends on relevant taxa being identified and formally named, this paper takes that important first step and names those previously unnamed forms as well defined species-level taxa.

In passing I note that all 11 morphologically defined and named species within this paper within *Delma sensu lato* are also corroborated and confirmed by the molecular data of Brennan (2014), Jennings *et al.* (2003) and Maryan *et al.* (2015a).

The only exception to this is the species described herein as *Wellsopus robwatsoni sp. nov.* from the East Pilbara, Western Australia which has until now referred to the species "*D. elegans* Kluge, 1974".

There is no available molecular data for this taxon, however the morphological differences between the populations of *W. robwatsoni sp. nov.* and *W. elegans* Kluge, 1974 appear to be consistent and both populations are well and truly separated by a zone incorporating the Fortescue River drainage and the different habitat and suite of species that it includes.

Other similar but separated species, confirmed by molecular data are affected by the same geographical barrier, including the two species of *Odatria (Pilbaravaranus)* Hoser, 2013, as defined by Maryan *et al.* (2014), which previously had been treated as a single species.

The Pilbara Death Adders (*Acanthophis wellsei*) *sensu lato* are also affected by the same Fortescue River drainage barrier, with this barrier being inhabited by the Desert Death Adder (*A. pyrrhus*) instead as outlined by Hoser (2014).

All the other 10 species within the genus *Delma sensu lato* as recognized to date that are formally named for the first time here are easily diagnosed by morphological features as outlined in the relevant descriptions and supported by the molecular evidence of Brennan (2014) (see for example his Fig: 3).

Which other species each are most closely related to is made clear in the various descriptions below.

However I note here that *Wellsopus kylienaughtonae sp. nov.*, *W. michaelguitheneufi sp. nov.* and *W. richardwarneri sp. nov.*, have until now all been regarded as regional populations of the

better-known *W. tincta* (De Vis, 1888).

In terms of the genus *Aprasia* Gray, 1839 *sensu lato* the division of the genus into two by Wells (2007), followed by Hoser (2015g) in effect divides two of four main groups in the genus as commonly recognized. However based on obvious morphological, biological and phylogenetic divergences (the latter spelt out by Jennings *et al.* (2003), the two most divergent groups remain unnamed.

These two both diverged from *Aprasia* Gray, 1839 (type species *A. pulchella* Gray, 1839) and *Abilaena* Wells, 2007 (type species *A. repens rostrata* Parker, 1956) some 19 MYA and from one another some 16 MYA.

Both are formally named below as new genera, with all four (genera) within *Aprasia sensu lato* being formally redefined herein.

The wide ranging and locally variable species the Common Scalyfoot *Pygopus lepidopodus* (Lacépède, 1804), has until now been treated as a single species. However I also note the recent description of the taxon *Pygopus robertsi* Oliver, Couper and Amey, 2010 in the PRINO (peer reviewed in name only) Journal *Zootaxa*, for the population previously referred to this species from north-east Queensland. However particular populations in southern Australia of *P. lepidopodus* are geographically isolated from one another and so two quite morphologically distinct forms are formally named herein as species within this paper, on the basis that they are taxonomically distinct.

That the Common Scalyfoot consists of more than one species has been known for a long time. However problematic for taxonomists has been the fact that a number of synonyms do exist and yet no one seemed to know the provenance of the relevant specimens. Hence names were available for some forms, but exactly which wasn't known.

For the first time ever, I audited the available names to ascertain which forms of Scalyfoot were the name bearing ones for the given names.

The original specimens of *Pygopus lepidopodus* (Lacépède, 1804), originally described as *Bipes lepidopodus* Lacépède, 1804, as well as *Sheltopusik novaehollandiae* Opperl, 1811, conformed with the so-called "Heath Form" of the lizard, this being known only from the south and west of Australia in a general region being west of the Great Dividing Range, commencing from central-western New South Wales and nearby Victoria, through the centre of the state, and across South Australia to Western Australia, including the mid-west coast, as outlined in Gray (1845) on page 67.

Pygopus squamiceps Gray, 1845 as described on page 68 of the same publication describes a colour variant most common in the Victorian Mallee and again only known from the southern part of Australia west of the East Coast and Great Dividing range.

Pygopus longicaudatus Tepper (1882) is also listed as coming from near Adelaide in South Australia.

The morphologically different East Coast populations are well separated from the south and western ones by the colder parts of the Great Dividing Range in South-east Australia.

Hoser (2013) showed a divergence of about 4 MYA between the species *Pantherosaurus kuringai* Wells and Wellington, 1985, from NSW, and *P. rosenbergi* (Mertens, 1957) from South Australia and Western Australia.

These taxa have a mirror distribution to that of *Pygopus lepidopodus* (Lacépède, 1804), as currently recognized and so if the East and West forms are two species for one group, it must be reasonably believed that the same applies to the other.

In terms of the relevant monitor species Hoser (2013) wrote of a paper by Smith *et al.* (2007), "Their crude results were a mitochondrial divergence of 8.2 per cent between the West Australian population (type for "*rosenbergi*") and the geographically isolated east Australian population, described by Wells and Wellington in 1985 as "*kuringai*")."

This means that the two well-known forms of *Pygopus* from the East Coast in NSW and South East Queensland remain effectively unnamed and without any available names. Hence they are both named for the first time herein as full species.

The form with a distribution centred around the NSW Central Coast (including Sydney's major National Parks) is herein named *Pygopus brettbarnetti* sp. nov., while the significantly larger form found north of the Brisbane River and on the Sunshine Coast is herein named *Pygopus woolfi* sp. nov..

MATERIALS AND METHODS

The identification of the relevant genus and species groups was easily achieved by simple inspection of relevant specimens, live in the field, in museums and via images sent to me by others. In terms of species level groups, biological barriers were identified by combining known locality data with known geographical barriers, most of which have become well known to myself in my various researches on other reptile groups inhabiting the same regions.

The formal naming exercises are a direct result of a review of the relevant literature to identify all previously named groups at both species and genus level, including known synonyms and potentially available names according to the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

As mentioned already, names coined in non peer reviewed or online PRINO (peer reviewed in name only) journals (e.g. *Zootaxa*) are now available under the relevant rules of the *International Code of Zoological Nomenclature* as amended and so are treated as valid and used when appropriate herein.

Available names are used as appropriate (in the paper below) and where none was available the relevant entities are named according to the provisions of the *International Code of Zoological Nomenclature*.

While the species and genera diagnosed herein are done so on the basis of their own physical characters, it is important to note the guidance given by relevant earlier publications (quoted above), which in combination show that the taxonomic conclusions within this paper are not only logical, but are in fact a mere statement of the obvious.

How long it will take other herpetologists to adopt and use the taxonomy within this paper will not depend on the merits of what is published herein, so much as how willing they are to brave the hatred and harassment from a group known as the Wüster gang, who will seek to do all they can to stop others from using any taxonomy or nomenclature formally proposed by myself.

Their actions are dictated by personal hatred and an illegal desire to steal the intellectual property of others rather than any scientific arguments they may allege.

The unscientific and highly illegal actions of this group have been documented in detail in the papers of Hoser (2015a-f) and sources cited therein and even publicly condemned by judges in law courts (Court of Appeal 2014, Victorian Civil and Administrative Tribunal (VCAT) 2015).

Key publications relevant to the genus *Delma* Gray, 1831 *sensu lato*, *Aprasia* Gray, 1839, *Pygopus* Merrem, 1820 and all the taxonomic judgements and conclusions herein (including with reference to the other pygopodids) include: Bamford (1998), Boulenger (1885, 1903), Brennan (2014), Brennan *et al.* (2015), Bush (1981), Bush and Maryan (2006), Bush *et al.* (2007), Cogger (2014), Cogger *et al.* (1983), Covacevich *et al.* (1998), Crouch (1977), Davis and Wilcox (2008), De Vis (1888), Dorrough (1999), Dorrough *et al.* (1996), Duméril and Bibron (1839), Garman (1901), Glauert (1956), Gray (1831, 1867), Günther (1873), Hall (1905), Hines *et al.* (2000), Hoser (1989, 2013, 2014, 2015g), Husband (1995), Jennings *et al.* (2003), Kinghorn (1924, 1926), Kluge (1974, 1976), Lacépède (1804), Lethbridge and Hawkes (1994), Lindholm (1905), Longman (1916), Lütken (1863), Maryan (1985, 2005), Maryan *et al.* (2007, 2013a, 2013b, 2014, 2015a, 2015b), Merrem (1820), Oliver *et al.* (2010), Opperl (1811), Pianka (1969, 1986, 2010),

Rosen (1905), Shea (1987, 1991, 1993), Smith *et al.* (2007), Storr (1987), Swan (1997), Tepper (1882), Wells (2007), Wells and Wellington (1985), Wilson and Knowles (1988), Wilson and Swan (2013) and sources cited therein.

Some material within descriptions below may be repeated for different described taxa and this is in accordance with the provisions of the *International Code of Zoological Nomenclature* and the legal requirements for each description. I make no apologies for this.

I also note that, notwithstanding the theft of relevant materials from this author in an illegal armed raid on 17 August 2011, which were not returned in breach of undertakings to the court (Court of Appeal Victoria 2014 and VCAT 2015), I have made a decision to publish this paper.

This is in view of the conservation significance attached to the formal recognition of unnamed taxa at all levels and on the basis that further delays may in fact put these presently unnamed or potentially improperly assigned taxa at greater risk of extinction.

This comment is made noting the extensive increase in human population in Australia and the general environmental destruction across the continent as documented by Hoser (1991), including low density areas without a large permanent human population.

I also note the abysmal environmental record of various Australian National, State and Local governments in the relevant Australian region over the past 200 years as detailed by Hoser (1989, 1991, 1993 and 1996).

NOTES ON THE DESCRIPTIONS FOR ANY POTENTIAL REVISORS

Unless mandated by the rules of the *International Code of Zoological Nomenclature*, none of the spellings of the newly proposed names should be altered in any way. The names created herein have also been created with a view to avoiding any potential homonymy with earlier established names. Should one or more newly named taxa be merged by later authors to be treated as a single entity, the order of priority of retention of names should be the order (page priority) of the descriptions within this text (which is the same as that listed in the abstract).

Below are the genus (and subgenus) level descriptions followed by the species descriptions. In terms of the latter, they are placed within the genera as outlined in the following section of this paper, this being the new taxonomy and nomenclature for the relevant group/s of reptiles.

Characters used to identify each genus described below are largely derived from the standardized accounts given in Cogger (2014) as they are both simple and can be employed easily in the field.

The tribe and subtribe descriptions for the entire Pygopodidae follow these descriptions.

Also presented with this paper is a list of the seven genera and their component species, which as a group were included within the genus *Delma* as recognized in most recent publications, including Cogger (2014) and Wilson and Swan (2013), although these publications and the online database of Peter Uetz (known as "The Reptile Database") do not in fact list all (until now) recognized species.

All are listed herein.

Following these descriptions are descriptions of all the tribes within the Pygopodidae, using available names and/or erecting new names for hitherto unnamed tribes, this being the first time ever a proper tribe arrangement has been made for the group. A summary of this new taxonomy is also presented in the form of a list.

Family-level treatment of several genera has been done in the past, but not at the tribe level and this is outlined in some detail on pages 45 and 46 of Kluge (1974) and is therefore not rehashed (repeated) here.

THE STATUS OF "DELMA WOLLEMI WELLS AND WELLINGTON, 1985" – WHY THE TAXON IS APPARENTLY VALID AND A REDESCRIPTION.

I note that without any scientific justification whatsoever, the taxon described as "*Delma wollemi* Wells and Wellington, 1985" from the Hunter Valley in New South Wales (herein placed in the genus *Pseudodelma* Fischer, 1882), has been effectively ignored by all other authors since. However almost without exception, none have ever sighted the relevant taxon and refuse to accept it on the basis of pressure from the Wüster gang.

I note herein that the gang leader, Wolfgang Wüster is based in Wales in the UK and therefore has probably never even sighted a *Delma*-type legless lizard in the flesh, but has no hesitation in directing others what taxonomy and nomenclature they must use.

Having personally observed specimens referable to that taxon ("D. Wollemi") and type Queensland "*Delma plebia* De Vis, 1888", there are consistent differences between them, making the isolated southern population most certainly worthy of taxonomic recognition.

Hence my acceptance of the Wells and Wellington taxonomy and the ICZN rules compliant nomenclature that follows.

Put simply, because the Wells and Wellington (1985) description complied with the relevant edition of the *International Code of Zoological Nomenclature* (Hoser, 2007), the species name is accepted and used herein.

I do note that as of this date there is no molecular data supporting whether the Wells and Wellington taxon is distinctive at the molecular level and therefore I am not 100% certain whether recognition should be at the species or subspecies level. Therefore my recognition herein of "*Delma wollemi* Wells and Wellington, 1985" as a full species within the resurrected genus *Paradelma* Fischer, 1882 is only tentative.

However there is no doubt that it is sufficiently different from and reproductively isolated from type *D. plebia*, and therefore it must have some form of taxonomic recognition.

Hence my use of the name herein.

In passing, I also note the continual derision by many of the Wells and Wellington, 1985 descriptions, which in the main are not properly justified.

Critics blame the two men for brevity of descriptions and lack of diagnostic characters and the criticisms are either baseless or where justified do in fact have legitimate explanations.

In the case of "*Delma wollemi* Wells and Wellington, 1985" and the similar species, "*D. plebia*", Wells and Wellington referred to two images (one for each taxon) in the published literature which display typical specimens of each taxon.

From those images alone, it is clear that the two legless lizards are sufficiently different to warrant recognition as such, or at least Wells and Wellington made a case for this.

Of course, it is likely that few if any other later workers on the genus *Delma* even went through the simple intellectual exercise of matching the images of each species to see if Wells and Wellington had made out their case for their taxonomic judgement, or for that matter examined relevant holotypes, or examples of the relevant taxa in life to confirm if the depicted specimens were in fact typical of each area.

I have done all three, in that:

1/ I cross matched the images from Cogger (1983), Plate 491 ("*wollemi*") and that of Kluge (1974). ("*plebia*") as referred to in the Wells and Wellington (1985) description, noting the obvious differences in the depicted animals;

2/ I also inspected both holotypes (which in turn matched the animals in the depicted images) and;

3/ I inspected numerous specimens of each taxon in life in the wild and/or recently caught or photographed.

In summary, the Wells and Wellington taxon checked out as different on all counts and so must be afforded taxonomic recognition at the species level of classification.

The differences between the species "*plebia*" and "*wollemi*" are obvious at a glance and as they have not been published as such in the past as a clear cut diagnosis, they are given here.

- 1/ "*wollemi*" consistently has a distinctive patch of darkened pigment on the crown, which is absent in "*plebia*";
- 2/ the three to four dark bars across the labials are large in "*plebia*" but narrow to medium in "*wollemi*";
- 3/ the medium to large dark bar running under the eye is triangular in "*plebia*", but not so in "*wollemi*". In the latter taxon this bar is more-or-less rectangular;
- 4/ there is significant white on the upper labials in "*plebia*", but this is not the case for "*wollemi*".
- 5/ "*wollemi*" is characterised by having 3-4 semi-distinct oblique darker bands on the lower flanks of the front neck and these are absent in "*plebia*".

The above is significant in that as far back as 1985, Richard Wells and Cliff Ross Wellington correctly identified and described a hitherto unrecognized taxon and yet more than 20 years later the taxon remains effectively unknown in Australian herpetology because quite improperly later authors have ignored the taxon and it has also not appeared in the general identification books for Australian reptiles.

By the way, the preceding redescription is NOT a description in accordance with the rules of the ICZN and does not need to be. The name "*wollemi*" was made available by Wells and Wellington in 1985, and so there is no need for the preceding "redescription" to be code compliant in the accepted sense of the term. "*wollemi*" is the correct ICZN Code compliant species name for the taxon referred to herein as *Paradelma wollemi* (Wells and Wellington, 1985).

CRYPTODELMA FISCHER, 1882

This genus was erected for the species described as *Cryptodelma nigriceps* Fischer, 1882. However *Cryptodelma* was synonymised with *Pygopus* Merrem, 1820 by Cogger *et al.* (1983) and this appears to have been the general usage ever since. As the two nominate taxa diverged about 18 MYA ago according to Jennings *et al.* (2003) also forming distinct species groups, I hereby resurrect *Cryptodelma* as a valid genus to accommodate the *nigriceps* species group.

I should note that neither genus arising from this split is monotypic and that this lack of monotypy predates this paper.

GENUS DELMA GRAY, 1831

Type species: *Delma fraseri* Gray, 1831.

Diagnosis: The Pygopodidae are a family embedded within the Gekkota, that is confined to the continental Australian bioregion. All species are effectively confined to Australia except for three within the genus *Lialis* Gray, 1835 of which one occurs in Australia and New Guinea (*L. burtonis* Gray, 1835) and two in New Guinea only (*L. jicari* Boulenger, 1903 and *L. cuneirostris* (Lindholm, 1905)). The members of this family are characterised and separated from all other lizards in Australasia by the following suite of characters: Forelimbs are absent and the hindlimbs are either not obvious or normal for a lizard. Instead the hindlimbs are represented by a scaly flap, just above the vent. The eyes lack an eyelid and are snake-like in that they are covered by a non-movable spectacle. An external ear opening may or may not be visible. As a rule all females lay 2 eggs, (rarely 1 or 3). While most are insectivorous, some also feed on small reptiles and spiders. Tails are typically long and readily broken and the regenerated tails are of distinctive appearance, not ever getting quite as long as the original.

The genus *Delma* Gray, 1831, and the six genera *Aclys* Kluge, 1974, *Crottyopus* *gen. nov.*, *Pseudodelma* Fischer, 1882, *Sloppopus* *gen. nov.*, *Wellingtonopus* *gen. nov.* and *Wellsopus* *gen. nov.* (all until now treated as being within *Delma*) are separated from all other Australasian Pygopodids by the following suite of characters: The head is covered with enlarged symmetrical shields; the ventral scales are smooth; there are no

pre-anal pores; parietal scales are present; the external ear opening is present and obvious; there are more than 8 scales along a line across the top of the head joining the angle of the mouth on each side.

The genus *Delma* Gray, 1831 is readily separated from the genera *Aclys* Kluge, 1974, *Crottyopus* *gen. nov.*, *Pseudodelma* Fischer, 1882, *Sloppopus* *gen. nov.*, *Wellingtonopus* *gen. nov.* and *Wellsopus* *gen. nov.* by the following suite of characters: Anterior nasals in contact, or fewer than 20 mid-body rows, and smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; one or no dark transverse bands posterior either to the parietal scales or to any dark transverse band fully or partly enclosing the parietal scales; usually fewer than 18 mid-body scale rows; usually seven scales on top of the snout between the rostral and frontal; usually three pre-anal scales; lateral lip pattern and dorsal head bands may be present or absent; fourth or fifth supralabial is usually below the eye; dark pigment on the throat or venter may be present or absent; and one or other of the following two:

1/ Conspicuous dorsal cross-bands are present on the head and nape; there is rarely a conspicuous dark lateral stripe present posteriorly; rostral noticeably projecting between the anterior pair of supranasals; strong dark bars or reticulations on the throat; usually more than five infralabials and three hindlimb scales (*D. fraseri* and *D. petersoni*), or:

2/ Conspicuous dorsal cross-bands are not present on the head and nape in adults; ventral scales lack dark edges; there are usually fewer than 16 scales along a line across the top of the head and fewer than 17 scales along a line across the throat, each line extending from the angle of the mouth on each side; no dark dorso-lateral stripe extending from the posterior third of the body to the tail (*D. grayi*, *D. inornata* and *D. megleesae* *sp. nov.*).

The subgenus *Honlamopus* *subgen. nov.* is separated from the other subgenus *Delma* Gray, 1831 by the following suite of characters:

Conspicuous dorsal cross-bands are not present on the head and nape in adults; ventral scales lack dark edges; there are usually fewer than 16 scales along a line across the top of the head and fewer than 17 scales along a line across the throat, each line extending from the angle of the mouth on each side; no dark dorso-lateral stripe extending from the posterior third of the body to the tail, no conspicuous lip pattern and flesh coloured ventral surfaces (in life) (*D. inornata* and *D. megleesae* *sp. nov.*).

The genus *Aclys* Kluge, 1974 is readily separated from the genera *Crottyopus* *gen. nov.*, *Delma* Gray, 1831, *Pseudodelma* Fischer, 1882, *Sloppopus* *gen. nov.*, *Wellingtonopus* *gen. nov.* and *Wellsopus* *gen. nov.* by having the anterior nasal scales separated by the rostral (as opposed to being in contact), 20 mid-body scale rows (as opposed to less than 20), striated or keeled dorsal scales (as opposed to smooth).

The genus *Pseudodelma* Fischer, 1882 is readily separated from the genera *Aclys* Kluge, 1974, *Crottyopus* *gen. nov.*, *Delma* Gray, 1831, *Sloppopus* *gen. nov.*, *Wellingtonopus* *gen. nov.* and *Wellsopus* *gen. nov.* by the following suite of characters: One or other of the following four:

1/ Anterior nasals in contact, or fewer than 20 mid-body rows, and smooth dorsal scales; one or two narrow whitish dorso-lateral stripes on the body and tail; nasal and first supralabial fused anterior to the nostril (*P. impar* and *P. cummingae* *sp. nov.*), or:

2/ Anterior nasals in contact, or fewer than 20 mid-body rows, and smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; one or no dark transverse bands posterior either to the parietal scales or to any dark transverse band fully or partly enclosing the parietal scales; 18 mid-body scale rows; 5 scales on top of the snout between the rostral and the frontal; ventrals or

conspicuously wider than adjacent body scales; no dark pigmentation on the throat (*P. mollerii*), or:

3/ Anterior nasals in contact, or fewer than 20 mid-body rows, and smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; one or no dark transverse bands posterior either to the parietal scales or to any dark transverse band fully or partly enclosing the parietal scales; usually fewer than 18 mid-body scale rows; usually seven scales on top of the snout between the rostral and frontal; usually two pre-anal scales; conspicuous lateral lip pattern present; dorsal head bands absent (*P. plebia* and *P. wollemi*), or:

4/ Anterior nasals in contact, or fewer than 20 mid-body rows, and smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; one or no dark transverse bands posterior either to the parietal scales or to any dark transverse band fully or partly enclosing the parietal scales; usually fewer than 18 mid-body scale rows; usually seven scales on top of the snout between the rostral and frontal; usually three pre-anal scales; lateral lip pattern and dorsal head bands may be present or absent; fourth or fifth supralabial is usually below the eye; dark pigment on the throat or venter may be present or absent; conspicuous dorsal cross-bands are present on the head and nape; there is usually a conspicuous dark lateral strip posteriorly; sharply demarcating the dark lateral from the pale ventral surfaces; rostral is not or scarcely projecting between the anterior pair of supranasals (*P. mitella*).

The genus *Crottyopus gen. nov.* is readily separated from the genera *Aclys* Kluge, 1974, *Delma* Gray, 1831, *Pseudodelma* Fischer, 1882, *Sloppopus gen. nov.*, *Wellingtonopus gen. nov.* and *Wellsopus gen. nov.* by one or other of the following two suites of characters:

1/ Anterior nasals in contact, or fewer than 20 mid-body rows, and smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; one or no broad dark transverse bands, sometimes faded in adults that are posterior to the parietal scales or to any dark transverse band fully or partly enclosing the parietal scales; 16-20 midbody rows, usually 18 at midbody, but sometimes varying elsewhere on the body; five scales on top of the snout between the rostral and frontal; ventral scales usually scarcely wider than adjacent body scales; dark reticulations usually present on the throat (*C. jamesbondi sp. nov.*, *C. australis*, *C. hebessa*) (subgenus *Crottyopus gen. nov.*), or:

2/ Anterior nasals in contact, or fewer than 20 mid-body rows, and smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; two broad dark transverse bands, sometimes faded in adults that are posterior to the parietal scales or to any dark transverse band fully or partly enclosing the parietal scales; five scales on top of the snout between the rostral and the frontal; third supralabial below the eye and two pre-anal scales (*C. torquata*) (subgenus *Gracileopus gen. nov.*).

The genus *Sloppopus gen. nov.* is readily separated from the genera *Aclys* Kluge, 1974, *Crottyopus gen. nov.*, *Delma* Gray, 1831, *Pseudodelma* Fischer, 1882, *Wellingtonopus gen. nov.* and *Wellsopus gen. nov.* by the following suite of characters: smooth glossy scales; 16-18 midbody rows; a moderate and rounded snout; seven scales on the upper snout between the rostral and frontal; nasal and first supralabial are distinct; four scales border the nostril; the fourth supralabial sits beneath the eye; there are 16 scales along a line across the top of the head at the angle of the mouth on each side; ventral scales are paired and noticeably wider than the adjacent body scales; there are three scales along the lower margin of the hindlimb flap; typically three enlarged pre-anal scales; rich red-brown or grey above; immaculate cream below; the top of the head is uniform brown but the lips, side of the head and neck are characterised by having a series of alternating cream and yellow-brown vertically

aligned bars; the throat and ventral surfaces are an immaculate cream in colour (*S. labialis*).

The genus *Wellingtonopus gen. nov.* is readily separated from the genera *Aclys* Kluge, 1974, *Crottyopus gen. nov.*, *Delma* Gray, 1831, *Pseudodelma* Fischer, 1882, *Sloppopus gen. nov.*, and *Wellsopus gen. nov.* by the following suite of characters, being one or other of the following two:

1/ Anterior nasals in contact and smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; 16-18 mid-body scale rows; usually seven scales on top of the snout between the rostral and frontal; usually three pre-anal scales; fourth or fifth supralabial is usually below the eye; four scales border the nostril; rostral noticeably projecting between the anterior pair of supranasals; usually less than six infralabials and three hindlimb scales; conspicuous but pale dorsal cross-bands are present on the head and nape; the pale bands on the head and neck are wavy in outline and there are usually some extra pale narrow bands on the side of the head between the pale dorsal bands; there is rarely a conspicuous dark lateral stripe present posteriorly; strong dark bars or reticulations absent from the throat; (*W. haroldi*), or:

2/ 15-18 midbody rows (usually 16), and smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; no dark transverse bands posterior either to the parietal scales or to any dark transverse band fully or partly enclosing the parietal scales; usually seven scales on top of the snout between the rostral and frontal; usually three often enlarged pre-anal scales; lateral lip pattern and dorsal head bands are absent or just flecking as opposed to lined; fourth or fifth supralabial is usually below the eye; dark pigment on the throat or venter may be present or absent; ventral scales with or without dark edges; there are usually 16 scales along a line across the top of the head and usually 17 scales along a line across the throat, each line extending from the angle of the mouth on each side; there is no dark dorso-lateral stripe extending from the posterior third of the body to the tail, (*Wellingtonopus stevebennetti sp. nov.*, *W. butleri*, *W. grahamrichardsoni sp. nov.*, *W. nasuta*).

The genus *Wellsopus gen. nov.* is readily separated from the genera *Aclys* Kluge, 1974, *Crottyopus gen. nov.*, *Delma* Gray, 1831, *Pseudodelma* Fischer, 1882, *Sloppopus gen. nov.*, and *Wellingtonopus gen. nov.* by the following suite of characters, being one or other of the following four:

1/ Anterior nasals in contact and smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; 14-16 (usually 16) mid-body scale rows; usually seven scales on top of the snout between the rostral and frontal; 2-3 scales along the lower margin of the hindlimb flap; usually three pre-anal scales; fourth supralabial is usually below the eye; four scales border the nostril; rostral noticeably projecting between the anterior pair of supranasals; usually less than six infralabials and three hindlimb scales; 11-14 scales along a line across the top of the head which joins the angle of the mouth on each side; ventrals paired and noticeably wider than adjacent scales; conspicuous but pale dorsal cross-bands are present on the head and nape; the pale bands on the head and neck are straight in outline and there are no additional pale bands on the side of the head between the pale dorsal bands, these all being bounded by thick black sections. Thickest pale band at the rear of the head. Snout is moderate and rounded (*W. shanekingi sp. nov.* and *W. borea*), or:

2/ Anterior nasals in contact, or fewer than 20 mid-body rows, and smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; two broad dark transverse bands, sometimes faded in adults that are posterior to the parietal scales or to any dark transverse band fully or partly enclosing the parietal scales; seven scales on top of the snout between the rostral and frontal; fourth supralabial below the eye; three pre-anal scales (*W. elegans* and *W. robwatsoni sp. nov.*).

3/ Smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; nasal and first supralabials are therefore very distinct; two dark transverse bands posterior to the parietal scales or to any dark transverse band fully or partly enclosing the parietal scales; 14 midbody scale rows (rarely 12 or 16); five scales on top of the snout between the rostral and frontal; 10-13 scales along a line across the top of the head which joins the angle of the mouth on each side; ventrals paired and noticeably wider than adjacent scales; colouration is a uniform grey or greyish brown above and immaculate white below (*W. richardwarneri* sp. nov., *W. tincta*, *W. kylienaughtonae* sp. nov., *W. michaelguiheneufi* sp. nov.), or:

4/ Third supralabial is usually below the eye and there is an absence of dark pigmentation from the throat and venter; there are usually three pre-anal scales and a lateral lip pattern and dorsal head bands may be present or absent; 18 or less midbody rows; usually seven scales on top of the snout between the rostral and frontal; smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; one or no broad dark transverse bands, sometimes faded in adults that are posterior to the parietal scales or to any dark transverse band fully or partly enclosing the parietal scales; (*W. pax*, *W. desmosa*, *W. tealei*).

The genus *Nisara* Gray, 1867, type species *Delma grayi* Smith, 1849 is in the same species group as *Delma fraseri* Gray, 1831 and is therefore this genus name is treated as a junior synonym of *Delma* and is also therefore not an available name for the other previously unnamed species groups.

Distribution: The genus *Delma* as defined herein is generally found in drier parts of southern Australia.

Content: *Delma fraseri* Gray, 1831 (Type species); *D. grayii* Smith, 1849; *D. inornata* Kluge, 1974; *D. megleesae* sp. nov.; *D. petersoni* Shea, 1991.

SUBGENUS HONLAMOPUS GEN. NOV.

Type species: *Delma inornata* Kluge, 1974.

Diagnosis: The subgenus *Honlamopus* subgen. nov. is separated from the other (nominated) subgenus *Delma* Gray, 1831, by the following suite of characters:

Conspicuous dorsal cross-bands are not present on the head and nape in adults; ventral scales lack dark edges; there are usually fewer than 16 scales along a line across the top of the head and fewer than 17 scales along a line across the throat, each line extending from the angle of the mouth on each side; no dark dorso-lateral stripe extending from the posterior third of the body to the tail, no conspicuous lip pattern and flesh coloured ventral surfaces (in life) (*D. inornata* and *D. megleesae* sp. nov.).

The genus *Delma* Gray, 1831, and the six genera *Aclys* Kluge, 1974, *Crottyopus* gen. nov., *Pseudodelma* Fischer, 1882, *Sloppopus* gen. nov., *Wellingtonopus* gen. nov. and *Wellsopus* gen. nov. (all until now treated as being within *Delma*) are separated from all other Australasian Pygopodids by the following suite of characters: The head is covered with enlarged symmetrical shields; the ventral scales are smooth; there are no pre-anal pores; parietal scales are present; the external ear opening is present and obvious; there are more than 8 scales along a line across the top of the head joining the angle of the mouth on each side.

The genus *Delma* Gray, 1831 is readily separated from the genera *Aclys* Kluge, 1974, *Crottyopus* gen. nov., *Pseudodelma* Fischer, 1882, *Sloppopus* gen. nov., *Wellingtonopus* gen. nov. and *Wellsopus* gen. nov. by the following suite of characters: Anterior nasals in contact, or fewer than 20 mid-body rows, and smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; one or no dark transverse bands posterior either to the parietal scales or to any dark transverse band fully or partly enclosing the parietal scales; usually fewer than 18 mid-body scale rows; usually seven scales on top of the snout between the rostral and

frontal; usually three pre-anal scales; lateral lip pattern and dorsal head bands may be present or absent; fourth or fifth supralabial is usually below the eye; dark pigment on the throat or venter may be present or absent; and one or other of the following two:

1/ Conspicuous dorsal cross-bands are present on the head and nape; there is rarely a conspicuous dark lateral stripe present posteriorly; rostral noticeably projecting between the anterior pair of supranasals; strong dark bars or reticulations on the throat; usually more than five infralabials and three hindlimb scales (*D. fraseri* and *D. petersoni*), or:

2/ Conspicuous dorsal cross-bands are not present on the head and nape in adults; ventral scales lack dark edges; there are usually fewer than 16 scales along a line across the top of the head and fewer than 17 scales along a line across the throat, each line extending from the angle of the mouth on each side; no dark dorso-lateral stripe extending from the posterior third of the body to the tail (*D. grayi*, *D. inornata* and *D. megleesae* sp. nov.).

Distribution: Drier parts of south-eastern Australia including most of Victoria and the Murray Darling River basin.

Etymology: The subgenus is named in honour of Mr Hon Lam, owner of the Park Orchards, Fish Cafe, for his magnificent efforts catering to the staff at Snakebusters, Australia's best reptiles displays over the best part of a decade preceding year 2017. People who work hard to give logistical support to frontline conservationists and educators should not have their efforts go unrecognized.

Content: *Delma (Honlamopus) inornata* Kluge, 1974; *D. (Honlamopus) megleesae* sp. nov.

GENUS ACLYS KLUGE, 1974

Type species: *Aclys concinna* Kluge, 1974

Diagnosis: The genus *Aclys* Kluge, 1974 is readily separated from the genera *Crottyopus* gen. nov., *Delma* Gray, 1831, *Pseudodelma* Fischer, 1882, *Sloppopus* gen. nov., *Wellingtonopus* gen. nov. and *Wellsopus* gen. nov. by having the anterior nasal scales separated by the rostral (as opposed to being in contact), 20 mid-body scale rows (as opposed to less than 20), striated or keeled dorsal scales (as opposed to smooth).

The genus *Delma* Gray, 1831, and the six genera *Aclys* Kluge, 1974, *Crottyopus* gen. nov., *Pseudodelma* Fischer, 1882, *Sloppopus* gen. nov., *Wellingtonopus* gen. nov. and *Wellsopus* gen. nov. (all until now treated as being within *Delma*) are separated from all other Australasian Pygopodids by the following suite of characters: The head is covered with enlarged symmetrical shields; the ventral scales are smooth; there are no pre-anal pores; parietal scales are present; the external ear opening is present and obvious; there are more than 8 scales along a line across the top of the head joining the angle of the mouth on each side.

Distribution: Coastal sand plains of south-western Australia (*A. concinna*) and in the Shark Bay region (*A. major*).

Content: *Aclys concinna* Kluge, 1974 (Type species); *A. major* (Storr, 1987).

GENUS PSEUODELMA FISCHER, 1882

Type species: *Pseudodelma impar* Fischer, 1882.

Diagnosis: The genus *Pseudodelma* Fischer, 1882 is readily separated from the genera *Aclys* Kluge, 1974, *Crottyopus* gen. nov., *Delma* Gray, 1831, *Sloppopus* gen. nov., *Wellingtonopus* gen. nov. and *Wellsopus* gen. nov. by the following suite of characters: One or other of the following four:

1/ Anterior nasals in contact, or fewer than 20 mid-body rows, and smooth dorsal scales; one or two narrow whitish dorso-lateral stripes on the body and tail; nasal and first supralabial fused anterior to the nostril (*P. impar* and *P. cummingae*), or:

2/ Anterior nasals in contact, or fewer than 20 mid-body rows, and smooth dorsal scales; no pale stripes on the body or tail;

nasal and first supralabial are not fused anterior to the nostril; one or no dark transverse bands posterior either to the parietal scales or to any dark transverse band fully or partly enclosing the parietal scales; 18 mid-body scale rows; 5 scales on top of the snout between the rostral and the frontal; ventrals or conspicuously wider than adjacent body scales; no dark pigmentation on the throat (*P. mollerii*), or:

3/ Anterior nasals in contact, or fewer than 20 mid-body rows, and smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; one or no dark transverse bands posterior either to the parietal scales or to any dark transverse band fully or partly enclosing the parietal scales; usually fewer than 18 mid-body scale rows; usually seven scales on top of the snout between the rostral and frontal; usually two pre-anal scales; conspicuous lateral lip pattern present; dorsal head bands absent (*P. plebeia* and *P. wollemi*), or:

4/ Anterior nasals in contact, or fewer than 20 mid-body rows, and smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; one or no dark transverse bands posterior either to the parietal scales or to any dark transverse band fully or partly enclosing the parietal scales; usually fewer than 18 mid-body scale rows; usually seven scales on top of the snout between the rostral and frontal; usually three pre-anal scales; lateral lip pattern and dorsal head bands may be present or absent; fourth or fifth supralabial is usually below the eye; dark pigment on the throat or venter may be present or absent; conspicuous dorsal cross-bands are present on the head and nape; there is usually a conspicuous dark lateral strip posteriorly; sharply demarcating the dark lateral from the pale ventral surfaces; rostral is not or scarcely projecting between the anterior pair of supranasals (*P. mitella*).

The genus *Delma* Gray, 1831, and the six genera *Aclys* Kluge, 1974, *Crottyopus* gen. nov., *Pseudodelma* Fischer, 1882, *Sloppopus* gen. nov., *Wellingtonopus* gen. nov. and *Wellsopus* gen. nov. (all until now treated as being within *Delma*) are separated from all other Australasian Pygopodids by the following suite of characters: The head is covered with enlarged symmetrical shields; the ventral scales are smooth; there are no pre-anal pores; parietal scales are present; the external ear opening is present and obvious; there are more than 8 scales along a line across the top of the head joining the angle of the mouth on each side.

Distribution: Mainly south-eastern Australia, extending to the wetter parts of South Australia and far north-east Queensland in the southern wet tropics.

Content: *Pseudodelma impar* Fischer, 1882 (Type species); *P. cummingae* sp. nov., *P. mitella* (Shea, 1987); *P. mollerii* (Lütken, 1863); *P. plebeia* (De Vis, 1888); *P. wollemi* (Wells and Wellington, 1985).

GENUS CROTTYOPUS GEN. NOV.

Type species: *Crottyopus jamesbondi* sp. nov. (Type species) (formally described in this paper).

Diagnosis: The genus *Crottyopus* gen. nov. is readily separated from the genera *Aclys* Kluge, 1974, *Delma* Gray, 1831, *Pseudodelma* Fischer, 1882, *Sloppopus* gen. nov., *Wellingtonopus* gen. nov. and *Wellsopus* gen. nov. by one or other of the following two suites of characters:

1/ Anterior nasals in contact, or fewer than 20 mid-body rows, and smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; one or no broad dark transverse bands, sometimes faded in adults that are posterior to the parietal scales or to any dark transverse band fully or partly enclosing the parietal scales; 16-20 midbody rows, usually 18 at midbody, but sometimes varying elsewhere on the body; five scales on top of the snout between the rostral and frontal; ventral scales usually scarcely wider than adjacent body scales; dark reticulations usually present on the

throat (*C. jamesbondi* sp. nov., *C. australis*, *C. hebesa*) (subgenus *Crottyopus* gen. nov.), or:

2/ Anterior nasals in contact, or fewer than 20 mid-body rows, and smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; two broad dark transverse bands, sometimes faded in adults that are posterior to the parietal scales or to any dark transverse band fully or partly enclosing the parietal scales; five scales on top of the snout between the rostral and the frontal; third supralabial below the eye and two pre-anal scales (*C. torquata*) (subgenus *Gracileopus* subgen. nov.).

The genus *Delma* Gray, 1831, and the six genera *Aclys* Kluge, 1974, *Crottyopus* gen. nov., *Pseudodelma* Fischer, 1882, *Sloppopus* gen. nov., *Wellingtonopus* gen. nov. and *Wellsopus* gen. nov. (all until now treated as being within *Delma*) are separated from all other Australasian Pygopodids by the following suite of characters: The head is covered with enlarged symmetrical shields; the ventral scales are smooth; there are no pre-anal pores; parietal scales are present; the external ear opening is present and obvious; there are more than 8 scales along a line across the top of the head joining the angle of the mouth on each side.

Distribution: Drier parts of southern Australia (subgenus *Crottyopus* subgen. nov.) and coastal areas of south-east Queensland in drier habitats (subgenus *Gracileopus* subgen. nov.).

Etymology: Named in honour of a deceased Great Dane Röttweiler pet named "Crotalus", or "Crotty" for short. Lived from 1989 to about 2002, this dog guarded my research facility from thieves and allowed significant herpetological research to continue unimpeded. I have no hesitation to name a taxon in honour of an animal that has made a valuable contribution to in wildlife conservation.

Content: *Crottyopus jamesbondi* sp. nov. (Type species); *C. australis* (Kluge, 1974); *C. hebesa* (Marian, Brennan, Adams and Aplin, 2015); *C. torquata* (Kluge, 1974).

SUBGENUS GRACILEOPUS SUBGEN. NOV.

Type species: *Delma torquata* Kluge, 1974.

Diagnosis: The subgenus *Gracileopus* subgen. nov. is separated from the subgenus *Crottyopus* subgen. nov. and the six genera *Aclys* Kluge, 1974, *Delma* Gray, 1831, *Pseudodelma* Fischer, 1882, *Sloppopus* gen. nov., *Wellingtonopus* gen. nov. and *Wellsopus* gen. nov. by the following suite of characters:

Anterior nasals in contact, or fewer than 20 mid-body rows, and smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; two broad dark transverse bands, sometimes faded in adults that are posterior to the parietal scales or to any dark transverse band fully or partly enclosing the parietal scales; five scales on top of the snout between the rostral and the frontal; third supralabial below the eye and two pre-anal scales (*C. torquata*).

The subgenus *Crottyopus* subgen. nov. is separated from the subgenus *Gracileopus* subgen. nov. and the six genera *Aclys* Kluge, 1974, *Delma* Gray, 1831, *Pseudodelma* Fischer, 1882, *Sloppopus* gen. nov., *Wellingtonopus* gen. nov. and *Wellsopus* gen. nov. by the following suite of characters:

Anterior nasals in contact, or fewer than 20 mid-body rows, and smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; one or no broad dark transverse bands, sometimes faded in adults that are posterior to the parietal scales or to any dark transverse band fully or partly enclosing the parietal scales; 16-20 midbody rows, usually 18 at midbody, but sometimes varying elsewhere on the body; five scales on top of the snout between the rostral and frontal; ventral scales usually scarcely wider than adjacent body scales; dark reticulations usually present on the throat (*C. jamesbondi* sp. nov., *C. australis*, *C. hebesa*).

The genus *Delma* Gray, 1831, and the six genera *Aclys* Kluge, 1974, *Crottyopus* gen. nov., *Pseudodelma* Fischer, 1882,

Sloppopus gen. nov., *Wellingtonopus gen. nov.* and *Wellsopus gen. nov.* (all until now treated as being within *Delma*) are separated from all other Australasian Pygopodids by the following suite of characters: The head is covered with enlarged symmetrical shields; the ventral scales are smooth; there are no pre-anal pores; parietal scales are present; the external ear opening is present and obvious; there are more than 8 scales along a line across the top of the head joining the angle of the mouth on each side.

Distribution: Coastal areas of south-east Queensland in drier habitats.

Etymology: Named in reflection of the gracile nature of the lizards in the subgenus.

Content: *Crottyopus (Gracileopus) torquata* (Kluge, 1974) (Monotypic).

SUBGENUS CROTTYOPUS SUBGEN. NOV.

Type species: *Crottyopus jamesbondi sp. nov.* (Type species) (formally described in this paper).

Diagnosis: The subgenus *Crottyopus gen. nov.* is readily separated from the subgenus *Gracileopus subgen. nov.* and the genera *Aclys* Kluge, 1974, *Delma* Gray, 1831, *Pseudodelma* Fischer, 1882, *Sloppopus gen. nov.*, *Wellingtonopus gen. nov.* and *Wellsopus gen. nov.* by the following suite of characters: Anterior nasals in contact, or fewer than 20 mid-body rows, and smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; one or no broad dark transverse bands, sometimes faded in adults that are posterior to the parietal scales or to any dark transverse band fully or partly enclosing the parietal scales; 16-20 midbody rows, usually 18 at midbody, but sometimes varying elsewhere on the body; five scales on top of the snout between the rostral and frontal; ventral scales usually scarcely wider than adjacent body scales; dark reticulations usually present on the throat (*C. jamesbondi sp. nov.*, *C. australis*, *C. hebesa*) (subgenus *Crottyopus gen. nov.*).

The subgenus *Gracileopus subgen. nov.* is readily separated from the subgenus *Crottyopus gen. nov.* and the genera *Aclys* Kluge, 1974, *Delma* Gray, 1831, *Pseudodelma* Fischer, 1882, *Sloppopus gen. nov.*, *Wellingtonopus gen. nov.* and *Wellsopus gen. nov.* by the following suite of characters: Anterior nasals in contact, or fewer than 20 mid-body rows, and smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; two broad dark transverse bands, sometimes faded in adults that are posterior to the parietal scales or to any dark transverse band fully or partly enclosing the parietal scales; five scales on top of the snout between the rostral and the frontal; third supralabial below the eye and two pre-anal scales (*C. torquata*) (subgenus *Gracileopus subgen. nov.*).

The genus *Delma* Gray, 1831, and the six genera *Aclys* Kluge, 1974, *Crottyopus gen. nov.*, *Pseudodelma* Fischer, 1882, *Sloppopus gen. nov.*, *Wellingtonopus gen. nov.* and *Wellsopus gen. nov.* (all until now treated as being within *Delma*) are separated from all other Australasian Pygopodids by the following suite of characters: The head is covered with enlarged symmetrical shields; the ventral scales are smooth; there are no pre-anal pores; parietal scales are present; the external ear opening is present and obvious; there are more than 8 scales along a line across the top of the head joining the angle of the mouth on each side.

Distribution: Drier parts of southern Australia.

Etymology: Named in honour of a deceased Great Dane Rottweiler pet named "*Crotalus*", or "*Crotty*" for short. Lived from 1989 to about 2002, this dog guarded my research facility and young children from thieves and allowed significant herpetological research to continue unimpeded. I have no hesitation to name a taxon in honour of an animal that has made a valuable contribution to in wildlife conservation.

Content: *Crottyopus (Crottyopus) jamesbondi sp. nov.* (Type

species); *C. (Crottyopus) australis* (Kluge, 1974); *C. (Crottyopus) hebesa* (Maryan, Brennan, Adams and Aplin, 2015).

GENUS SLOPPOPUS GEN. NOV.

Type species: *Delma labialis* Shea, 1987.

Diagnosis: The genus *Sloppopus gen. nov.* is readily separated from the genera *Aclys* Kluge, 1974, *Crottyopus gen. nov.*, *Delma* Gray, 1831, *Pseudodelma* Fischer, 1882, *Wellingtonopus gen. nov.* and *Wellsopus gen. nov.* by the following suite of characters: smooth glossy scales; 16-18 midbody rows; a moderate and rounded snout; seven scales on the upper snout between the rostral and frontal; nasal and first supralabial are distinct; four scales border the nostril; the fourth supralabial sits beneath the eye; there are 16 scales along a line across the top of the head at the angle of the mouth on each side; ventral scales are paired and noticeably wider than the adjacent body scales; there are three scales along the lower margin of the hindlimb flap; typically three enlarged pre-anal scales; rich red-brown or grey above; immaculate cream below; the top of the head is uniform brown but the lips, side of the head and neck are characterised by having a series of alternating cream and yellow-brown vertically aligned bars; the throat and ventral surfaces are an immaculate cream in colour (*S. labialis*).

Distribution: The region from Townsville to Mackay in north-east Queensland, including offshore islands.

Etymology: Named in honour of a nearly five year old (as of 2017) Great Dane owned by the Hoser family, named Slopp. This dog has guarded our research and conservation facility from illegal incursions by animal haters motivated by a desire for financial aggrandisement and who seek to undermine our wildlife conservation and education efforts to get what they seek to obtain illegally. I have no hesitation to name a taxon in honour of an animal that has made a valuable contribution to in wildlife conservation.

Content: *Sloppopus labialis* (Shea, 1987) (Monotypic).

GENUS WELLINGTONOPUS GEN. NOV.

Type species: *Wellingtonopus stevebennetti sp. nov.* (formally described in this paper).

Diagnosis: The genus *Wellingtonopus gen. nov.* is readily separated from the genera *Aclys* Kluge, 1974, *Crottyopus gen. nov.*, *Delma* Gray, 1831, *Pseudodelma* Fischer, 1882, *Sloppopus gen. nov.*, and *Wellsopus gen. nov.* by the following suite of characters, being one or other of the following two:

1/ Anterior nasals in contact and smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; 16-18 mid-body scale rows; usually seven scales on top of the snout between the rostral and frontal; usually three pre-anal scales; fourth or fifth supralabial is usually below the eye; four scales border the nostril; rostral noticeably projecting between the anterior pair of supranasals; usually less than six infralabials and three hindlimb scales; conspicuous but pale dorsal cross-bands are present on the head and nape; the pale bands on the head and neck are wavy in outline and there are usually some extra pale narrow bands on the side of the head between the pale dorsal bands; there is rarely a conspicuous dark lateral stripe present posteriorly; strong dark bars or reticulations absent from the throat; (*W. haroldi*), or:
2/ 15-18 midbody rows (usually 16), and smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; no dark transverse bands posterior either to the parietal scales or to any dark transverse band fully or partly enclosing the parietal scales; usually seven scales on top of the snout between the rostral and frontal; usually three often enlarged pre-anal scales; lateral lip pattern and dorsal head bands are absent or just flecking as opposed to lined; fourth or fifth supralabial is usually below the eye; dark pigment on the throat or venter may be present or absent; ventral scales with or without dark edges; there are usually 16 scales along a line across the top of the head and usually 17 scales along a line across the throat, each line extending from

the angle of the mouth on each side; there is no dark dorso-lateral stripe extending from the posterior third of the body to the tail, (*Wellingtonopus stevebennetti* sp. nov., *W. butleri*, *W. grahamrichardsoni* sp. nov., *W. nasuta*).

The genus *Delma* Gray, 1831, and the six genera *Aclyx* Kluge, 1974, *Crottyopus* gen. nov., *Pseudodelma* Fischer, 1882, *Sloppopus* gen. nov., *Wellingtonopus* gen. nov. and *Wellsopus* gen. nov. (all until now treated as being within *Delma*) are separated from all other Australasian Pygopodids by the following suite of characters: The head is covered with enlarged symmetrical shields; the ventral scales are smooth; there are no pre-anal pores; parietal scales are present; the external ear opening is present and obvious; there are more than 8 scales along a line across the top of the head joining the angle of the mouth on each side.

Distribution: Most of the drier western two thirds of Australia.

Etymology: Named in honour of Cliff Ross Wellington of New South Wales, Australia and who is one of the leading lights in Australian herpetology spanning many decades. He is best known to many as a co-author of papers with Richard Wells, but whose massive contributions to herpetology go well beyond this.

Content: *Wellingtonopus stevebennetti* sp. nov. (Type species); *W. butleri* (Storr, 1987); *W. grahamrichardsoni* sp. nov.; *W. haroldi* (Storr, 1987); *W. nasuta* (Kluge, 1974)

GENUS WELLSOPUS GEN. NOV.

Type species: *Wellsopus shanekingi* sp. nov. (formally described in this paper).

Diagnosis: The genus *Wellsopus* gen. nov. is readily separated from the genera *Aclyx* Kluge, 1974, *Crottyopus* gen. nov., *Delma* Gray, 1831, *Pseudodelma* Fischer, 1882, *Sloppopus* gen. nov., and *Wellingtonopus* gen. nov. by the following suite of characters, being one or other of the following four:

1/ Anterior nasals in contact and smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; 14-16 (usually 16) mid-body scale rows; usually seven scales on top of the snout between the rostral and frontal; 2-3 scales along the lower margin of the hindlimb flap; usually three pre-anal scales; fourth supralabial is usually below the eye; four scales border the nostril; rostral noticeably projecting between the anterior pair of supranasals; usually less than six infralabials and three hindlimb scales; 11-14 scales along a line across the top of the head which joins the angle of the mouth on each side; ventrals paired and noticeably wider than adjacent scales; conspicuous but pale dorsal cross-bands are present on the head and nape; the pale bands on the head and neck are straight in outline and there are no additional pale bands on the side of the head between the pale dorsal bands, these all being bounded by thick black, blackish or grey sections. Thickest pale band at the rear of the head. Snout is moderate and rounded (*W. shanekingi* sp. nov., *W. brianbarnetti* sp. nov. and *W. borea*), or:

2/ Anterior nasals in contact, or fewer than 20 mid-body rows, and smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; two broad dark transverse bands, sometimes faded in adults that are posterior to the parietal scales or to any dark transverse band fully or partly enclosing the parietal scales; seven scales on top of the snout between the rostral and frontal; fourth supralabial below the eye; three pre-anal scales (*W. elegans* and *W. robwatsoni* sp. nov.).

3/ Smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; nasal and first supralabials are therefore very distinct; two dark transverse bands posterior to the parietal scales or to any dark transverse band fully or partly enclosing the parietal scales; 14 midbody scale rows (rarely 12 or 16); five scales on top of the snout between the rostral and frontal; 10-13 scales along a line across the top of the head which joins the angle of the mouth on each side; ventrals paired and noticeably wider than adjacent

scales; colouration is a uniform grey or greyish brown above and immaculate white below (*W. richardwarneri* sp. nov., *W. tincta*, *W. kylienaughtonae* sp. nov., *W. michaelguiheneufi* sp. nov.), or:

4/ Third supralabial is usually below the eye and there is an absence of dark pigmentation from the throat and venter; there are usually three pre-anal scales and a lateral lip pattern and dorsal head bands may be present or absent; 18 or less midbody rows; usually seven scales on top of the snout between the rostral and frontal; smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; one or no broad dark transverse bands, sometimes faded in adults that are posterior to the parietal scales or to any dark transverse band fully or partly enclosing the parietal scales; (*W. pax*, *W. desmosa*, *W. tealei*).

The genus *Delma* Gray, 1831, and the six genera *Aclyx* Kluge, 1974, *Crottyopus* gen. nov., *Pseudodelma* Fischer, 1882, *Sloppopus* gen. nov., *Wellingtonopus* gen. nov. and *Wellsopus* gen. nov. (all until now treated as being within *Delma*) are separated from all other Australasian Pygopodids by the following suite of characters: The head is covered with enlarged symmetrical shields; the ventral scales are smooth; there are no pre-anal pores; parietal scales are present; the external ear opening is present and obvious; there are more than 8 scales along a line across the top of the head joining the angle of the mouth on each side.

Distribution: Most of the northern three quarters of Australia, except for the far south and wetter south-east, although most species are confined to the western parts of Australia.

Etymology: Named in honour of Richard Wells of New South Wales, Australia and who is one of the leading lights in Australian herpetology spanning many decades. He is best known to many as a co-author of papers with Cliff Ross Wellington, but whose massive contributions to herpetology go well beyond this.

Content: *Wellsopus shanekingi* sp. nov. (Type species); *W. brianbarnetti* sp. nov., *W. borea* (Kluge, 1974); *W. desmosa* (Maryan, Aplin and Adams, 2007); *W. elegans* (Kluge, 1974); *W. kylienaughtonae* sp. nov.; *W. michaelguiheneufi* sp. nov.; *W. pax* (Kluge, 1974); *W. richardwarneri* sp. nov.; *W. robwatsoni* sp. nov.; *W. tealei* (Maryan, Aplin and Adams, 2007); *W. tincta* (De Vis, 1888).

GENUS APRASIA GRAY, 1839

Type species: *Aprasia pulchella* Gray, 1839.

Diagnosis: The genus *Aprasia* Gray, 1839 is separated from the genera *Abilaena* Wells, 2007, *Brettbarnettus* gen. nov. and *Maryannmartinekeke* gen. nov. by one or other of the following two suites of characters:

1/ External ear opening is absent; prefrontal is not in contact with the subocular labial and there are five supralabials bordering the upper lip on each side; colour of the head and tail tip do not sharply contrast with the colour of the rest of the body; nasal and first supralabial completely or partially fused posterior to the nostril and two pre-anal scales (*Aprasia pulchella*), or:

2/ External ear opening is absent; prefrontal is not in contact with the subocular labial and there are five supralabials bordering the upper lip on each side; colour of the head and tail tip sharply contrast with the colour of the rest of the body; head including the upper lips are black or dark brownish-black, the tail tip is freckled with black and there is a small but distinct postocular scale (*Aprasia picturata*).

The genus *Abilaena* Wells, 2007 is separated from the genera *Aprasia* Gray, 1839, *Brettbarnettus* gen. nov. and *Maryannmartinekeke* gen. nov. by one or other of the following four suites of characters:

1/ External ear opening is absent; prefrontal is not in contact with the subocular labial and there are five supralabials bordering the upper lip on each side; colour of the head and tail tip do not sharply contrast with the colour of the rest of the body; nasal and first supralabial are not fused posterior to the nostril;

usually 14 (rarely 12) mid-body scale rows; two preanal scales; the snout is long and pointed and projecting when viewed dorsally and laterally (*Abilaena rostrata*, *A. litorea*), or:

2/ External ear opening is absent; prefrontal is in contact with the subocular labial and there are four supralabials (*Abilaena haroldi*), or:

3/ External ear opening is absent; prefrontal is not in contact with the subocular labial and there are five supralabials bordering the upper lip on each side; colour of the head and tail tip sharply contrast with the colour of the rest of the body; tail tip and/or head, excluding the lips are black; there is no distinct postocular scale it having fused with the fourth supralabial (*Abilaena smithi*), or:

4/ External ear opening is absent; prefrontal is not in contact with the subocular labial and there are five supralabials bordering the upper lip on each side; colour of the head and tail tip do not sharply contrast with the colour of the rest of the body; nasal and first supralabial are not fused posterior to the nostril; usually 12 mid-body scale rows; postocular scale absent, the fourth supralabial contacts the supraocular (*Abilaena repens*, *A. clairae*, *A. wicherina*).

This genus is also the group of lizards described by Maryan *et al.* (2013a) as the "*Aprasia repens* species-group" which they defined as follows: "Compared to other *Aprasia*, the members of this group have a more slender body, a narrower head with a longer, more angular snout profile, and the postocular is almost always fused to the second last supralabial."

While offering a defacto recognition of the genus *Abilaena* Wells, 2007, the politics of the Western Australian Museum and their ban on usage of anything by Richard Wells, led to Maryan *et al.* being forced to pretend that *Abilaena* Wells, 2007 did not exist and that they (Maryan *et al.*) were the first to define and recognize their so-called "*Aprasia repens* species-group". In summary the deliberate non-use of *Abilaena* Wells, 2007 and the remanufacturing of the Richard Wells genus concept as "new" was an act of scientific fraud.

The genus *Brettbarnettus gen. nov.* is separated from the genera *Aprasia* Gray, 1839, *Abilaena* Wells, 2007 and *Maryannmartinekea gen. nov.* by the presence of an external ear opening (as opposed to none in the other genera) although in this genus it is partially hidden beneath a temporal scale. *Brettbarnettus gen. nov.* is further characterised by the suite of characters described on page 380 of Cogger (2014) under the heading "*Aprasia aurita* Kluge, 1974".

The genus *Maryannmartinekea gen. nov.* is separated from the genera *Aprasia* Gray, 1839, *Abilaena* Wells, 2007, and *Brettbarnettus gen. nov.* by one or other of the following three suites of characters:

1/ External ear opening is absent; prefrontal is not in contact with the subocular labial and there are five supralabials bordering the upper lip on each side; colour of the head and tail tip do not sharply contrast with the colour of the rest of the body; nasal and first supralabial completely or partially fused posterior to the nostril and three pre-anal scales (*Maryannmartinekea parapulchella* Kluge, 1974, *M. pseudopulchella* Kluge, 1974), or:

2/ External ear opening is absent; prefrontal is not in contact with the subocular labial and there are five supralabials bordering the upper lip on each side; colour of the head and tail tip do not sharply contrast with the colour of the rest of the body; nasal and first supralabial are not fused posterior to the nostril; usually 12 mid-body scale rows; a single postocular scale separates the fourth supralabial from the supraocular (*Maryannmartinekea striolata* Lütken, 1863), or:

3/ External ear opening is absent; prefrontal is not in contact with the subocular labial and there are five supralabials bordering the upper lip on each side; colour of the head and tail tip do not sharply contrast with the colour of the rest of the body; nasal and first supralabial are not fused posterior to the nostril; usually 14 (rarely 12) mid-body scale rows; three preanal scales;

the snout is rounded and not strongly projecting when viewed dorsally and laterally (*Maryannmartinekea inaurita* Kluge, 1974).

The subtribe *Aprasiaina subtribe nov.* are separated from all other Australasian Pygopodids (the rest of the family) by the following suite of characters: Head covered with enlarged symmetrical shields, smooth ventral scales, pre-anal pores absent, parietal scales absent (*Aprasia* Gray, 1839, *Abilaena* Wells, 2007, *Brettbarnettus gen. nov.*, *Maryannmartinekea gen. nov.*).

The other two subtribes within *Aprasiaina tribe nov.* are separated from all other all other Australasian Pygopodids (the rest of the family) by the following suite of characters, being one or other of the following two:

1/ Head covered with enlarged symmetrical shields, keeled ventral scales (*Pletholax* Cope, 1864) (Subtribe *Pletholaxina subtribe nov.*), or:

2/ Head covered with enlarged symmetrical shields, smooth ventral scales, pre-anal pores absent, parietal scales present, external ear opening is very small and generally hidden by the overlying temporal scales; fewer than eight scales along a line across the top of the head joining the angle of the mouth on each side (*Ophidiocephalus* Lucas and Frost, 1897) (Subtribe *Ophidiocephalina subtribe nov.*).

Australasian Pygopodids are separated from all other lizards in the region by the following suite of characters: No obvious or normal limbs although many may have a scaly flap or "fin" on either side of the anal region. Ventral scales are in two longitudinal rows which are usually noticeably larger than the adjoining body scales on the lower flanks (adapted from Cogger 2014).

Distribution: *Aprasia* as defined above are found in southwestern Western Australia, including areas inland from the coast.

Content: *Aprasia pulchella* Gray, 1839 (Type species); *Aprasia picturata* Smith and Henry, 1999.

GENUS ABILAENA WELLS, 2007

Type species: *Aprasia repens rostrata* Parker, 1956.

Diagnosis: The genus *Abilaena* Wells, 2007 is separated from the genera *Aprasia* Gray, 1839, *Brettbarnettus gen. nov.* and *Maryannmartinekea gen. nov.* by one or other of the following four suites of characters:

1/ External ear opening is absent; prefrontal is not in contact with the subocular labial and there are five supralabials bordering the upper lip on each side; colour of the head and tail tip do not sharply contrast with the colour of the rest of the body; nasal and first supralabial are not fused posterior to the nostril; usually 14 (rarely 12) mid-body scale rows; two preanal scales; the snout is long and pointed and projecting when viewed dorsally and laterally (*Abilaena rostrata*, *A. litorea*), or:

2/ External ear opening is absent; prefrontal is in contact with the subocular labial and there are four supralabials (*Abilaena haroldi*), or:

3/ External ear opening is absent; prefrontal is not in contact with the subocular labial and there are five supralabials bordering the upper lip on each side; colour of the head and tail tip sharply contrast with the colour of the rest of the body; tail tip and/or head, excluding the lips are black; there is no distinct postocular scale it having fused with the fourth supralabial (*Abilaena smithi*), or:

4/ External ear opening is absent; prefrontal is not in contact with the subocular labial and there are five supralabials bordering the upper lip on each side; colour of the head and tail tip do not sharply contrast with the colour of the rest of the body; nasal and first supralabial are not fused posterior to the nostril; usually 12 mid-body scale rows; postocular scale absent, the fourth supralabial contacts the supraocular (*Abilaena repens*, *A. clairae*, *A. wicherina*).

This genus is also the group of lizards described by Maryan *et*

al. (2013a) as the “*Aprasia repens* species-group” which they defined as follows: “Compared to other *Aprasia*, the members of this group have a more slender body, a narrower head with a longer, more angular snout profile, and the postocular is almost always fused to the second last supralabial.”

While offering a defacto recognition of the genus *Abilaena* Wells, 2007, the politics of the Western Australian Museum and their ban on usage of anything by Richard Wells, led to Maryan *et al.* being forced to pretend that *Abilaena* Wells, 2007 did not exist and that they (Maryan *et al.*) were the first to define and recognize their so-called “*Aprasia repens* species-group”. In summary the deliberate non-use of *Abilaena* Wells, 2007 and the remanufacturing of the Richard Wells genus concept as “new” was an act of scientific fraud.

The genus *Aprasia* Gray, 1839 is separated from the genera *Abilaena* Wells, 2007, *Brettbarnettus gen. nov.* and *Maryannmartinekeke gen. nov.* by one or other of the following two suites of characters:

1/ External ear opening is absent; prefrontal is not in contact with the subocular labial and there are five supralabials bordering the upper lip on each side; colour of the head and tail tip do not sharply contrast with the colour of the rest of the body; nasal and first supralabial completely or partially fused posterior to the nostril and two pre-anal scales (*Aprasia pulchella*), or:

2/ External ear opening is absent; prefrontal is not in contact with the subocular labial and there are five supralabials bordering the upper lip on each side; colour of the head and tail tip sharply contrast with the colour of the rest of the body; head including the upper lips are black or dark brownish-black, the tail tip is freckled with black and there is a small but distinct postocular scale (*Aprasia picturata*).

The genus *Brettbarnettus gen. nov.* is separated from the genera *Aprasia* Gray, 1839, *Abilaena* Wells, 2007 and *Maryannmartinekeke gen. nov.* by the presence of an external ear opening (as opposed to none in the other genera) although in this genus it is partially hidden beneath a temporal scale.

Brettbarnettus gen. nov. is further characterised by the suite of characters described on page 380 of Cogger (2014) under the heading “*Aprasia aurita* Kluge, 1974”.

The genus *Maryannmartinekeke gen. nov.* is separated from the genera *Aprasia* Gray, 1839, *Abilaena* Wells, 2007, and *Brettbarnettus gen. nov.* by one or other of the following three suites of characters:

1/ External ear opening is absent; prefrontal is not in contact with the subocular labial and there are five supralabials bordering the upper lip on each side; colour of the head and tail tip do not sharply contrast with the colour of the rest of the body; nasal and first supralabial completely or partially fused posterior to the nostril and three pre-anal scales (*Maryannmartinekeke parapulchella* Kluge, 1974, *M. pseudopulchella* Kluge, 1974), or:

2/ External ear opening is absent; prefrontal is not in contact with the subocular labial and there are five supralabials bordering the upper lip on each side; colour of the head and tail tip do not sharply contrast with the colour of the rest of the body; nasal and first supralabial are not fused posterior to the nostril; usually 12 mid-body scale rows; a single postocular scale separates the fourth supralabial from the supraocular (*Maryannmartinekeke striolata* Lütken, 1863), or:

3/ External ear opening is absent; prefrontal is not in contact with the subocular labial and there are five supralabials bordering the upper lip on each side; colour of the head and tail tip do not sharply contrast with the colour of the rest of the body; nasal and first supralabial are not fused posterior to the nostril; usually 14 (rarely 12) mid-body scale rows; three preanal scales; the snout is rounded and not strongly projecting when viewed dorsally and laterally (*Maryannmartinekeke inaurita* Kluge, 1974).

The subtribe *Aprasiaina subtribe nov.* are separated from all other Australasian Pygopodids (the rest of the family) by the following suite of characters: Head covered with enlarged

symmetrical shields, smooth ventral scales, pre-anal pores absent, parietal scales absent (*Aprasia* Gray, 1839, *Abilaena* Wells, 2007, *Brettbarnettus gen. nov.*, *Maryannmartinekeke gen. nov.*).

The other two subtribes within *Aprasiaina tribe nov.* are separated from all other all other Australasian Pygopodids (the rest of the family) by the following suite of characters, being one or other of the following two:

1/ Head covered with enlarged symmetrical shields, keeled ventral scales (*Pletholax* Cope, 1864) (Subtribe *Pletholaxina subtribe nov.*), or:

2/ Head covered with enlarged symmetrical shields, smooth ventral scales, pre-anal pores absent, parietal scales present, external ear opening is very small and generally hidden by the overlying temporal scales; fewer than eight scales along a line across the top of the head joining the angle of the mouth on each side (*Ophidiocephalus* Lucas and Frost, 1897) (Subtribe *Ophidiocephalina subtribe nov.*).

Australasian Pygopodids are separated from all other lizards in the region by the following suite of characters: No obvious or normal limbs although many may have a scaly flap or “fin” on either side of the anal region. Ventral scales are in two longitudinal rows which are usually noticeably larger than the adjoining body scales on the lower flanks (adapted from Cogger 2014).

Distribution: The west coast of Western Australia and nearby areas.

Content: *Abilaena rostrata* (Parker, 1956) (Type species); *A. clairae* (Maryan, How and Adams, 2013); *A. haroldi* (Storr, 1978); *A. litorea* (Maryan, Bush and Adams, 2013); *A. repens* (Fry, 1914); *A. smithi* (Storr, 1970); *A. wicherina* (Maryan, Adams and Aplin, 2015).

GENUS BRETTBARNETTUS GEN. NOV.

Type species: *Aprasia aurita* Kluge, 1974.

Diagnosis: The genus *Brettbarnettus gen. nov.* is separated from the genera *Aprasia* Gray, 1839, *Abilaena* Wells, 2007 and *Maryannmartinekeke gen. nov.* by the presence of an external ear opening (as opposed to none in the other genera) although in this genus it is partially hidden beneath a temporal scale. *Brettbarnettus gen. nov.* is further characterised by the suite of characters described on page 380 of Cogger (2014) under the heading “*Aprasia aurita* Kluge, 1974”.

The genus *Aprasia* Gray, 1839 is separated from the genera *Abilaena* Wells, 2007, *Brettbarnettus gen. nov.* and *Maryannmartinekeke gen. nov.* by one or other of the following two suites of characters:

1/ External ear opening is absent; prefrontal is not in contact with the subocular labial and there are five supralabials bordering the upper lip on each side; colour of the head and tail tip do not sharply contrast with the colour of the rest of the body; nasal and first supralabial completely or partially fused posterior to the nostril and two pre-anal scales (*Aprasia pulchella*), or:

2/ External ear opening is absent; prefrontal is not in contact with the subocular labial and there are five supralabials bordering the upper lip on each side; colour of the head and tail tip sharply contrast with the colour of the rest of the body; head including the upper lips are black or dark brownish-black, the tail tip is freckled with black and there is a small but distinct postocular scale (*Aprasia picturata*).

The genus *Abilaena* Wells, 2007 is separated from the genera *Aprasia* Gray, 1839, *Brettbarnettus gen. nov.* and *Maryannmartinekeke gen. nov.* by one or other of the following four suites of characters:

1/ External ear opening is absent; prefrontal is not in contact with the subocular labial and there are five supralabials bordering the upper lip on each side; colour of the head and tail tip do not sharply contrast with the colour of the rest of the body; nasal and first supralabial are not fused posterior to the nostril;

usually 14 (rarely 12) mid-body scale rows; two preanal scales; the snout is long and pointed and projecting when viewed dorsally and laterally (*Abilaena rostrata*, *A. litorea*), or:

2/ External ear opening is absent; prefrontal is in contact with the subocular labial and there are four supralabials (*Abilaena haroldi*), or:

3/ External ear opening is absent; prefrontal is not in contact with the subocular labial and there are five supralabials bordering the upper lip on each side; colour of the head and tail tip sharply contrast with the colour of the rest of the body; tail tip and/or head, excluding the lips are black; there is no distinct postocular scale it having fused with the fourth supralabial (*Abilaena smithi*), or:

4/ External ear opening is absent; prefrontal is not in contact with the subocular labial and there are five supralabials bordering the upper lip on each side; colour of the head and tail tip do not sharply contrast with the colour of the rest of the body; nasal and first supralabial are not fused posterior to the nostril; usually 12 mid-body scale rows; postocular scale absent, the fourth supralabial contacts the supraocular (*Abilaena repens*, *A. clairae*, *A. wicherina*).

This genus is also the group of lizards described by Maryan *et al.* (2013a) as the "*Aprasia repens* species-group" which they defined as follows: "Compared to other *Aprasia*, the members of this group have a more slender body, a narrower head with a longer, more angular snout profile, and the postocular is almost always fused to the second last supralabial."

While offering a defacto recognition of the genus *Abilaena* Wells, 2007, the politics of the Western Australian Museum and their ban on usage of anything by Richard Wells, led to Maryan *et al.* being forced to pretend that *Abilaena* Wells, 2007 did not exist and that they (Maryan *et al.*) were the first to define and recognize their so-called "*Aprasia repens* species-group". In summary the deliberate non-use of *Abilaena* Wells, 2007 and the remanufacturing of the Richard Wells genus concept as "new" was an act of scientific fraud.

The genus *Maryannmartineke* *gen. nov.* is separated from the genera *Aprasia* Gray, 1839, *Abilaena* Wells, 2007, and *Brettbarnettus* *gen. nov.* by one or other of the following three suites of characters:

1/ External ear opening is absent; prefrontal is not in contact with the subocular labial and there are five supralabials bordering the upper lip on each side; colour of the head and tail tip do not sharply contrast with the colour of the rest of the body; nasal and first supralabial completely or partially fused posterior to the nostril and three pre-anal scales (*Maryannmartineke parapulchella* Kluge, 1974, *M. pseudopulchella* Kluge, 1974), or:

2/ External ear opening is absent; prefrontal is not in contact with the subocular labial and there are five supralabials bordering the upper lip on each side; colour of the head and tail tip do not sharply contrast with the colour of the rest of the body; nasal and first supralabial are not fused posterior to the nostril; usually 12 mid-body scale rows; a single postocular scale separates the fourth supralabial from the supraocular (*Maryannmartineke striolata* Lütken, 1863), or:

3/ External ear opening is absent; prefrontal is not in contact with the subocular labial and there are five supralabials bordering the upper lip on each side; colour of the head and tail tip do not sharply contrast with the colour of the rest of the body; nasal and first supralabial are not fused posterior to the nostril; usually 14 (rarely 12) mid-body scale rows; three preanal scales; the snout is rounded and not strongly projecting when viewed dorsally and laterally (*Maryannmartineke inaurita* Kluge, 1974).

The subtribe *Aprasiaina subtribe nov.* are separated from all other Australasian Pygopodids (the rest of the family) by the following suite of characters: Head covered with enlarged symmetrical shields, smooth ventral scales, pre-anal pores absent, parietal scales absent (*Aprasia* Gray, 1839, *Abilaena* Wells, 2007, *Brettbarnettus* *gen. nov.*, *Maryannmartineke* *gen. nov.*).

The other two subtribes within *Aprasiaina* *tribe nov.* are separated from all other all other Australasian Pygopodids (the rest of the family) by the following suite of characters, being one or other of the following two:

1/ Head covered with enlarged symmetrical shields, keeled ventral scales (*Pletholax* Cope, 1864) (Subtribe *Pletholaxina subtribe nov.*), or:

2/ Head covered with enlarged symmetrical shields, smooth ventral scales, pre-anal pores absent, parietal scales present, external ear opening is very small and generally hidden by the overlying temporal scales; fewer than eight scales along a line across the top of the head joining the angle of the mouth on each side (*Ophidiocephalus* Lucas and Frost, 1897) (Subtribe *Ophidiocephalina subtribe nov.*).

Australasian Pygopodids are separated from all other lizards in the region by the following suite of characters: No obvious or normal limbs although many may have a scaly flap or "fin" on either side of the anal region. Ventral scales are in two longitudinal rows which are usually noticeably larger than the adjoining body scales on the lower flanks (adapted from Cogger 2014).

Distribution: Northwest Victoria and nearby parts of south-east South Australia and New South Wales.

Content: *Brettbarnettus aurita* (Kluge, 1974) (Monotypic).

GENUS MARYANMARTINEKEA GEN. NOV.

Type species: *Aprasia parapulchella* Kluge, 1974 (Type species).

Diagnosis: The genus *Maryannmartineke* *gen. nov.* is separated from the genera *Aprasia* Gray, 1839, *Abilaena* Wells, 2007, and *Brettbarnettus* *gen. nov.* by one or other of the following three suites of characters:

1/ External ear opening is absent; prefrontal is not in contact with the subocular labial and there are five supralabials bordering the upper lip on each side; colour of the head and tail tip do not sharply contrast with the colour of the rest of the body; nasal and first supralabial completely or partially fused posterior to the nostril and three pre-anal scales (*Maryannmartineke parapulchella* Kluge, 1974, *M. pseudopulchella* Kluge, 1974), or:

2/ External ear opening is absent; prefrontal is not in contact with the subocular labial and there are five supralabials bordering the upper lip on each side; colour of the head and tail tip do not sharply contrast with the colour of the rest of the body; nasal and first supralabial are not fused posterior to the nostril; usually 12 mid-body scale rows; a single postocular scale separates the fourth supralabial from the supraocular (*Maryannmartineke striolata* Lütken, 1863), or:

3/ External ear opening is absent; prefrontal is not in contact with the subocular labial and there are five supralabials bordering the upper lip on each side; colour of the head and tail tip do not sharply contrast with the colour of the rest of the body; nasal and first supralabial are not fused posterior to the nostril; usually 14 (rarely 12) mid-body scale rows; three preanal scales; the snout is rounded and not strongly projecting when viewed dorsally and laterally (*Maryannmartineke inaurita* Kluge, 1974).

The genus *Aprasia* Gray, 1839 is separated from the genera *Abilaena* Wells, 2007, *Brettbarnettus* *gen. nov.* and *Maryannmartineke* *gen. nov.* by one or other of the following two suites of characters:

1/ External ear opening is absent; prefrontal is not in contact with the subocular labial and there are five supralabials bordering the upper lip on each side; colour of the head and tail tip do not sharply contrast with the colour of the rest of the body; nasal and first supralabial completely or partially fused posterior to the nostril and two pre-anal scales (*Aprasia pulchella*), or:

2/ External ear opening is absent; prefrontal is not in contact with the subocular labial and there are five supralabials bordering the upper lip on each side; colour of the head and tail tip sharply contrast with the colour of the rest of the body; head

including the upper lips are black or dark brownish-black, the tail tip is flecked with black and there is a small but distinct postocular scale (*Aprasia picturata*).

The genus *Abilaena* Wells, 2007 is separated from the genera *Aprasia* Gray, 1839, *Brettbarnettus* gen. nov. and *Maryannmartinekea* gen. nov. by one or other of the following four suites of characters:

1/ External ear opening is absent; prefrontal is not in contact with the subocular labial and there are five supralabials bordering the upper lip on each side; colour of the head and tail tip do not sharply contrast with the colour of the rest of the body; nasal and first supralabial are not fused posterior to the nostril; usually 14 (rarely 12) mid-body scale rows; two preanal scales; the snout is long and pointed and projecting when viewed dorsally and laterally (*Abilaena rostrata*, *A. litorea*), or:

2/ External ear opening is absent; prefrontal is in contact with the subocular labial and there are four supralabials (*Abilaena haroldi*), or:

3/ External ear opening is absent; prefrontal is not in contact with the subocular labial and there are five supralabials bordering the upper lip on each side; colour of the head and tail tip sharply contrast with the colour of the rest of the body; tail tip and/or head, excluding the lips are black; there is no distinct postocular scale it having fused with the fourth supralabial (*Abilaena smithi*), or:

4/ External ear opening is absent; prefrontal is not in contact with the subocular labial and there are five supralabials bordering the upper lip on each side; colour of the head and tail tip do not sharply contrast with the colour of the rest of the body; nasal and first supralabial are not fused posterior to the nostril; usually 12 mid-body scale rows; postocular scale absent, the fourth supralabial contacts the supraocular (*Abilaena repens*, *A. clairae*, *A. wicherina*).

This genus is also the group of lizards described by Maryan *et al.* (2013a) as the "*Aprasia repens* species-group" which they defined as follows: "Compared to other *Aprasia*, the members of this group have a more slender body, a narrower head with a longer, more angular snout profile, and the postocular is almost always fused to the second last supralabial."

While offering a defacto recognition of the genus *Abilaena* Wells, 2007, the politics of the Western Australian Museum and their ban on usage of anything by Richard Wells, led to Maryan *et al.* being forced to pretend that *Abilaena* Wells, 2007 did not exist and that they (Maryan *et al.*) were the first to define and recognize their so-called "*Aprasia repens* species-group". In summary the deliberate non-use of *Abilaena* Wells, 2007 and the remanufacturing of the Richard Wells genus concept as "new" was an act of scientific fraud.

The genus *Brettbarnettus* gen. nov. is separated from the genera *Aprasia* Gray, 1839, *Abilaena* Wells, 2007 and *Maryannmartinekea* gen. nov. by the presence of an external ear opening (as opposed to none in the other genera) although in this genus it is partially hidden beneath a temporal scale. *Brettbarnettus* gen. nov. is further characterised by the suite of characters described on page 380 of Cogger (2014) under the heading "*Aprasia aurita* Kluge, 1974".

The subtribe *Aprasiaina subtribe nov.* are separated from all other Australasian Pygopodids (the rest of the family) by the following suite of characters: Head covered with enlarged symmetrical shields, smooth ventral scales, pre-anal pores absent, parietal scales absent (*Aprasia* Gray, 1839, *Abilaena* Wells, 2007, *Brettbarnettus* gen. nov., *Maryannmartinekea* gen. nov.).

The other two subtribes within *Aprasiaina tribe nov.* are separated from all other all other Australasian Pygopodids (the rest of the family) by the following suite of characters, being one or other of the following two:

1/ Head covered with enlarged symmetrical shields, keeled ventral scales (*Pletholax* Cope, 1864) (Subtribe *Pletholaxina*

subtribe nov.), or:

2/ Head covered with enlarged symmetrical shields, smooth ventral scales, pre-anal pores absent, parietal scales present, external ear opening is very small and generally hidden by the overlying temporal scales; fewer than eight scales along a line across the top of the head joining the angle of the mouth on each side (*Ophidiocephalus* Lucas and Frost, 1897) (Subtribe *Ophidiocephalina subtribe nov.*).

Australasian Pygopodids are separated from all other lizards in the region by the following suite of characters: No obvious or normal limbs although many may have a scaly flap or "fin" on either side of the anal region. Ventral scales are in two longitudinal rows which are usually noticeably larger than the adjoining body scales on the lower flanks (adapted from Cogger 2014).

Distribution: Southern Australia.

Content: *Maryannmartinekea parapulchella* (Kluge, 1974) (Type species); *M. inaurita* (Kluge, 1974); *M. pseudopulchella* (Kluge, 1974); *M. striolata* (Lütken, 1863).

DELMA (HONLAMOPUS) MEGLEESAE SP. NOV.

Holotype: A preserved specimen at the Australian Museum in Sydney, NSW, Australia, specimen number R.142790 collected from Sunrise Property, Ironmines Road, 6.4 km south of the Yass-Goulburn Road, New South Wales, Australia, Lat. -34.70, Long. 149.05.

The Australian Museum in Sydney, NSW, Australia is a government-owned facility that allows scientists access to its holdings.

Paratype: A preserved specimen at the Australian Museum in Sydney, NSW, Australia, specimen number R. 84293 collected from Yass, New South Wales, Australia, Lat. -34.85, Long. 148.92.

Diagnosis: *Delma megleesae* sp. nov. is similar in most respects to *D. inornata* Kluge, 1974, the species it has been treated as until now.

D. megleesae sp. nov. is readily separated from *D. inornata* by a strongly yellow chin, snout and upper labials, versus cream or at best light yellow in *D. inornata*. *D. megleesae* sp. nov. is also readily separated from *D. inornata* by the absence of obviously dark etched scales on the top and sides of the head and neck, which is seen in *D. inornata*. In *D. inornata* the dark etched scales are formed by the rear of each scale having a dark etching, giving the entirety of each brownish scale a dark etched appearance.

The subgenus *Honlamopus subgen. nov.* which includes the species *D. inornata* and *D. megleesae* sp. nov. are separated from the other subgenus *Delma* Gray, 1831 by the following suite of characters:

Conspicuous dorsal cross-bands are not present on the head and nape in adults; ventral scales lack dark edges; there are usually fewer than 16 scales along a line across the top of the head and fewer than 17 scales along a line across the throat, each line extending from the angle of the mouth on each side; no dark dorso-lateral stripe extending from the posterior third of the body to the tail, no conspicuous lip pattern and flesh coloured ventral surfaces (in life).

The genus *Delma* Gray, 1831 is readily separated from the genera *Aclys* Kluge, 1974, *Crottyopus* gen. nov., *Pseudodelma* Fischer, 1882, *Sloppopus* gen. nov., *Wellingtonopus* gen. nov. and *Wellsopus* gen. nov. by the following suite of characters: Anterior nasals in contact, or fewer than 20 mid-body rows, and smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; one or no dark transverse bands posterior either to the parietal scales or to any dark transverse band fully or partly enclosing the parietal scales; usually fewer than 18 mid-body scale rows; usually seven scales on top of the snout between the rostral and frontal; usually three pre-anal scales; lateral lip pattern and

dorsal head bands may be present or absent; fourth or fifth supralabial is usually below the eye; dark pigment on the throat or venter may be present or absent; and one or other of the following two:

1/ Conspicuous dorsal cross-bands are present on the head and nape; there is rarely a conspicuous dark lateral stripe present posteriorly; rostral noticeably projecting between the anterior pair of supranasals; strong dark bars or reticulations on the throat; usually more than five infralabials and three hindlimb scales (*D. fraseri* and *D. petersoni*), or:

2/ Conspicuous dorsal cross-bands are not present on the head and nape in adults; ventral scales lack dark edges; there are usually fewer than 16 scales along a line across the top of the head and fewer than 17 scales along a line across the throat, each line extending from the angle of the mouth on each side; no dark dorso-lateral stripe extending from the posterior third of the body to the tail (*D. grayi*, *D. inornata* and *D. meglesae* sp. nov.).

The genus *Delma* Gray, 1831, and the six genera *Aclys* Kluge, 1974, *Crottyopus* gen. nov., *Pseudodelma* Fischer, 1882, *Sloppopus* gen. nov., *Wellingtonopus* gen. nov. and *Wellsopus* gen. nov. (all until now treated as being within *Delma*) are separated from all other Australasian Pygopodids by the following suite of characters: The head is covered with enlarged symmetrical shields; the ventral scales are smooth; there are no pre-anal pores; parietal scales are present; the external ear opening is present and obvious; there are more than 8 scales along a line across the top of the head joining the angle of the mouth on each side.

Distribution: *Delma meglesae* sp. nov. is restricted to the basaltic and granite plains of the ACT and nearby parts of Southern New South Wales, in association with the drier plateaux and near western slopes of the southern Great Dividing Range in southern NSW and the ACT. *D. inornata* Kluge, 1974, is found in a broad region from the drier parts of south-east South Australia, not including arid areas in the north across most of Victoria north and west of the Great Dividing Range, through most of the western slopes and nearby plains of New South Wales, into nearby parts of southern Queensland, west of the Great Dividing Range.

Etymology: *Delma* in honour of Meg Heather Lees (née Francis, born 19 October 1948). She was a member of the Australian Senate from 1990 to 2005, representing the state of South Australia. She represented the Australian Democrats from 1990 to 2002, and was her party's Senate leader from 1997 – 2001. After being deposed by Natasha Stott Despoja, she quit the party to sit as an independent senator in 2002, adopting the party designation Australian Progressive Alliance from 2003 until her electoral defeat in 2005. Her greatest achievement was in 1993, when in association with News Limited Journalist Fia Cumming (of Canberra, ACT), she publicly denounced an illegal ban of the best-selling book *Smuggled: The Underground Trade in Australia's Wildlife* by the New South Wales National Parks and Wildlife Service (NPWS).

The actions of Lees played a pivotal role in having the illegal ban lifted. As a result of the publication of that book and a sequel (*Smuggled-2: Wildlife Trafficking, Crime and Corruption in Australia*), draconian and anti-conservation wildlife laws were forcibly rewritten in all Australian states, reversing a decades old ban on private ownership of wildlife including humble species like snakes and lizards.

Consequently it can be said without exaggeration that the actions of Lees made a significant and permanent positive impact on wildlife conservation in Australia.

Details of the actions of Lees and others such as Fia Cumming and publisher Charles Pierson in those critically important months of May 1993 are within the text of *Smuggled-2: Wildlife Trafficking, Crime and Corruption in Australia* and are mandatory reading for all persons with a genuine interest in wildlife conservation in Australia.

PSEUODELMA CUMMINGAE SP. NOV.

Holotype: A preserved specimen at the Australian Museum in Sydney, NSW, Australia, specimen number R.31621 collected from Gungahlin, Australian Capital Territory, Australia.

The Australian Museum in Sydney, NSW, Australia is a government-owned facility that allows scientists access to its holdings.

Paratypes: 1/ A preserved specimen at the Australian Museum in Sydney, NSW, Australia, specimen number R.14349 collected from Barton, Australian Capital Territory, Australia.

2/ A preserved specimen at the South Australian Museum, Australia, specimen number: R43328 collected from the Australian Capital Territory, Australia.

Diagnosis: *P. cummingae* sp. nov. is similar in most respects to *P. cummingae* sp. nov. Fischer, 1882, which it was until now treated as being a population of.

Both *P. impar* and *P. cummingae* sp. nov. are separated from all other species within *Pseudodelma* and the six genera *Aclys* Kluge, 1974, *Delma* Gray, 1831, *Crottyopus* gen. nov., *Sloppopus* gen. nov., *Wellingtonopus* gen. nov. and *Wellsopus* gen. nov. (all until now treated as being within *Delma*) by the following suite of characters: they are two moderate-sized species of "*Delma*" (SVL up to 101 mm) with a single pair of supranasals, fused rostrally with first supralabial and caudally with the postnasal, two pre-anal scales, and usually with a series of distinct narrow pale stripes laterally and dorso-lateral stripes on the body and tail, with series of dark spots between these stripes, often merged to form dark lines.

P. cummingae sp. nov. is separated from *P. impar* by the fact that in *P. impar* each of the lateral white stripes commences either above the ear or anterior to it. In *P. cummingae* sp. nov. this line commences well posterior to the ear.

P. impar is characterised by having a strong yellow flush across otherwise whiteish scales on the upper and lower labials posterior to the eye and running down the upper neck. *P. cummingae* sp. nov. rarely has a strong yellow flush in this region, instead having at best a faint yellowish flush and even then it is confined to the upper labials.

In *P. cummingae* sp. nov. the darker region of the crown fades into the lighter labials at a level just below the eye and posterior to it. In *P. impar* there is a sharp and well-defined transition from the dark to the light in the same region.

Distribution: The basaltic plains of the ACT and immediately adjoining areas in NSW. *P. impar* is herein confined to Victoria and nearby South Australia. A single record of a specimen previously assigned to *P. impar* allegedly from Alpine Way, in Kosciusko National Park, 9 KM west of Thredbo is likely to be either *P. cummingae* sp. nov. or *P. impar* as opposed to a third species.

THE CONSERVATION STATUS OF BOTH *P. IMPAR* AND *P. CUMMINGAE* SP. NOV.

Other than by direct removal of habitat for urban development or high intensity agriculture, there is absolutely no evidence of decline or recent rarity of either taxon.

The only serious known threat to either taxon is the "Big Australia policy" this being a Federal and (all states) State Government policy to ensure Australia increases the human population tenfold in the next 200 years, meaning it will be home to over 250 million people as opposed to the 25 million (approximately) at present.

Government funds spent doing "surveys" for either species are in effect a total waste of time and resources if the human population continues to increase, ultimately leading to the habitat for both species literally being paved over.

In the short to medium term (next 50 years), there is absolutely no point in "protection" of either species (read this as "banning" the public from being able to catch, keep, interact or even kill either species).

Ill informed people will continue to kill specimens in mistake for

venomous snakes and this toll has no discernable impact on populations in any event as evidenced by the current situation arising after 200 years of people killing these species when finding them.

There is no need to ban or restrict private individuals from catching, keeping or studying these species as they are so small and innocuous that collection of specimens for any pet trade would not be likely to impact on populations (most would be missed and undetected) and in any event, there is no significant demand (if any) for people to keep these lizards in captivity anyway.

To date, most if not all direct human collection of specimens of both species have been within the auspices of wildlife surveys, scientific research, or hobbyists seeking to find and photograph specimens only.

Government departments spending money on these species on the basis they are "endangered" are merely diverting precious resources away from other species that may be genuinely endangered in the short to medium term. Also by listing species such as *P. cummingae* sp. nov. or *P. impar* as threatened, vulnerable or endangered and promoting them as the same, government officials are in fact devaluing the status of those other species that really are genuinely threatened or endangered.

Etymology: Named in honour of leading Australian journalist Fia Cumming, who over a 20 year period was often the only news reporter employed with the mainstream media with the courage to take on the corruption and lies from government officials who sought to outlaw all private ownership of reptiles in Australia.

Without her efforts, including her being the first and main reporter to break the news story of the illegal banning of the book *Smuggled: The Underground Trade in Australia's Wildlife* (Hoser 1993) in May 1993, there would be no person in Australia allowed to have contact with reptiles in any way, save for a handful of privileged persons in government run zoos and the like.

That was the legal situation in most of Australia before the publication of the *Smuggled* books in 1993 and 1996 (Hoser 1993, 1996).

Every man, woman and child in Australia who in 2017 enjoys the legal right to keep live reptiles as pets in their home, or who sees a mobile reptile or wildlife display at their school, event or party owes Fia Cumming an eternal debt of gratitude, as without her courageous efforts, that right would not exist in Australia.

CROTTYOPUS JAMESBONDI SP. NOV.

Holotype: A preserved specimen at the South Australian Museum in Adelaide, South Australia, Australia, specimen number: R46980 collected from 5.6 km SSE from Mosquito Camp Dam, far north South Australia, Latitude -26.16, Longitude 134.51

The South Australian Museum in Adelaide, South Australia, Australia is a government-owned facility that allows scientists access to its holdings.

Paratype: A specimen in the Northern Territory Museum in Darwin, NT, Australia, specimen number: NTM R35854, collected from the top of the Krichauff Ranges, near the gas plant, at Hermannsburg, NT, Latitude -24.03, Longitude 132.42.

Diagnosis: *Crottyopus jamesbondi* sp. nov., *C. australis* (Kluge, 1974) and *C. hebesa* (Maryan, Brennan, Adams and Aplin, 2015) are all separated from the other species of *Crottyopus* gen. nov. and the six genera *Aclys* Kluge, 1974, *Delma* Gray, 1831, *Pseudodelma*, *Sloppopus* gen. nov., *Wellingtonopus* gen. nov. and *Wellsopus* gen. nov. (all until now treated as being within *Delma*) by the following suite of characters: Smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; one pair of supranasals, six upper labials with the fourth below the eye, supralabial in contact with second upper labial, one or no broad dark transverse bands, sometimes faded in adults that are

posterior to the parietal scales or to any dark transverse band fully or partly enclosing the parietal scales; 16-20 midbody rows, usually 18 at midbody, but sometimes varying elsewhere on the body; five scales on top of the snout between the rostral and frontal; ventral scales usually scarcely wider than adjacent body scales; SV up to 64 mm with a moderately robust body and relatively short tail (less than 2.5 times length of body).

Crottyopus jamesbondi sp. nov. is readily separated from the morphologically similar *C. australis* and *C. hebesa* by the distinctly weakened facial and throat banding, versus strong markings in the latter two species (as seen for example on page 145 of Wilson and Swan 2013, top image).

Crottyopus jamesbondi sp. nov. is further separated from *C. australis* and *C. hebesa* by its generally inornate colouration, and brownish body, versus a distinctively much darker head in the other two species.

Distribution: Found in a huge area from the western Lake Eyre drainage in South Australia, into the extreme southern Northern Territory (the main population), with apparently isolated outlier populations in Western Australia including the North West Cape, south-central Western Australia and Shark Bay.

Etymology: Named in honour of James Bond (yes the real one), of 496 Park Road, Park Orchards, Victoria, Australia, who over more than a decade has provided amazing assistances and logistical support to the wildlife conservation efforts of Snakebusters: Australia's best reptiles shows. Maintaining wildlife cages, facilities and the like is often boring and monotonous work and James Bond has assisted our efforts over many years and without ever asking for so much as a cent in payment or any other reward, merely being satisfied he has helped preserve the planet for future generations.

WELLINGTONOPUS STEVEBENNETTI SP. NOV.

Holotype: A preserved specimen at the Australian Museum in Sydney, NSW, Australia, specimen number R.130986 collected from 19.7km North of the Coombah Roadhouse on the Silver City Highway, New South Wales, Australia.

The Australian Museum in Sydney, NSW, Australia is a government-owned facility that allows scientists access to its holdings.

Paratypes: 1/ A preserved specimen at the Australian Museum in Sydney, NSW, Australia, specimen number R. 130988 collected from 19.7km North of the Coombah Roadhouse on the Silver City Highway, New South Wales, Australia.

2/ A preserved specimen at the Australian Museum in Sydney, NSW, Australia, specimen number R. 156715 collected at Yarra Property, 35km From Mt Hope on the Euabalong Road, New South Wales, Australia. Latitude -32.95, Longitude 146.19.

Diagnosis: *Wellingtonopus stevebennetti* sp. nov. and *W. butleri* (Storr, 1987) are separated from the other species of *Wellingtonopus* gen. nov. and the six genera *Aclys* Kluge, 1974, *Crottyopus* gen. nov., *Delma* Gray, 1831, *Pseudodelma*, *Sloppopus* gen. nov., and *Wellsopus* gen. nov. (all until now treated as being within *Delma*) by the following suite of characters: 15-18 midbody rows (usually 16), and smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; no dark transverse bands posterior either to the parietal scales or to any dark transverse band fully or partly enclosing the parietal scales; usually seven scales on top of the snout between the rostral and frontal; usually three often enlarged pre-anal scales; lateral lip pattern and dorsal head bands are absent or just flecking as opposed to lined; fourth or fifth supralabial is usually below the eye; dark pigment on the throat or venter may be present or absent; ventral scales with or without dark edges; there are usually 16 scales along a line across the top of the head and usually 17 scales along a line across the throat, each line extending from the angle of the mouth on each side; there is no dark dorso-lateral stripe extending from the posterior third of the body to the tail, dorsal scales are dark brown in colour and finely

etched with blackish colour; ventral scales lack dark edges, or if present are indistinct.

Wellingtonopus stevebennetti sp. nov. is separated from the similar *W. butleri* by the generally olive dorsal colouration versus brownish in *W. butleri*. *W. butleri* has a well defined white patch posterior to the eye, which is not the case in *W. stevebennetti* sp. nov.. The bars or spots on the upper labials are well-defined in *W. butleri*, versus indistinct in *W. stevebennetti* sp. nov..

Distribution: The Murray Darling River basin and nearby areas in NSW, Victoria and South Australia. The status of specimens assigned to *W. butleri* in most parts of South Australia and nearby parts of the NT and Qld is not known. *W. butleri terra typica* (*sensu stricto*) are herein restricted to Western Australia and immediately adjacent parts of South Australia.

Etymology: Named in honour of Steve Bennett, of Narre Warren South, Victoria, Australia in recognition of a significant contribution to wildlife conservation in Australia over some decades, including at times by maintaining the fleet of vehicles used by the educational reptile displays of the Snakebusters: Australia's best reptiles team.

WELLINGTONOPUS GRAHAMRICHARDSONI SP. NOV.

Holotype: A preserved specimen at the Northern Territory Museum, Darwin, Australia, specimen number NTM R35899 collected from Camooweal, Queensland, Australia, Lat. -19.92, Longitude 138.12.

The Northern Territory Museum, Darwin, Australia is a government-owned facility that allows scientists access to its holdings.

Paratype: A preserved specimen at the Queensland Museum, Brisbane, Australia, specimen number J39044 collected from 9.5 km east of Camooweal, Queensland, Australia.

Diagnosis: Until now, *W. grahamrichardsoni* sp. nov. has been treated as a population of *W. nasuta* Kluge, 1974. However *W. grahamrichardsoni* sp. nov. can be readily separated from *W. nasuta* by the following characters: At the rear lower margin of the eye are one or more obviously dark grey or black scales, forming a patch or comma. This feature is absent in *W. nasuta*. Most of the width of the posterior of each scale on the tail of *W. nasuta* is etched with dark brown or black, whereas this is not the case in *W. grahamrichardsoni* sp. nov.. When there is etching at the rear of the scales on the tail of *W. grahamrichardsoni* sp. nov. it occupies less than half the scale width, versus more than half in *W. nasuta*.

W. grahamrichardsoni sp. nov. is characterised by yellow under the front chin shields versus cream or white in *W. nasuta*.

The genus *Wellingtonopus* gen. nov. is readily separated from the genera *Aclyis* Kluge, 1974, *Crottyopus* gen. nov., *Delma* Gray, 1831, *Pseudodelma* Fischer, 1882, *Sloppopus* gen. nov., and *Wellsopus* gen. nov. by the following suite of characters, being one or other of the following two:

1/ Anterior nasals in contact and smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; 16-18 mid-body scale rows; usually seven scales on top of the snout between the rostral and frontal; usually three pre-anal scales; fourth or fifth supralabial is usually below the eye; four scales border the nostril; rostral noticeably projecting between the anterior pair of supranasals; usually less than six infralabials and three hindlimb scales; conspicuous but pale dorsal cross-bands are present on the head and nape; the pale bands on the head and neck are wavy in outline and there are usually some extra pale narrow bands on the side of the head between the pale dorsal bands; there is rarely a conspicuous dark lateral stripe present posteriorly; strong dark bars or reticulations absent from the throat; (*W. haroldi*), or: 2/ 15-18 midbody rows (usually 16), and smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; no dark transverse bands posterior either to the parietal scales or to any dark transverse band fully or partly enclosing the parietal scales; usually seven

scales on top of the snout between the rostral and frontal; usually three often enlarged pre-anal scales; lateral lip pattern and dorsal head bands are absent or just flecking as opposed to lined; fourth or fifth supralabial is usually below the eye; dark pigment on the throat or venter may be present or absent; ventral scales with or without dark edges; there are usually 16 scales along a line across the top of the head and usually 17 scales along a line across the throat, each line extending from the angle of the mouth on each side; there is no dark dorso-lateral stripe extending from the posterior third of the body to the tail, (*Wellingtonopus stevebennetti* sp. nov., *W. butleri*, *W. grahamrichardsoni* sp. nov., *W. nasuta*).

W. grahamrichardsoni sp. nov. and *W. nasuta* are separated from *Wellingtonopus stevebennetti* sp. nov. and *W. butleri* by the presence of dorsal scales that are pale brown, spotted and flecked or etched with darker brown and ventral scales that are usually dark edged. By contrast *Wellingtonopus stevebennetti* sp. nov. and *W. butleri* have dark brown dorsal scales that are finely edged with blackish pigment and ventral scales that lack dark edges.

The genus *Delma* Gray, 1831, and the six genera *Aclyis* Kluge, 1974, *Crottyopus* gen. nov., *Pseudodelma* Fischer, 1882, *Sloppopus* gen. nov., *Wellingtonopus* gen. nov. and *Wellsopus* gen. nov. (all until now treated as being within *Delma*) are separated from all other Australasian Pygopodids by the following suite of characters: The head is covered with enlarged symmetrical shields; the ventral scales are smooth; there are no pre-anal pores; parietal scales are present; the external ear opening is present and obvious; there are more than 8 scales along a line across the top of the head joining the angle of the mouth on each side.

Distribution: *W. grahamrichardsoni* sp. nov. is found in northwest Queensland and the far north-east of the Northern Territory near the southern edge of the Gulf of Carpentaria, in a region generally north and east of the black soiled plains of the Diamantina River System and east of the Simpson Desert. *W. nasuta* Kluge, 1974 is found in most parts of continental Australia beyond this region, excluding the top end of the Northern Territory and also the far south, including the southern half of South Australia, the south-west of Western Australia and along near coastal areas north to about Shark Bay.

Etymology: Named in honour of Graham Frederick Richardson (born 27 September 1949), a former Australian politician, who was a Senator for New South Wales from 1983-94 for the Australian Labor Party. He was a senior minister in Hawke and Keating governments, but best known for his significant contributions to wildlife conservation and the cause of environmental protection.

Significantly and as a major power-broker in the Australian Labor Party he wrote the forward to the best-selling book *Smuggled: The Underground Trade in Australia's Wildlife*, which was unlawfully banned by the New South Wales National Parks and Wildlife Service when the book was first published in May 1993.

Canberra-based News limited Journalist Fia Cumming spearheaded a campaign to have the illegal ban lifted which succeeded in June 1993.

As a result of the publication of that book and a sequel (*Smuggled-2: Wildlife Trafficking, Crime and Corruption in Australia*), draconian and anti-conservation wildlife laws were forcibly rewritten in all Australian states, reversing a decades old ban on private ownership of wildlife including humble species like snakes and lizards.

Consequently it can be said that the actions of Graham Richardson in demanding that the contents of the book *The Underground Trade in Australia's Wildlife* be read and acted upon, made a significant and permanent positive impact on wildlife conservation in Australia.

Details of the actions of Lees and others such as Fia Cumming

and publisher Charles Pierson in those critically important months of May 1993 to get the ban on that book lifted are within the text of *Smuggled-2: Wildlife Trafficking, Crime and Corruption in Australia* and both books are mandatory reading for all persons with a genuine interest in wildlife conservation in Australia.

WELLSOPUS SHANEKINGI SP. NOV.

Holotype: A preserved specimen at the Western Australian Museum in Perth, Western Australia, Australia, specimen number: WAM R157937, collected from Barrow Island, Western Australia, Australia, Latitude -20.80, Longitude 115.44. The Western Australian Museum in Perth, Western Australia, Australia, is a government-owned facility that allows scientists access to its holdings.

Paratype: A preserved specimen at the Western Australian Museum in Perth, Western Australia, Australia, specimen number: WAM R157938, collected from Barrow Island, Western Australia, Australia, Latitude -20.80, Longitude 115.44.

Diagnosis: *Wellsopus shanekingi sp. nov.* and the similar *W. brianbarnetti sp. nov.* and *W. borea* (Kluge, 1974) are separated from the other species of *Wellsopus gen. nov.* and the six genera *Aclys* Kluge, 1974, *Crottyopus gen. nov.*, *Delma* Gray, 1831, *Pseudodelma*, *Sloppopus gen. nov.*, and *Wellingtonopus gen. nov.* (all until now treated as being within *Delma*) by the following suite of characters: Anterior nasals in contact and smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; 14-16 (usually 16) mid-body scale rows; usually seven scales on top of the snout between the rostral and frontal; 2-3 scales along the lower margin of the hindlimb flap; usually three pre-anal scales; fourth supralabial is usually below the eye; four scales border the nostril; rostral noticeably projecting between the anterior pair of supranasals (there being two pairs); usually less than six infralabials and three hindlimb scales; 11-14 scales along a line across the top of the head which joins the angle of the mouth on each side; ventrals paired and noticeably wider than adjacent scales; conspicuous but pale dorsal cross-bands are present on the head and nape; the pale bands on the head and neck are straight in outline and there are no additional pale bands on the side of the head between the pale dorsal bands, these all being bounded by thick black, blackish or grey sections; the thickest pale band is at the rear of the head, with narrower ones anterior running immediately behind the eye and another posterior on neck, this being the thinner of the trio; the snout is moderate and rounded.

While *Wellsopus shanekingi sp. nov.*, *W. brianbarnetti sp. nov.* and *W. borea* (Kluge, 1974) are all very similar in appearance, they can all be readily distinguished from one another when viewed together, or alternatively one their own after one has viewed many specimens of each. The differences are very consistent, even across the wide range of each species.

W. borea (Kluge, 1974) is characterised by four dark blackish bands across the snout, head and upper neck interspersed with thin, yellowish-orange and white cross bands. While the patterning is much the same in both *W. shanekingi sp. nov.* and *W. brianbarnetti sp. nov.* the snout is brownish as opposed to blackish, meaning that the first of the four dark cross-bands is in effect absent. These start at the second dark cross-band above the eyes. However this cross-band is so faded in *W. shanekingi sp. nov.* as to be barely noticeable, in contrast to the other two species, in which it is prominent and obvious.

W. shanekingi sp. nov. is further separated from the other two species by having indistinct greyish blotches along the flanks and sides of the forebody.

W. borea (Kluge, 1974) is further separated from both *W. shanekingi sp. nov.* and *W. brianbarnetti sp. nov.* by the configuration of dark patches on the upper and lower labials. In *W. borea* (Kluge, 1974) the black patch on the lower labial (yes lower, not upper), below the eye is large and forms a blob. It is also effectively joined to the black of the upper labial and the

eye.

By contrast in *W. brianbarnetti sp. nov.* the same black patch is significantly reduced in size, forming a small spot, separated from above by a line of white, while in *W. shanekingi sp. nov.* it is a narrow line joining the dark in the upper labial.

With rare exceptions, the dark head bands in *W. brianbarnetti sp. nov.* are somewhat faded black, as opposed to a rich dark black in *W. borea*. In *W. shanekingi sp. nov.* the dark head bands are so faded as to be grey in colour.

Distribution: *W. shanekingi sp. nov.* is found on Barrow Island, Western Australia and north along the adjacent coastline of Western Australia to about Broome. *W. borea* is confined to the tropical NT near Darwin and within about 50 KM south of there in a zone continuing along the north coast of the NT to at least the Gove Peninsula. In most other parts of the Northern Territory, including the western interior, Victoria River Region and the Kimberley Ranges, specimens previously referred to *W. borea*, are now referred to the species *W. brianbarnetti sp. nov.* formally described below.

Specimens from the East Coast of the top end of the Northern Territory are also referred to *W. borea*.

Etymology: Named in honour of Shane King, formerly of Bendigo, now of Mildura in Victoria, Australia for his services to herpetology over some decades.

WELLSOPUS BRIANBARNETTI SP. NOV.

Holotype: A preserved specimen at the Western Australian Museum in Perth, Western Australia, Australia, specimen number: WAM R171025, collected from Saint Andrew Island, Western Australia, Australia, Latitude -15.36, Longitude 125.00. The Western Australian Museum in Perth, Western Australia, Australia, is a government-owned facility that allows scientists access to its holdings.

Paratype: A preserved specimen at the Western Australian Museum in Perth, Western Australia, Australia, specimen number: WAM R171015, collected from Adolphus Island, Western Australia, Australia, Latitude -15.08, Longitude 128.14.

Diagnosis: *Wellsopus shanekingi sp. nov.* and the similar *W. brianbarnetti sp. nov.* and *W. borea* (Kluge, 1974) are separated from the other species of *Wellsopus gen. nov.* and the six genera *Aclys* Kluge, 1974, *Crottyopus gen. nov.*, *Delma* Gray, 1831, *Pseudodelma*, *Sloppopus gen. nov.*, and *Wellingtonopus gen. nov.* (all until now treated as being within *Delma*) by the following suite of characters: Anterior nasals in contact and smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; 14-16 (usually 16) mid-body scale rows; usually seven scales on top of the snout between the rostral and frontal; 2-3 scales along the lower margin of the hindlimb flap; usually three pre-anal scales; fourth supralabial is usually below the eye; four scales border the nostril; rostral noticeably projecting between the anterior pair of supranasals (there being two pairs); usually less than six infralabials and three hindlimb scales; 11-14 scales along a line across the top of the head which joins the angle of the mouth on each side; ventrals paired and noticeably wider than adjacent scales; conspicuous but pale dorsal cross-bands are present on the head and nape; the pale bands on the head and neck are straight in outline and there are no additional pale bands on the side of the head between the pale dorsal bands, these all being bounded by thick black, blackish or grey sections; the thickest pale band is at the rear of the head, with narrower ones anterior running immediately behind the eye and another posterior on neck, this being the thinner of the trio; the snout is moderate and rounded.

While *Wellsopus shanekingi sp. nov.*, *W. brianbarnetti sp. nov.* and *W. borea* (Kluge, 1974) are all very similar in appearance, they can all be readily distinguished from one another when viewed together, or alternatively one their own after one has viewed many specimens of each. The differences are very consistent, even across the wide range of each species.

W. borea (Kluge, 1974) is characterised by four dark blackish bands across the snout, head and upper neck interspersed with thin, yellowish-orange and white cross bands. While the patterning is much the same in both *W. shanekingi* sp. nov. and *W. brianbarnetti* sp. nov. the snout is brownish as opposed to blackish, meaning that the first of the four dark cross-bands is in effect absent. These start at the second dark cross-band above the eyes. However this cross-band is so faded in *W. shanekingi* sp. nov. as to be barely noticeable, in contrast to the other two species, in which it is prominent and obvious.

W. shanekingi sp. nov. is further separated from the other two species by having indistinct greyish blotches along the flanks and sides of the fore-body.

W. borea (Kluge, 1974) is further separated from both *W. shanekingi* sp. nov. and *W. brianbarnetti* sp. nov. by the configuration of dark patches on the upper and lower labials. In *W. borea* (Kluge, 1974) the black patch on the lower labial (yes lower, not upper), below the eye is large and forms a blob. It is also effectively joined to the black of the upper labial and the eye.

By contrast in *W. brianbarnetti* sp. nov. the same black patch is significantly reduced in size, forming a small spot, separated from above by a line of white, while in *W. shanekingi* sp. nov. it is a narrow line joining the dark in the upper labial.

With rare exceptions, the dark head bands in *W. brianbarnetti* sp. nov. are somewhat faded black, as opposed to a rich dark black in *W. borea*. In *W. shanekingi* sp. nov. the dark head bands are so faded as to be grey in colour.

Distribution: *W. shanekingi* sp. nov. as described in this paper is found on Barrow Island, Western Australia and north along the adjacent coastline of Western Australia to about Broome. *W. borea* is confined to the tropical NT near Darwin and within about 50 KM south of there in a zone continuing along the north coast of the NT to at least the Gove Peninsula. In most other parts of the Northern Territory, including the western interior, Victoria River Region and the Kimberley Ranges (both east and west and offshore islands), specimens previously referred to *W. borea*, are now referred to the species *W. brianbarnetti* sp. nov. as formally described and named here.

Specimens from the East Coast of the top end of the Northern Territory are also referred to *W. borea*.

WELLSOPUS KYLIENAUGHTONAE SP. NOV.

Holotype: A preserved specimen at the Australian Museum in Sydney, NSW, Australia, specimen number R. 151607 collected from 14.8km south of the Olive Downs Homestead, Connia Creek, Jump-Up Loop Road in the Sturt National Park, North-west, New South Wales, Australia, Latitude 29.17, Longitude 141.87.

The Australian Museum in Sydney, NSW, Australia is a government-owned facility that allows scientists access to its holdings.

Diagnosis: *Wellsopus kylienaughtonae* sp. nov., *W. richardwarneri* sp. nov., *W. tincta* (De Vis, 1888), and *W. michaelguiheneufi* sp. nov. are readily separated from other species in the genus *Wellsopus* gen. nov. and the genera *Acly* Kluge, 1974, *Crottyopus* gen. nov., *Delma* Gray, 1831, *Pseudodelma* Fischer, 1882, *Sloppopus* gen. nov., and *Wellingtonopus* gen. nov. by the following suite of characters:

Smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; nasal and first supralabials are therefore very distinct; two dark transverse bands posterior to the parietal scales or to any dark transverse band fully or partly enclosing the parietal scales; 14 mid-body scale rows (rarely 12 or 16); five scales on top of the snout between the rostral and frontal; 10-13 scales along a line across the top of the head which joins the angle of the mouth on each side; ventrals paired and noticeably wider than adjacent scales; colouration is a uniform grey or greyish brown above and immaculate white below.

Wellsopus kylienaughtonae sp. nov., *W. richardwarneri* sp. nov., *W. tincta*, and *W. michaelguiheneufi* sp. nov. are readily separated from one another by the following consistent traits:

W. kylienaughtonae sp. nov. from northwest New South Wales and nearby southern Queensland has no light cross band anterior to the eye. Instead this is reduced to yellowish upticks on the front labials above the eye. There are no further cross-bands or partially formed cross-bands beyond the last of the 3 obvious ones on the head and neck. There is a reddish tinge in the dorsal scales throughout the length of the body.

W. tincta from north-east Queensland always has four well-defined lighter bands across head and upper neck, including the head band anterior to the eye. There are no further cross-bands or partially formed cross-bands beyond the last of these. The lower flanks have minor reddening.

W. richardwarneri sp. nov. from the Pilbara in Western Australia and areas south-west of there is identified by the fact that all the darker head bands widen considerably as they commence from a narrow base on the upper labials (surrounded by white), versus more-or-less even width on labials and crown in the other three forms for those dark headbands behind the eyes. Beyond the four darker headbands (including the upper neck) there are two to three partially formed darker cross-bands running up the lower flanks, (this is not seen in the other three species).

W. michaelguiheneufi sp. nov. of the Kimberley division of Western Australia is characterised by there being no narrowing of the yellow with white crossband across the crown of the head behind the eyes as seen in the species *W. richardwarneri* sp. nov. and *W. tincta*, where the band narrows across the crown. The same band is effectively incomplete in *W. kylienaughtonae* sp. nov..

Distribution: Far north-west New South Wales and nearby parts of far south-west Queensland.

Etymology: Named in honour of Kylie Naughton of 484 Park Road, Park Orchards, Victoria, Australia for her services to wildlife conservation in Australia including by assisting in the critically important wildlife conservation and education work of Snakebusters: Australia's best reptiles shows.

WELLSOPUS MICHAELGUIHENEUFI SP. NOV.

Holotype: A preserved specimen at the Western Australian Museum in Perth, Western Australia, Australia, specimen number: WAM R137953, collected from 35 Kilometers, North, North-east of Kunnamurra, Western Australia, Australia, Latitude -15.59, Longitude 128.98.

The Western Australian Museum in Perth, Western Australia, Australia, is a government-owned facility that allows scientists access to its holdings.

Diagnosis: *W. michaelguiheneufi* sp. nov., *Wellsopus kylienaughtonae* sp. nov., *W. richardwarneri* sp. nov. and *W. tincta* (De Vis, 1888) are readily separated from other species in the genus *Wellsopus* gen. nov. and the genera *Acly* Kluge, 1974, *Crottyopus* gen. nov., *Delma* Gray, 1831, *Pseudodelma* Fischer, 1882, *Sloppopus* gen. nov., and *Wellingtonopus* gen. nov. by the following suite of characters:

Smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; nasal and first supralabials are therefore very distinct; two dark transverse bands posterior to the parietal scales or to any dark transverse band fully or partly enclosing the parietal scales; 14 mid-body scale rows (rarely 12 or 16); five scales on top of the snout between the rostral and frontal; 10-13 scales along a line across the top of the head which joins the angle of the mouth on each side; ventrals paired and noticeably wider than adjacent scales; colouration is a uniform grey or greyish brown above and immaculate white below.

Wellsopus michaelguiheneufi sp. nov., *W. kylienaughtonae* sp. nov., *W. richardwarneri* sp. nov. and *W. tincta* are readily separated from one another by the following consistent traits:

W. michaelguiheneufi sp. nov. of the Kimberley division of Western Australia is characterised by there being no narrowing of the yellow with white crossband across the crown of the head behind the eyes as seen in the species *W. richardwarneri* sp. nov. and *W. tincta*, where the band narrows across the crown. The same band is effectively incomplete in *W. kylienaughtonae* sp. nov.. There are no further cross-bands or partially formed cross-bands beyond the last of the 3 most obvious ones on the head and neck.

W. kylienaughtonae sp. nov. from northwest New South Wales and nearby southern Queensland has no light cross band anterior to the eye. Instead this is reduced to yellowish upticks on the front labials above the eye. There are no further cross-bands or partially formed cross-bands beyond the last of the 3 obvious ones on the head and neck. There is a reddish tinge in the dorsal scales throughout the length of the body.

W. tincta from north-east Queensland always has four well-defined lighter bands across head and upper neck, including the head band anterior to the eye. There are no further cross-bands or partially formed cross-bands beyond the last of these. The lower flanks have minor reddening.

W. richardwarneri sp. nov. from the Pilbara in Western Australia and areas south-west of there is identified by the fact that all the darker head bands widen considerably as they commence from a narrow base on the upper labials (surrounded by white), versus more-or-less even width on labials and crown in the other three forms for those dark headbands behind the eyes. Beyond the four darker headbands (including the upper neck) there are two to three partially formed darker cross-bands running up the lower flanks, (this is not seen in the other three species).

Distribution: Apparently restricted to the Kimberley division of north-west Western Australia.

Etymology: Named in honour of Michael Guiheneufi of 484 Park Road, Park Orchards, Victoria, Australia for his services to wildlife conservation in Australia including by assisting in the critically important wildlife conservation and education work of Snakebusters: Australia's best reptiles shows.

WELLSOPUS RICHARDWARNERI SP. NOV.

Holotype: A preserved specimen at the Western Australian Museum in Perth, Western Australia, Australia, specimen number: WAM R129587, collected from 120 Kilometers, North-west of Newman, Western Australia, Australia, Latitude -22.92, Longitude 118.9.

The Western Australian Museum in Perth, Western Australia, Australia, is a government-owned facility that allows scientists access to its holdings.

Paratype: A preserved specimen at the Western Australian Museum in Perth, Western Australia, Australia, specimen number: WAM R158202, collected from 52.2 Kilometers, west of Roy Hill, Western Australia, Australia, Latitude -22.74, Longitude 120.47.

Diagnosis: *W. richardwarneri* sp. nov., *W. michaelguiheneufi* sp. nov., *Wellsopus kylienaughtonae* sp. nov. and *W. tincta* (De Vis, 1888) are readily separated from other species in the genus *Wellsopus* gen. nov. and the genera *Aclys* Kluge, 1974, *Crottyopus* gen. nov., *Delma* Gray, 1831, *Pseudodelma* Fischer, 1882, *Sloppopus* gen. nov., and *Wellingtonopus* gen. nov. by the following suite of characters:

Smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; nasal and first supralabials are therefore very distinct; two dark transverse bands posterior to the parietal scales or to any dark transverse band fully or partly enclosing the parietal scales; 14 mid-body scale rows (rarely 12 or 16); five scales on top of the snout between the rostral and frontal; 10-13 scales along a line across the top of the head which joins the angle of the mouth on each side; ventrals paired and noticeably wider than adjacent scales; colouration is a uniform grey or greyish brown above and immaculate white below.

Wellsopus richardwarneri sp. nov., *W. michaelguiheneufi* sp. nov., *W. kylienaughtonae* sp. nov. and *W. tincta* are readily separated from one another by the following consistent traits:

W. richardwarneri sp. nov. from the Pilbara in Western Australia and areas south-west of there is identified by the fact that all the darker head bands widen considerably as they commence from a narrow base on the upper labials (surrounded by white), versus more-or-less even width on labials and crown in the other three forms for those dark headbands behind the eyes. Beyond the four darker headbands (including the upper neck) there are two to three partially formed darker cross-bands running up the lower flanks, (this is not seen in the other three species).

W. michaelguiheneufi sp. nov. of the Kimberley division of Western Australia is characterised by there being no narrowing of the yellow with white crossband across the crown of the head behind the eyes as seen in the species *W. richardwarneri* sp. nov. and *W. tincta*, where the band narrows across the crown. The same band is effectively incomplete in *W. kylienaughtonae* sp. nov.. There are no further cross-bands or partially formed cross-bands beyond the last of the 3 most obvious ones on the head and neck.

W. kylienaughtonae sp. nov. from northwest New South Wales and nearby southern Queensland has no light cross band anterior to the eye. Instead this is reduced to yellowish upticks on the front labials above the eye. There are no further cross-bands or partially formed cross-bands beyond the last of the 3 obvious ones on the head and neck. There is a reddish tinge in the dorsal scales throughout the length of the body.

W. tincta from north-east Queensland always has four well-defined lighter bands across head and upper neck, including the head band anterior to the eye. There are no further cross-bands or partially formed cross-bands beyond the last of these. The lower flanks have minor reddening.

Distribution: The Pilbara of Western Australia and regions to the south-east of there in Western Australia.

Etymology: Named in honour of Richard Warner of Donvale, Victoria, Australia for his extended services to the care of the elderly and otherwise disabled people, done over many years and without ever asking for payment or any other financial rewards.

WELLSOPUS ROBWatSONI SP. NOV.

Holotype: A preserved specimen at the Western Australian Museum in Perth, Western Australia, Australia, specimen number: WAM R112733, collected from the old Meentheena Homestead, Western Australia, Australia, Latitude -21.17, Longitude 120.28.

The Western Australian Museum in Perth, Western Australia, Australia, is a government-owned facility that allows scientists access to its holdings.

Paratypes: 1/ A preserved specimen at the Western Australian Museum in Perth, Western Australia, Australia, specimen number: R139247, collected from Meentheena, Western Australia, Australia, Latitude -21.26, Longitude 120.46.

2/ A preserved specimen at the Western Australian Museum in Perth, Western Australia, Australia, specimen number: R139307, collected from Meentheena, Western Australia, Australia, Latitude -21.17, Longitude 120.27.

Diagnosis: *Wellsopus robwatsoni* sp. nov. and *W. elegans* (Kluge, 1974) are readily separated from all other *Wellsopus* gen. nov. and members of the genera *Aclys* Kluge, 1974, *Crottyopus* gen. nov., *Delma* Gray, 1831, *Pseudodelma* Fischer, 1882, *Sloppopus* gen. nov., and *Wellingtonopus* gen. nov. by the following suite of characters: Anterior nasals in contact, or fewer than 20 mid-body rows, and smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; two broad dark transverse bands, sometimes faded in adults that are posterior to the parietal scales or to any dark transverse band fully or partly enclosing the parietal scales; seven scales on top of the snout between

the rostral and frontal; fourth supralabial below the eye; three pre-anal scales.

W. robwatsoni sp. nov. is readily separated from *W. elegans* by colouration. In *W. robwatsoni* sp. nov. the dorsal head bands are relatively indistinct on the upper surface (crown area, back of head and neck) as opposed to distinct in *W. elegans*. The front of the snout in *W. robwatsoni* sp. nov. is dark, versus light in *W. elegans*.

Numerous specimens of *W. robwatsoni* sp. nov. have an area of white at the rear of each dorsal scale on the body, giving specimens a distinctive appearance. Dorsally *W. robwatsoni* sp. nov. are pinkish-reddish brown, as opposed to brown with a red tinge in *W. elegans*.

Distribution: *W. robwatsoni* sp. nov. is found in the general region of the Chichester Range and nearby areas in the north-east Pilbara in Western Australia, bounded in the south by the Fortescue River drainage and associated floodplains.

South of here in the Hamersley Ranges and nearby the similar *W. elegans* is found.

Etymology: Named in honour of Robert (Bob) Watson of Brisbane, Queensland, Australia, owner of South Eastern Reptiles, Brisbane, Queensland, Australia doing snake catching and wildlife rescuing for many years in South East Queensland and highlighting reptile conservation at the same time.

PYGOPUS BRETTBARNETTI SP. NOV.

Holotype: A preserved specimen at the Australian Museum in Sydney, NSW, Australia, specimen number R174855 collected from 100m past the entrance to WRCS flying field at Morgan Road, Belrose, New South Wales, Australia, Latitude 33.71, Longitude 151.24.

The Australian Museum in Sydney, NSW, Australia is a government-owned facility that allows scientists access to its holdings.

Paratype: A preserved specimen at the Australian Museum in Sydney, NSW, Australia, specimen number R174855 collected from Forestville, New South Wales, Australia, Latitude 33.77, Longitude 151.22.

Diagnosis: *Pygopus lepidopodus* (Lacépède, 1804) from southern Australia are characterised by two downward pointing rectangular dark patches on the lower labials, the first beneath the eye and the second at the rear of the jaw.

In *Pygopus brettbarnetti* sp. nov. the second of these patches on the lower labials is rectangular in a horizontal pattern. The dorsal body colour of adult *Pygopus brettbarnetti* sp. nov. may be either grey or brown and sometimes with russet down the sides.

By contrast *Pygopus woolfi* sp. nov. are of a brick red dorsum, this red colouration extending down the tail. This species is not characterised by two downward pointing rectangular dark patches on the lower labials. Unlike both *Pygopus lepidopodus* (Lacépède, 1804) and *Pygopus brettbarnetti* sp. nov. the lower forebody in *P. woolfi* sp. nov. is generally immaculate and whitish in colour and lacking darker spots as seen in the other two species.

Large adult *Pygopus lepidopodus* (Lacépède, 1804) and *Pygopus brettbarnetti* sp. nov. rarely exceed 60 cm in total length (original tails), whereas *P. woolfi* sp. nov. attain up to 90 cm in total length making them easily the largest Pygopodid in the world.

Pygopus robertsi Oliver, Couper and Amey, 2010 are readily separated from the other three species by having 9 dorsal scale rows, versus 10-15 in the other three species and having the supraciliaries in a single row.

All species in the genus *Pygopus* Merrem, 1820 as defined herein are defined by the following combination of character states: heavily built large legless lizards with large hind-limb flaps and conspicuous external ear openings. The dorsal surface of head covered with large and small scales, 3 to 5 post-mental scales, parietals and other head scales are enlarged and symmetrical, 21 or more mid-body scale rows, dorsal body

scales strongly keeled, there are no dark bars across the head, adults of both sexes have 9 or more pre-anal pores.

The genus *Cryptodelma* Fischer, 1882, is readily separated from *Pygopus* by the less rugose dorsal scales and at least one dark bar across the head or neck.

Distribution: *Pygopus brettbarnetti* sp. nov. has its centre of distribution in New South Wales in the vicinity of Sydney. It is also found along the NSW Coast and adjacent highlands, including far north-east Victoria and presumably into far south-east Queensland. North of the Brisbane River and on the Sunshine Coast in Queensland, the species *P. brettbarnetti* sp. nov. is replaced by the larger *P. woolfi* sp. nov.. *Pygopus lepidopodus* (Lacépède, 1804) occurs from far south-west NSW and nearby Victoria, across southern Australia to Western Australia and north along the coast. Specimens taken from south of Melbourne, Victoria conform to the species *P. lepidopodus*.

Pygopus robertsi Oliver, Couper and Amey, 2010 are restricted to eastern Cape York.

Etymology: Named in honour of Brett Barnett of Ardeer, Victoria in recognition of his monumental contribution to herpetology over many decades. Brett is known to many as the elder son of Brian Barnett, the foundation president of the Victorian Herpetological Society (VHS). However in the 20 years preceding the publication of this paper (in 2017), Brett has been the driving force behind the herpetology and conservation efforts of Brian Barnett, as Brian Barnett's health and ability to do things has declined.

PYGOPUS WOOLFI SP. NOV.

Holotype: A preserved specimen at the Queensland Museum in Brisbane, Queensland, Australia, specimen number J70147 collected from the Mount Glorious area, north-west of Brisbane, Queensland, Australia, Latitude 27.33, Longitude 152.77.

The Queensland Museum in Brisbane, Queensland, Australia, is a government-owned facility that allows scientists access to its holdings.

Paratype: A preserved specimen at the Queensland Museum in Brisbane, Queensland, Australia, specimen number J9902 collected from the Mount Glorious area, north-west of Brisbane, Queensland, Australia, Latitude 27.33, Longitude 152.77.

Diagnosis: By contrast *Pygopus woolfi* sp. nov. are easily recognized by their distinctive bright brick red dorsum, this red colouration extending down the tail. This species is not characterised by two downward pointing rectangular dark patches on the lower labials as seen in *Pygopus lepidopodus* (Lacépède, 1804). Unlike both *P. lepidopodus* and *Pygopus brettbarnetti* sp. nov. the lower forebody in *P. woolfi* sp. nov. is generally immaculate and whitish in colour and lacking darker spots as seen in the other two species.

Large adult *Pygopus lepidopodus* (Lacépède, 1804) and *Pygopus brettbarnetti* sp. nov. rarely exceed 60 cm in total length (original tails), whereas *P. woolfi* sp. nov. attain up to 90 cm in total length making them easily the largest Pygopodid in the world.

If there is a dark patch on the lower labials at the end of the mouth it is usually in the form of a small spot, or occasionally a horizontal or near horizontal dash. It is not in the form of a downward pointing rectangle.

Pygopus lepidopodus (Lacépède, 1804) from southern Australia are characterised by two downward pointing rectangular dark patches on the lower labials, the first beneath the eye and the second at the rear of the jaw.

In *Pygopus brettbarnetti* sp. nov. the second of these patches on the lower labials is rectangular in a horizontal pattern. The dorsal body colour of adult *Pygopus brettbarnetti* sp. nov. may be either grey or brown and sometimes with russet down the sides.

Pygopus robertsi Oliver, Couper and Amey, 2010 are readily separated from the other three species by having 9 dorsal scale

rows, versus 10-15 in the other three species and having the supraciliaries in a single row.

All species in the genus *Pygopus* Merrem, 1820 as defined herein are defined by the following combination of character states: heavily built large legless lizards with large hind-limb flaps and conspicuous external ear openings. The dorsal surface of head covered with large and small scales, 3 to 5 post-mental scales, parietals and other head scales are enlarged and symmetrical, 21 or more mid-body scale rows, dorsal body scales strongly keeled, there are no dark bars across the head, adults of both sexes have 9 or more pre-anal pores.

The genus *Cryptodelma* Fischer, 1882, is readily separated from *Pygopus* by the less rugose dorsal scales and at least one dark bar across the head or neck.

Distribution: *P. woolfi* sp. nov. is found in the hilly region north and north west of the Brisbane River Valley in south-east Queensland, including the Sunshine Coast and nearby areas. Specimens of *Pygopus* from near Rockhampton while potentially of this species, may quite likely be another as yet undescribed species.

Pygopus brettbarnetti sp. nov. has its centre of distribution in New South Wales in the vicinity of Sydney. It is also found along the NSW Coast and adjacent highlands, including far north-east Victoria and presumably into far south-east Queensland. North of the Brisbane River and on the Sunshine Coast in Queensland, the species *P. brettbarnetti* sp. nov. is replaced by the larger *P. woolfi* sp. nov..

Pygopus lepidopodus (Lacépède, 1804) occurs from far south-west NSW and nearby Victoria, across southern Australia to Western Australia and north along the coast. Specimens taken from south of Melbourne, Victoria conform to the species *P. lepidopodus*.

Pygopus robertsi Oliver, Couper and Amey, 2010 are restricted to eastern Cape York.

Etymology: Named in honour of Paul Woolf of Walloon, Queensland, Australia, the foundation president of the Herpetological Society of Queensland Incorporated (HSQI), publisher of the journal *Boydii*, in recognition of his immense contributions to herpetology spanning some decades.

TRIBE APRASIAINI TRIBE NOV.

(Terminal taxon: *Aprasia pulchella*, Gray, 1839)

Diagnosis: The tribe Aprasiaina *tribe nov.* are separated from all other Australasian Pygopodids (the rest of the family) by the following suite of characters, being one or other of the following three:

1/ Head covered with enlarged symmetrical shields, keeled ventral scales (*Pletholax* Cope, 1864), or:

2/ Head covered with enlarged symmetrical shields, smooth ventral scales, pre-anal pores absent, parietal scales absent (*Aprasia* Gray, 1839, *Abilaena* Wells, 2007, *Brettbarnettus* gen. nov., *Maryannmartinekea* gen. nov.) (Subtribe Aprasiaina *subtribe nov.*), or:

2/ Head covered with enlarged symmetrical shields, smooth ventral scales, pre-anal pores absent, parietal scales present, external ear opening is very small and generally hidden by the overlying temporal scales; fewer than eight scales along a line across the top of the head joining the angle of the mouth on each side (*Ophidiocephalus* Lucas and Frost, 1897).

Australasian Pygopodids are separated from all other lizards in the region by the following suite of characters: No obvious or normal limbs although many may have a scaly flap or "fin" on either side of the anal region. Ventral scales are in two longitudinal rows which are usually noticeably larger than the adjoining body scales on the lower flanks (adapted from Cogger 2014).

Distribution: Various localities across the southern half of Australia, mainly in the southern third, excluding very wet areas.

Content: *Aprasia* Gray, 1839; *Abilaena* Wells, 2007;

Brettbarnettus gen. nov.; *Maryannmartinekea* gen. nov.; *Ophidiocephalus* Lucas and Frost, 1897; *Pletholax* Cope, 1864.

SUBTRIBE APRASIAINA SUBTRIBE NOV.

(Terminal taxon: *Aprasia pulchella*, Gray, 1839)

Diagnosis: The subtribe Aprasiaina *subtribe nov.* are separated from all other Australasian Pygopodids (the rest of the family) by the following suite of characters: Head covered with enlarged symmetrical shields, smooth ventral scales, pre-anal pores absent, parietal scales absent (*Aprasia* Gray, 1839, *Abilaena* Wells, 2007, *Brettbarnettus* gen. nov., *Maryannmartinekea* gen. nov.). The other two subtribes within Aprasiaina *tribe nov.* are separated from all other all other Australasian Pygopodids (the rest of the family) by the following suite of characters, being one or other of the following two:

1/ Head covered with enlarged symmetrical shields, keeled ventral scales (*Pletholax* Cope, 1864) (Subtribe Pletholaxina *subtribe nov.*), or:

2/ Head covered with enlarged symmetrical shields, smooth ventral scales, pre-anal pores absent, parietal scales present, external ear opening is very small and generally hidden by the overlying temporal scales; fewer than eight scales along a line across the top of the head joining the angle of the mouth on each side (*Ophidiocephalus* Lucas and Frost, 1897) (Subtribe Ophidiocephalina *subtribe nov.*).

Australasian Pygopodids are separated from all other lizards in the region by the following suite of characters: No obvious or normal limbs although many may have a scaly flap or "fin" on either side of the anal region. Ventral scales are in two longitudinal rows which are usually noticeably larger than the adjoining body scales on the lower flanks (adapted from Cogger 2014).

Distribution: Various localities across the southern half of Australia, mainly in the southern third, excluding very wet areas.

Content: *Aprasia* Gray, 1839; *Abilaena* Wells, 2007; *Brettbarnettus* gen. nov.; *Maryannmartinekea* gen. nov..

SUBTRIBE PLETHOLAXINA SUBTRIBE NOV.

(Terminal taxon: *Pletholax gracilis* Cope, 1864)

Diagnosis: The subtribe Pletholaxina *subtribe nov.* are separated from all other Australasian Pygopodids (the rest of the family) by the following suite of characters: Head covered with enlarged symmetrical shields, keeled ventral scales (*Pletholax* Cope, 1864).

The other two subtribes within Aprasiaina *tribe nov.* are separated from all other all other Australasian Pygopodids (the rest of the family) by the following suite of characters, being one or other of the following two:

1/ Head covered with enlarged symmetrical shields, smooth ventral scales, pre-anal pores absent, parietal scales absent (*Aprasia* Gray, 1839, *Abilaena* Wells, 2007, *Brettbarnettus* gen. nov., *Maryannmartinekea* gen. nov.) (Subtribe Aprasiaina *subtribe nov.*), or:

2/ Head covered with enlarged symmetrical shields, smooth ventral scales, pre-anal pores absent, parietal scales present, external ear opening is very small and generally hidden by the overlying temporal scales; fewer than eight scales along a line across the top of the head joining the angle of the mouth on each side (*Ophidiocephalus* Lucas and Frost, 1897) (Subtribe Ophidiocephalina *subtribe nov.*).

Australasian Pygopodids are separated from all other lizards in the region by the following suite of characters: No obvious or normal limbs although many may have a scaly flap or "fin" on either side of the anal region. Ventral scales are in two longitudinal rows which are usually noticeably larger than the adjoining body scales on the lower flanks (adapted from Cogger 2014).

Distribution: Coastal areas of Western Australia from the Shark Bay area south to the lower west coast.

Content: *Pletholax* Cope, 1864.

SUBTRIBE OPHIDIOCEPHALINA SUBTRIBE NOV.

(Terminal taxon: *Ophidiocephalus taeniatus* Lucas and Frost, 1897)

Diagnosis: The subtribe *Ophidiocephalina subtribe nov.* are separated from all other Australasian Pygopodids (the rest of the family) by the following suite of characters: Head covered with enlarged symmetrical shields, smooth ventral scales, pre-anal pores absent, parietal scales present, external ear opening is very small and generally hidden by the overlying temporal scales; fewer than eight scales along a line across the top of the head joining the angle of the mouth on each side (*Ophidiocephalus* Lucas and Frost, 1897).

The other two subtribes within *Aprasiaini tribe nov.* are separated from all other all other Australasian Pygopodids (the rest of the family) by the following suite of characters, being one or other of the following two:

1/ Head covered with enlarged symmetrical shields, keeled ventral scales (*Pletholax* Cope, 1864) (Subtribe *Pletholaxina subtribe nov.*), or:

2/ Head covered with enlarged symmetrical shields, smooth ventral scales, pre-anal pores absent, parietal scales absent (*Aprasia* Gray, 1839, *Abilaena* Wells, 2007) (Subtribe *Aprasiaina subtribe nov.*). Australasian Pygopodids are separated from all other lizards in the region by the following suite of characters: No obvious or normal limbs although many may have a scaly flap or "fin" on either side of the anal region. Ventral scales are in two longitudinal rows which are usually noticeably larger than the adjoining body scales on the lower flanks (adapted from Cogger 2014).

Distribution: Inland areas of far north east South Australia and nearby parts of the Northern Territory, Australia.

Content: *Ophidiocephalus* Lucas and Frost, 1897.

PYGOPUSINI TRIBE NOV.

(Terminal taxon: *Bipes lepidopodus* Lacépède, 1804)

Diagnosis: Specimens within the tribe *Pygopusini tribe nov.* are readily separated from all other Australian Pygopodids by the following suite of characters: Head covered with enlarged symmetrical shields, smooth ventral scales, pre-anal pores present.

Specimens in the subtribe *Paradelmaina subtribe nov.* are separated from the nominate subtribe *Pygopusina subtribe nov.* by four pre-anal pores versus eight or more in the nominate subtribe.

Australasian Pygopodids are separated from all other lizards in the region by the following suite of characters: No obvious or normal limbs although many may have a scaly flap or "fin" on either side of the anal region. Ventral scales are in two longitudinal rows which are usually noticeably larger than the adjoining body scales on the lower flanks (adapted from Cogger 2014).

Distribution: Most parts of mainland Australia, but not known from Tasmania or New Guinea.

Content: *Pygopus* Merrem, 1820; *Paradelma* Kinghorn, 1926; *Cryptodelma* Fischer, 1882.

PYGOPUSINA SUBTRIBE NOV.

(Terminal taxon: *Bipes lepidopodus* Lacépède, 1804)

Diagnosis: Specimens within the tribe *Pygopusini tribe nov.* are readily separated from all other Australian Pygopodids by the following suite of characters: Head covered with enlarged symmetrical shields, smooth ventral scales, pre-anal pores present.

Specimens in the subtribe *Paradelmaina subtribe nov.* are separated from the nominate subtribe *Pygopusina subtribe nov.* by four pre-anal pores versus eight or more in the nominate subtribe.

Australasian Pygopodids are separated from all other lizards in the region by the following suite of characters: No obvious or

normal limbs although many may have a scaly flap or "fin" on either side of the anal region. Ventral scales are in two longitudinal rows which are usually noticeably larger than the adjoining body scales on the lower flanks (adapted from Cogger 2014).

Distribution: Most parts of mainland Australia, but not known from Tasmania or New Guinea.

Content: *Pygopus* Merrem, 1820; *Cryptodelma* Fischer, 1882.

PARADELMAINA SUBTRIBE NOV.

(Terminal taxon: *Delma orientalis* Günther, 1876)

Diagnosis: Specimens within the tribe *Pygopusini tribe nov.* are readily separated from all other Australian Pygopodids by the following suite of characters: Head covered with enlarged symmetrical shields, smooth ventral scales, pre-anal pores present.

Specimens in the subtribe *Paradelmaina subtribe nov.* are separated from the nominate subtribe *Pygopusina subtribe nov.* by four pre-anal pores versus eight or more in the nominate subtribe.

Australasian Pygopodids are separated from all other lizards in the region by the following suite of characters: No obvious or normal limbs although many may have a scaly flap or "fin" on either side of the anal region. Ventral scales are in two longitudinal rows which are usually noticeably larger than the adjoining body scales on the lower flanks (adapted from Cogger 2014).

Distribution: Most parts of mainland Australia, but not known from Tasmania or New Guinea.

Content: *Paradelma* Kinghorn, 1926.

TRIBE LIALISINI TRIBE NOV.

(Terminal taxon: *Lialis burtonis* Gray, 1835)

Diagnosis: Specimens within the tribe *Lialisini tribe nov.* are readily separated from all other Australian Pygopodids by the fact that the head is covered with small irregular head shields as opposed to enlarged symmetrical shields in all the other species. Australasian Pygopodids are separated from all other lizards in the region by the following suite of characters: No obvious or normal limbs although many may have a scaly flap or "fin" on either side of the anal region. Ventral scales are in two longitudinal rows which are usually noticeably larger than the adjoining body scales on the lower flanks (adapted from Cogger 2014).

Distribution: Most parts of mainland Australia except for the coldest parts of the south-east, including all of Tasmania and the coldest parts of the south-west and also found in southern New Guinea near to Torres Strait.

Content: *Lialis* Gray, 1835.

TRIBE SLOPPOPINI TRIBE NOV.

(Terminal taxon: *Delma labialis* Shea, 1987)

Diagnosis: Specimens within the tribe *Sloppopini tribe nov.* are readily separated from all other Australian Pygopodids by the following suite of characters: Head covered with enlarged symmetrical shields, smooth ventral scales, pre-anal pores absent, parietal scales present, external ear opening is present and obvious; there are more than eight scales along a line across the top of the head joining the angle of the mouth on each side.

The nominate subtribe *Sloppopina subtribe nov.* is separated from the other subtribe *Crottyopina subtribe nov.* by the possession of one or other of the following suites of characters: 1/ Smooth glossy scales; 16-18 midbody rows; a moderate and rounded snout; seven scales on the upper snout between the rostral and frontal; nasal and first supralabial are distinct; four scales border the nostril; the fourth supralabial sits beneath the eye; there are 16 scales along a line across the top of the head at the angle of the mouth on each side; ventral scales are paired and noticeably wider than the adjacent body scales; there are

three scales along the lower margin of the hindlimb flap; typically three enlarged pre-anal scales; rich red-brown or grey above; immaculate cream below; the top of the head is uniform brown but the lips, side of the head and neck are characterised by having a series of alternating cream and yellow-brown vertically aligned bars; the throat and ventral surfaces are an immaculate cream in colour (*Sloppopus gen. nov.*), or:

2/ The anterior nasal scales are separated by the rostral (as opposed to being in contact), 20 mid-body scale rows (as opposed to less than 20), striated or keeled dorsal scales (as opposed to smooth) (*Aclys*, Kluge, 1974).

Australasian Pygopodids are separated from all other lizards in the region by the following suite of characters: No obvious or normal limbs although many may have a scaly flap or "fin" on either side of the anal region. Ventral scales are in two longitudinal rows which are usually noticeably larger than the adjoining body scales on the lower flanks (adapted from Cogger 2014).

Distribution: Most parts of mainland Australia except for the very coldest parts. Apparently absent from Tasmania and New Guinea.

Content: *Sloppopus gen. nov.*; *Aclys* Kluge, 1974; *Crottyopus gen. nov.*; *Delma* Gray, 1831; *Pseudodelma* Fischer, 1882.; *Wellingtonopus gen. nov.*; *Wellsopus gen. nov.*.

SUBTRIBE SLOPPOPINA SUBTRIBE NOV.

(Terminal taxon: *Delma labialis* Shea, 1987)

Diagnosis: Specimens within the tribe Sloppopini *tribe nov.* are readily separated from all other Australian Pygopodids by the following suite of characters: Head covered with enlarged symmetrical shields, smooth ventral scales, pre-anal pores absent, parietal scales present, external ear opening is present and obvious; there are more than eight scales along a line across the top of the head joining the angle of the mouth on each side.

The nominate subtribe Sloppopina *Subtribe nov.* is separated from the other subtribe Crottyopina *subtribe nov.* by the possession of one or other of the following suites of characters: 1/ Smooth glossy scales; 16-18 midbody rows; a moderate and rounded snout; seven scales on the upper snout between the rostral and frontal; nasal and first supralabial are distinct; four scales border the nostril; the fourth supralabial sits beneath the eye; there are 16 scales along a line across the top of the head at the angle of the mouth on each side; ventral scales are paired and noticeably wider than the adjacent body scales; there are three scales along the lower margin of the hindlimb flap; typically three enlarged pre-anal scales; rich red-brown or grey above; immaculate cream below; the top of the head is uniform brown but the lips, side of the head and neck are characterised by having a series of alternating cream and yellow-brown vertically aligned bars; the throat and ventral surfaces are an immaculate cream in colour (*Sloppopus gen. nov.*), or:

2/ The anterior nasal scales are separated by the rostral (as opposed to being in contact), 20 mid-body scale rows (as opposed to less than 20), striated or keeled dorsal scales (as opposed to smooth) (*Aclys*, Kluge, 1974).

See also for the description of the subtribe Crottyopina *subtribe nov.* published below.

Australasian Pygopodids are separated from all other lizards in the region by the following suite of characters: No obvious or normal limbs although many may have a scaly flap or "fin" on either side of the anal region. Ventral scales are in two longitudinal rows which are usually noticeably larger than the adjoining body scales on the lower flanks (adapted from Cogger 2014).

Distribution: The coastal region between Townsville and Mackay in Queensland, and offshore islands (*Sloppopus gen. nov.*) and the lower west coast of south-western West Australia and the Shark Bay region of West Australia (*Aclys* Kluge, 1974).

Content: *Sloppopus gen. nov.*; *Aclys* Kluge, 1974.

CROTTYOPINA SUBTRIBE NOV.

(Terminal taxon: *Crottyopus jamesbondi sp. nov.*)

Diagnosis: Specimens within the tribe Sloppopini *tribe nov.* are readily separated from all other Australian Pygopodids by the following suite of characters: Head covered with enlarged symmetrical shields, smooth ventral scales, pre-anal pores absent, parietal scales present, external ear opening is present and obvious; there are more than eight scales along a line across the top of the head joining the angle of the mouth on each side.

The nominate subtribe subtribe Crottyopina *subtribe nov.* is separated from the other subtribe Sloppopina *Subtribe nov.* by the possession of one or other of the following five suites of characters:

Suite 1/ The genus *Delma* Gray, 1831 is readily separated from the genera *Aclys* Kluge, 1974, *Crottyopus gen. nov.*, *Pseudodelma* Fischer, 1882, *Sloppopus gen. nov.*, *Wellingtonopus gen. nov.* and *Wellsopus gen. nov.* by the following suite of characters: Anterior nasals in contact, or fewer than 20 mid-body rows, and smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; one or no dark transverse bands posterior either to the parietal scales or to any dark transverse band fully or partly enclosing the parietal scales; usually fewer than 18 mid-body scale rows; usually seven scales on top of the snout between the rostral and frontal; usually three pre-anal scales; lateral lip pattern and dorsal head bands may be present or absent; fourth or fifth supralabial is usually below the eye; dark pigment on the throat or venter may be present or absent; and one or other of the following two:

A/ Conspicuous dorsal cross-bands are present on the head and nape; there is rarely a conspicuous dark lateral stripe present posteriorly; rostral noticeably projecting between the anterior pair of supranasals; strong dark bars or reticulations on the throat; usually more than five infralabials and three hindlimb scales (*D. fraseri* and *D. petersoni*), or:

B/ Conspicuous dorsal cross-bands are not present on the head and nape in adults; ventral scales lack dark edges; there are usually fewer than 16 scales along a line across the top of the head and fewer than 17 scales along a line across the throat, each line extending from the angle of the mouth on each side; no dark dorso-lateral stripe extending from the posterior third of the body to the tail (*D. grayi*, *D. inornata* and *D. megleesae sp. nov.*).

The subgenus *Honlamopus subgen. nov.* is separated from the other subgenus *Delma* Gray, 1831 by the following suite of characters:

Conspicuous dorsal cross-bands are not present on the head and nape in adults; ventral scales lack dark edges; there are usually fewer than 16 scales along a line across the top of the head and fewer than 17 scales along a line across the throat, each line extending from the angle of the mouth on each side; no dark dorso-lateral stripe extending from the posterior third of the body to the tail, no conspicuous lip pattern and flesh coloured ventral surfaces (in life) (*D. inornata* and *D. megleesae sp. nov.*).

Suite 2/ The genus *Pseudodelma* Fischer, 1882 is readily separated from the genera *Aclys* Kluge, 1974, *Crottyopus gen. nov.*, *Delma* Gray, 1831, *Sloppopus gen. nov.*, *Wellingtonopus gen. nov.* and *Wellsopus gen. nov.* by the following suite of characters: One or other of the following four:

A/ Anterior nasals in contact, or fewer than 20 mid-body rows, and smooth dorsal scales; one or two narrow whitish dorso-lateral stripes on the body and tail; nasal and first supralabial fused anterior to the nostril (*P. impar* and *P. cummingae*), or:

B/ Anterior nasals in contact, or fewer than 20 mid-body rows, and smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; one or no dark transverse bands posterior either to the parietal

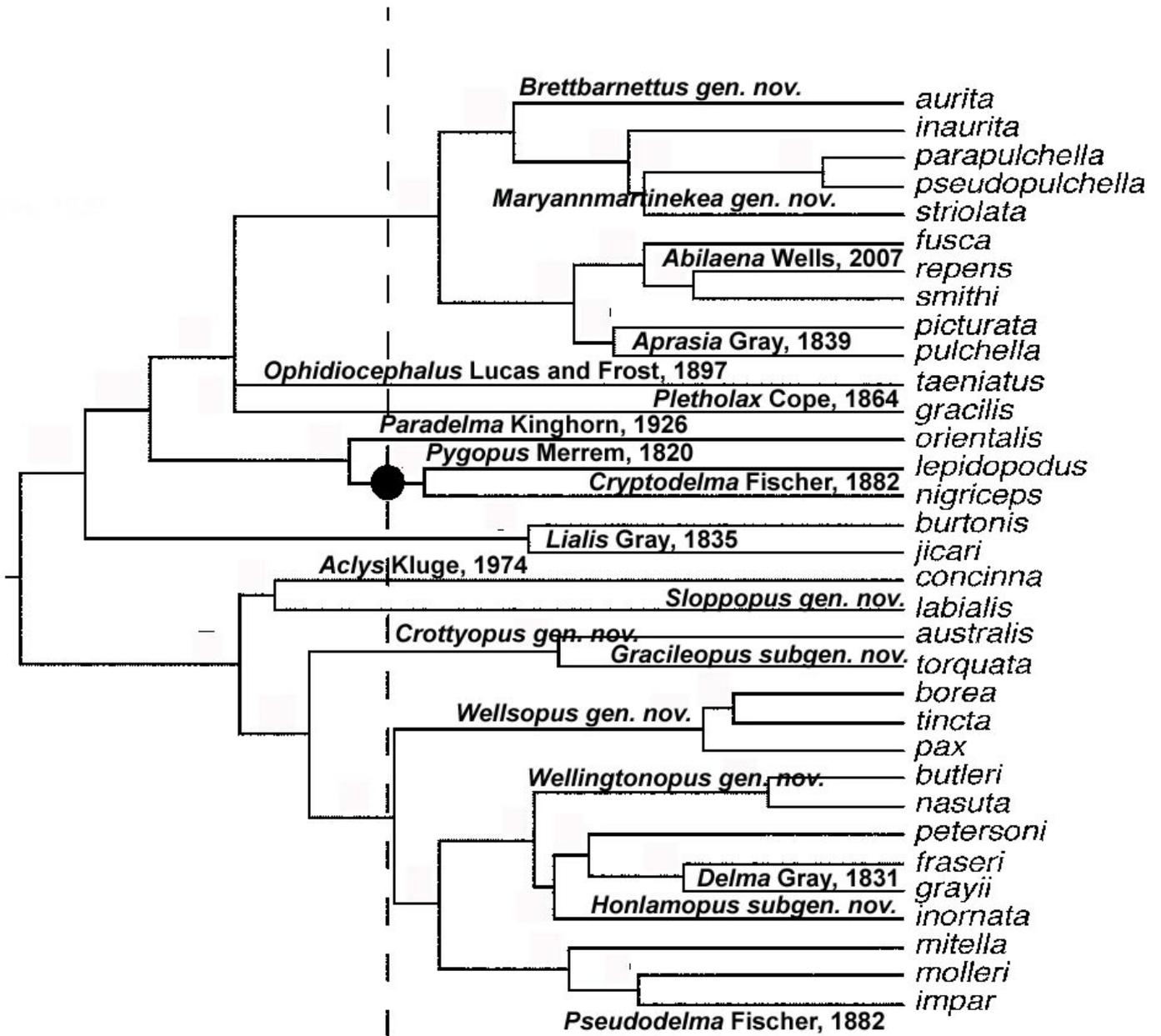


Fig. 1. Pygopodid molecular clock tree based on combined mtDNA and nDNA data as presented by Jennings *et al.* (2003) modified by the addition of the new generic arrangement of species presented in this paper as indicated. The dashed line represents 23 MYA.

scales or to any dark transverse band fully or partly enclosing the parietal scales; 18 mid-body scale rows; 5 scales on top of the snout between the rostral and the frontal; ventrals or conspicuously wider than adjacent body scales; no dark pigmentation on the throat (*P. mollerii*), or:

C/ Anterior nasals in contact, or fewer than 20 mid-body rows, and smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; one or no dark transverse bands posterior either to the parietal scales or to any dark transverse band fully or partly enclosing the parietal scales; usually fewer than 18 mid-body scale rows; usually seven scales on top of the snout between the rostral and frontal; usually two pre-anal scales; conspicuous lateral lip pattern present; dorsal head bands absent (*P. plebia* and *P. wollemi*), or:

D/ Anterior nasals in contact, or fewer than 20 mid-body rows, and smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; one or no dark transverse bands posterior either to the parietal scales or to any dark transverse band fully or partly enclosing the parietal scales; usually fewer than 18 mid-body scale rows; usually seven scales on top of the snout between the rostral and frontal; usually three pre-anal scales; lateral lip pattern and dorsal head bands may be present or absent; fourth or fifth supralabial is usually below the eye; dark pigment on the throat or venter may be present or absent; conspicuous dorsal cross-bands are present on the head and nape; there is usually a conspicuous dark lateral strip posteriorly; sharply demarcating the dark lateral from the pale ventral surfaces; rostral is not or scarcely projecting between the anterior pair of supranasals (*P. mitella*).

Suite 3/ The genus *Crottyopus gen. nov.* is readily separated from the genera *Aclys* Kluge, 1974, *Delma* Gray, 1831, *Pseudodelma* Fischer, 1882, *Sloppopus gen. nov.*, *Wellingtonopus gen. nov.* and *Wellsopus gen. nov.* by one or other of the following two suites of characters:

A/ Anterior nasals in contact, or fewer than 20 mid-body rows, and smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; one or no broad dark transverse bands, sometimes faded in adults that are posterior to the parietal scales or to any dark transverse band fully or partly enclosing the parietal scales; 16-20 midbody rows, usually 18 at midbody, but sometimes varying elsewhere on the body; five scales on top of the snout between the rostral and frontal; ventral scales usually scarcely wider than adjacent body scales; dark reticulations usually present on the throat (*C. jamesbondi sp. nov.*, *C. australis*, *C. hebesa*) (subgenus *Crottyopus gen. nov.*), or:

B/ Anterior nasals in contact, or fewer than 20 mid-body rows, and smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; two broad dark transverse bands, sometimes faded in adults that are posterior to the parietal scales or to any dark transverse band fully or partly enclosing the parietal scales; five scales on top of the snout between the rostral and the frontal; third supralabial below the eye and two pre-anal scales (*C. torquata*) (subgenus *Gracileopus gen. nov.*).

Suite 4/ The genus *Wellingtonopus gen. nov.* is readily separated from the genera *Aclys* Kluge, 1974, *Crottyopus gen. nov.*, *Delma* Gray, 1831, *Pseudodelma* Fischer, 1882, *Sloppopus gen. nov.*, and *Wellsopus gen. nov.* by the following suite of characters, being one or other of the following two:

A/ Anterior nasals in contact and smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; 16-18 mid-body scale rows; usually seven scales on top of the snout between the rostral and frontal; usually three pre-anal scales; fourth or fifth supralabial is usually below the eye; four scales border the nostril; rostral noticeably projecting between the anterior pair of supranasals; usually less than six infralabials and three hindlimb scales; conspicuous but

pale dorsal cross-bands are present on the head and nape; the pale bands on the head and neck are wavy in outline and there are usually some extra pale narrow bands on the side of the head between the pale dorsal bands; there is rarely a conspicuous dark lateral stripe present posteriorly; strong dark bars or reticulations absent from the throat; (*W. haroldi*), or: B/ 15-18 midbody rows (usually 16), and smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; no dark transverse bands posterior either to the parietal scales or to any dark transverse band fully or partly enclosing the parietal scales; usually seven scales on top of the snout between the rostral and frontal; usually three often enlarged pre-anal scales; lateral lip pattern and dorsal head bands are absent or just flecking as opposed to lined; fourth or fifth supralabial is usually below the eye; dark pigment on the throat or venter may be present or absent; ventral scales with or without dark edges; there are usually 16 scales along a line across the top of the head and usually 17 scales along a line across the throat, each line extending from the angle of the mouth on each side; there is no dark dorso-lateral stripe extending from the posterior third of the body to the tail, (*Wellingtonopus stevebennetti sp. nov.*, *W. butleri*, *W. grahamrichardsoni sp. nov.*, *W. nasuta*).

Suite 5/ The genus *Wellsopus gen. nov.* is readily separated from the genera *Aclys* Kluge, 1974, *Crottyopus gen. nov.*, *Delma* Gray, 1831, *Pseudodelma* Fischer, 1882, *Sloppopus gen. nov.*, and *Wellingtonopus gen. nov.* by the following suite of characters, being one or other of the following four:

A/ Anterior nasals in contact and smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; 14-16 (usually 16) mid-body scale rows; usually seven scales on top of the snout between the rostral and frontal; 2-3 scales along the lower margin of the hindlimb flap; usually three pre-anal scales; fourth supralabial is usually below the eye; four scales border the nostril; rostral noticeably projecting between the anterior pair of supranasals; usually less than six infralabials and three hindlimb scales; 11-14 scales along a line across the top of the head which joins the angle of the mouth on each side; ventrals paired and noticeably wider than adjacent scales; conspicuous but pale dorsal cross-bands are present on the head and nape; the pale bands on the head and neck are straight in outline and there are no additional pale bands on the side of the head between the pale dorsal bands, these all being bounded by thick black sections. Thickest pale band at the rear of the head. Snout is moderate and rounded (*W. shanekingi sp. nov.* and *W. borea*), or:

B/ Anterior nasals in contact, or fewer than 20 mid-body rows, and smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; two broad dark transverse bands, sometimes faded in adults that are posterior to the parietal scales or to any dark transverse band fully or partly enclosing the parietal scales; seven scales on top of the snout between the rostral and frontal; fourth supralabial below the eye; three pre-anal scales (*W. elegans* and *W. robwatsoni sp. nov.*).

C/ Smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; nasal and first supralabials are therefore very distinct; two dark transverse bands posterior to the parietal scales or to any dark transverse band fully or partly enclosing the parietal scales; 14 midbody scale rows (rarely 12 or 16); five scales on top of the snout between the rostral and frontal; 10-13 scales along a line across the top of the head which joins the angle of the mouth on each side; ventrals paired and noticeably wider than adjacent scales; colouration is a uniform grey or greyish brown above and immaculate white below (*W. richardwarneri sp. nov.*, *W. tincta*, *W. kylienaughtonae sp. nov.*, *W. michaelguiheneufi sp. nov.*), or:

D/ Third supralabial is usually below the eye and there is an absence of dark pigmentation from the throat and venter; there are usually three pre-anal scales and a lateral lip pattern and

dorsal head bands may be present or absent; 18 or less midbody rows; usually seven scales on top of the snout between the rostral and frontal; smooth dorsal scales; no pale stripes on the body or tail; nasal and first supralabial are not fused anterior to the nostril; one or no broad dark transverse bands, sometimes faded in adults that are posterior to the parietal scales or to any dark transverse band fully or partly enclosing the parietal scales; (*W. pax*, *W. desmosa*, *W. tealei*).

Conversely, the nominate subtribe *Sloppopina* *Subtribe nov.* is separated from the other subtribe *Crottyopina* *subtribe nov.* by the possession of one or other of the following two suites of characters:

Suite 1/ Smooth glossy scales; 16-18 midbody rows; a moderate and rounded snout; seven scales on the upper snout between the rostral and frontal; nasal and first supralabial are distinct; four scales border the nostril; the fourth supralabial sits beneath the eye; there are 16 scales along a line across the top of the head at the angle of the mouth on each side; ventral scales are paired and noticeably wider than the adjacent body scales; there are three scales along the lower margin of the hindlimb flap; typically three enlarged pre-anal scales; rich red-brown or grey above; immaculate cream below; the top of the head is uniform brown but the lips, side of the head and neck are characterised by having a series of alternating cream and yellow-brown vertically aligned bars; the throat and ventral surfaces are an immaculate cream in colour (*Sloppopus gen. nov.*), or:

Suite 2/ The anterior nasal scales are separated by the rostral (as opposed to being in contact), 20 mid-body scale rows (as opposed to less than 20), striated or keeled dorsal scales (as opposed to smooth) (*Aclys*, Kluge, 1974).

Australasian Pygopodids are separated from all other lizards in the region by the following suite of characters: No obvious or normal limbs although many may have a scaly flap or "fin" on either side of the anal region. Ventral scales are in two longitudinal rows which are usually noticeably larger than the adjoining body scales on the lower flanks (adapted from Cogger 2014).

Distribution: Most parts of mainland Australia except for the very coldest parts. Apparently absent from Tasmania and New Guinea.

Content: *Crottyopus gen. nov.*; *Delma* Gray, 1831; *Pseudodelma* Fischer, 1882.; *Wellingtonopus gen. nov.*; *Wellsopus gen. nov.*

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NEW TAXONOMY AND NOMENCLATURE OF *DELMA SENSU LATO.*

Delma Gray, 1831

Delma fraseri Gray, 1831 (Type species)

Delma grayii Smith, 1849

Delma petersoni Shea, 1991

Subgenus *Honlamopus* subgen. nov.

Delma (Honlamopus) inornata Kluge, 1974

Aclys Kluge, 1974

Aclys concinna Kluge, 1974

Aclys major Storr, 1987

Pseudodelma Fischer, 1882

Pseudodelma impar Fischer, 1882 (Type species)

Pseudodelma cummingae sp. nov.

Pseudodelma mitella (Shea, 1987)

Pseudodelma mollerii (Lütken, 1863)

Pseudodelma plebeia (De Vis, 1888)

Pseudodelma wollemi (Wells and Wellington, 1985)

Wellingtonopus gen. nov.

Wellingtonopus stevebennetti sp. nov. (Type species)

Wellingtonopus butleri (Storr, 1987)

Wellingtonopus haroldi (Storr, 1987)

Wellingtonopus nasuta (Kluge, 1974)

Wellsopus gen. nov.

Wellsopus shanekingi sp. nov. (Type species)

Wellsopus borea (Kluge, 1974)

Wellsopus brianbarnetti sp. nov.

Wellsopus desmosa (Maryan, Aplin and Adams, 2007)

Wellsopus elegans (Kluge, 1974)

Wellsopus kylienaughtonae sp. nov.

Wellsopus michaelguiheneuf sp. nov.

Wellsopus pax (Kluge, 1974)

Wellsopus richardwarneri sp. nov.

Wellsopus robwatsoni sp. nov.

Wellsopus tealei (Maryan, Aplin and Adams, 2007)

Wellsopus tinctoria (De Vis, 1888)

Crottyopus gen. nov.

Crottyopus jamesbondi sp. nov. (Type species)

Crottyopus australis (Kluge, 1974)

Crottyopus hebesa (Maryan, Brennan, Adams and Aplin, 2015)

Subgenus *Gracileopus* subgen. nov.

Crottyopus torquata (Kluge, 1974)

Sloppopus gen. nov.

Sloppopus labialis (Shea, 1987)

PYGOPODIDAE TRIBES.

Aprasiaini tribe nov.

Subtribes

Aprasiaina Wells, 2007

Ophidiocaphalina subtribe nov.

Pletholaxina subtribe nov.

Pygopusini tribe nov.

Subtribes

Pygopusina subtribe nov.

Paradelmaina subtribe nov.

Lialisini tribe nov.

Sloppopini tribe nov.

Subtribes

Sloppopina subtribe nov.

Crottyopina subtribe nov.

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CONFLICT OF INTEREST

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

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A further breakup of the *Boiga cynodon* (Boie, 1827) species complex (Serpentes: Colubridae).

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Received 2 September 2016, Accepted 10 November 2016, Published 20 July 2017.

ABSTRACT

The Dog Toothed Cat Snake *Boiga cynodon* (Boie, 1827) from south-east Asia, including western Indonesia (the type locality) has long been suspected by herpetologists as comprising a wide-ranging species complex (e.g. Orlov and Ryabov 2002 or Ramadhan *et al.* 2010).

The latter authors formally named the Nusa Tenggara Islands population as the species *B. hoeseli* based on significant and consistent morphological differences.

Inspection of specimens from across the range of the putative species show consistent differences in populations, which combined with geographical isolation of each, makes a firm case for recognition of more than one species.

In accordance with the *International Code of Zoological Nomenclature* (Ride *et al.* 1999), this paper further divides the putative species *B. cynodon* as currently recognized into four species.

The nominate form from Sumatra and Java includes *B. waandersi* (Bleeker, 1860) from Bali treated herein as synonymous to *B. cynodon*.

The other three species formally named for the first time are *B. donagheyae* sp. nov. from Peninsula Malaysia, *B. germainegreerae* sp. nov. from Mindanao Island in the Philippines and *B. mickpitmani* sp. nov. from northern Borneo.

This paper also notes and corrects a typographical error in the original description of the genus *Mulvanyus* to confirm the nomenclatural availability of the name.

Keywords: Taxonomy; snakes; Asia; south-east Asia; Indonesia; Philippines; Malaysia; genus; *Boiga*; *Dorisius*; *Mulvanyus*; *Slopboiga*; species; *cynodon*; *waandersi*; New species; *donagheyae*; *germainegreerae*; *mickpitmani*.

INTRODUCTION

The Dog Toothed Cat Snake *Boiga cynodon* (Boie, 1827) from south-east Asia, including western Indonesia (the type locality) has long been suspected by herpetologists as comprising a wide-ranging species complex (e.g. Orlov and Ryabov 2002 or Ramadhan *et al.* 2010).

While found widely in the south-east Asian realm centred on Sundaland, local populations vary significantly.

Ramadhan *et al.* 2010 commenced the breakup of the species complex by formally naming the Nusa Tenggara Islands population as the species *B. hoeseli*.

The diagnosis of this newly named taxon was based on significant and consistent morphological differences.

The basis of this paper is the result of inspection of specimens from across the range of the putative species.

This showed differences in populations, which combined with geographical isolation of each, makes a firm case for recognition of more than one species. In accordance with the *International Code of Zoological Nomenclature* (Ride *et al.* 1999), this paper further divides the putative species *B. cynodon* as currently recognized into four species.

The nominate form from Sumatra and Java includes *B. waandersi* (Bleeker, 1860) from Bali and is treated herein as synonymous to *B. cynodon*.

The other three species formally named for the first time are *B. donagheyae* sp. nov. from Peninsula Malaysia, *B. germainegreerae* sp. nov. from Mindanao Island in the Philippines and *B. mickpitmani* sp. nov. from northern Borneo.

The formal descriptions of each are below, following a proper

diagnosis of *Boiga* Fitzinger, 1826 as currently understood, which includes the diagnoses for the newly named genera, *Dorisius* Hoser, 2012, *Mulvanyus* Hoser, 2012 and *Sloppoiga* Hoser, 2013.

The original description of *Mulvanyus* Hoser, 2012, contained an obvious typographical error.

The relevant part of the description was written:

"*Mulvanyus* gen. nov. are separated from snakes of the genus *Boiga* and *Mulvanyus* gen. nov. by their greatly enlarged and blunt triangular head (distinctly blunt snout) as well as their unusually large and bulbous eyes (even when compared to other *Boiga* species)."

From the context of the words in the paper, it is clear that the second use of the words "*Mulvanyus* gen. nov." should have been "*Dorisius* gen. nov."

While this is obvious to any reader of the paper, because the corresponding description of "*Dorisius* gen. nov." correctly mirrors this in relevant ways, in view of the nature of claims made by members of the Wüster gang of thieves as they are known, it is prudent that the genus be redescribed herein as new, without the typographical error.

This is to ensure that there is no possible doubt at all, as to the nomenclatural availability of the genus name *Mulvanyus*.

Details of the illegal and dishonest tactics of the Wüster gang, including references to their very creative and improper interpretations of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999) are widespread in the scientific literature and include Hoser (2015a-f) and sources cited therein.

MATERIALS AND METHODS

These are not formally explained in a number of my recent papers under the heading "Materials and methods" or similar, on the basis they are self evident to any vaguely perceptive reader. However, the process by which the following taxonomy and nomenclature in this and other recent papers by myself of similar form (in *Australasian Journal of Herpetology* issues 1-33), has been arrived at, is explained herein for the benefit of people who have recently published so-called "criticisms" online of some of my recent papers. They have alleged a serious "defect" by myself not formally explaining "Materials and Methods" under such a heading.

The process involved in creating the final product for this and other relevant papers has been via a combination of the following:

Genera and component species have been audited to see if their classifications are correct on the basis of known type specimens, locations and the like when compared with known phylogenies and obvious morphological differences between relevant specimens and similar putative species.

Original descriptions and contemporary concepts of the species are matched with available specimens from across the ranges of the species to see if all conform to accepted norms.

These may include those held in museums, private collections, collected in the field, photographed, posted on the internet in various locations or held by individuals, and only when the location data is good and any other relevant and verifiable data is available.

Where specimens do not appear to comply with the described species or genera (and accepted concept of each), this non-conformation is looked at with a view to ascertaining if it is worthy of taxonomic recognition or other relevant considerations on the basis of differences that can be tested for antiquity or deduced from earlier studies.

When this appears to be the case (non-conformation), the potential target taxon is inspected as closely as practicable with a view to comparing with the nominate form or forms if other similar taxa have been previously named.

Other relevant data is also reviewed, including any available molecular studies which may indicate likely divergence of

populations.

Where molecular studies are unavailable for the relevant taxon or group, other studies involving species and groups constrained by the same geographical or geological barriers, or with like distribution patterns are inspected as they give reasonable indications of the likely divergences of the taxa being studied herein.

Additionally other studies involving geological history, sea level and habitat changes associated with long-term climate change, including recent ice age changes in sea levels, versus known sea depths are utilized to predict past movements of species and genus groups in order to further ascertain likely divergences between extant populations (as done in this very paper).

When all available information checks out to show taxonomically distinct populations worthy of recognition, they are then recognized herein according to the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

This means that if a name has been properly proposed in the past, it is used. Alternatively, if no name is available, one is proposed according to the rules of the Code as is done in this paper.

As a matter of trite I mention that if a target taxon or group does check out as being "in order" or properly classified, a paper is usually not published unless some other related taxon is named for the first time.

The published literature relevant to *Boiga cynodon sensu lato* and the taxonomic and nomenclatural judgements made within this paper includes the following: Auliya (2006), Blackburn (1993), Boie (1827), Brown *et al.* (2013), Bulian (2005), Chanard *et al.* (1999, 2015), Cox *et al.* (1998), Das (2012), David and Vogel (1996), Dowling and Jenner (1988), Duméril *et al.* (1854), Ferner *et al.* (2000), Gaulke (1994, 2001, 2011), Grismer (2011), Groen (2008), Grossmann and Tillack (2001), Hien *et al.* (2001), Hoser (2012, 2013), Lenz (2012), Lidth De Jeude (1922), Lim and Ng (1999), Malkmus *et al.* (2002), Manthey and Grossmann (1997), Mattison (2007), Mertens (1930), Onn *et al.* (2009), Orlov and Ryabov (2002), Orlov *et al.* (2014), Pauwels *et al.* (2000, 2005), Ramadhan *et al.* (2010), Rooijen (2009), Sacha (2015), Sanguila *et al.* (2016), Schmidt (2010), Sharma (2004), Siler *et al.* (2011), Smith (1993), Taylor (1965), Teo and Rajathurai (1997), Teynié *et al.* (2010), Tillack *et al.* (2004), Wallach *et al.* (2014) and sources cited therein.

Some material within descriptions below is repeated for different described taxa and this is in accordance with the provisions of the *International Code of Zoological Nomenclature* and the legal requirements for each description. I make no apologies for this.

I also note that, notwithstanding the theft of relevant materials from this author in an illegal armed raid on 17 August 2011, which were not returned in breach of undertakings to the court (Court of Appeal Victoria 2014 and VCAT 2015), I have made a decision to publish this paper.

This is in view of the conservation significance attached to the formal recognition of unnamed taxa at all levels and on the basis that further delays may in fact put these presently unnamed or potentially improperly assigned taxa at greater risk of extinction.

This comment is made noting the extensive increase in human population in south-east Asia and elsewhere and the general environmental destruction across that continent as documented by Hoser (1991), including low density areas without a large permanent human population.

I also note the abysmal environmental record of various National, State and Local governments in the region the past 200 years as detailed by Hoser (1989, 1991, 1993 and 1996).

NOTES ON THE DESCRIPTIONS FOR ANY POTENTIAL REVISORS

Unless mandated by the rules of the *International Code of Zoological Nomenclature*, none of the spellings of the newly proposed names should be altered in any way. Should one or

more newly named taxa be merged by later authors to be treated as a single species or subspecies, the order of priority of retention of names should be the order (page priority) of the descriptions within this text.

SYSTEMATICS

GENUS *BOIGA* FITZINGER, 1826

Type species: *Coluber irregularis* Bechstein, 1802.

Diagnosis: As currently understood *Boiga sensu lato* is a composite group of snakes.

However they are defined as follows:

They are venomous rear fanged generally arboreal "Tree Snakes" or climbing species characterized by a broad head and large often bulbous eyes with a vertically elliptical pupil.

There are solid teeth on both jaws, the prefrontal is in contact with the nasal, the tail is more-or-less cylindrical and pointed, 19-25 mid-body rows, smooth dorsal scales, ventral scales run fully across the belly, the nostrils are usually lateral and the head is covered with large symmetrical shields, undivided anal, divided subcaudals and a loreal on each side of the head.

These snakes are long and thin in build and have a laterally compressed body, the degree of these traits varying on the species.

All are oviparous.

The genus *Dorisious* Hoser, 2012 are separated from all other snakes in the genus *Boiga* by the following suite of characters: While it is a relatively long thin snake with a laterally compressed body, sharp vertebral ridge and enlarged head, the snake is more stout and heavily bodied than most other *Boiga* and so is a heavier animal at a given length. In line with the relatively stout build is a lower ventral count of 209-239 ventrals versus 240 or more for other *Boiga* species (and *Mulvanyus* Hoser, 2012).

In *Dorisious* Hoser, 2012 there are 78-110, subcaudals versus over 112 for *Boiga* species (and *Mulvanyus* Hoser, 2012.).

These snakes are unmistakable by their black body with thin, incomplete yellow bands, being orangeish on juveniles, the head is black, the supralabials are yellow with black etching.

The snake attains a maximum total length of about 2.5 metres.

In line with other *Boiga*, the snakes of this genus retains large eyes, smooth dorsal scales, single anal, all divided subcaudals and has an enlarged vertebral row of scales.

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

The genus *Mulvanyus* Hoser, 2012 (or as defined as new below), are separated from snakes of the genus *Boiga* and *Dorisious* Hoser, 2012 by their greatly enlarged and blunt triangular head (distinctly blunt snout) as well as their unusually large and bulbous eyes (even when compared to other *Boiga* species).

There are 19 smooth dorsal mid-body scale rows, 250-285 ventrals, 114-168 divided subcaudals, and a single anal. The body comes in various colours depending on locality and species.

Most specimens are reddish or brownish with some sort of transverse bands not contacting the ventrals, often with irregularly shaped white ventrolateral blotches occurring along the length of the body and tail, and with a brownish head.

Slopboiga Hoser, 2013 is readily separated from species within the genus *Boiga* Fitzinger, 1826 as defined herein by having a divided anal and a scarcely enlarged vertebral scale series, as well as very short posterior chin shields and numerous small temporals. The monotypic genus is further defined (and separated from all of *Boiga*, *Dorisious* and *Mulvanyus*) by the following suite of characters: Anterior palatine teeth enlarged; diameter of eye equals its distance from anterior border of

nostril; upper preocular extending to upper surface of the head but separated widely from the frontal; scales in 21 mid body rows, median row scarcely enlarged; ventrals 232-245; anal plate divided; subcaudals 142-143 all divided; posterior chin-shields much shorter than the anterior; temporals 4-5, scale-like and irregular.

BOIGA CYNODON (BOIE, 1827)

Holotype: BMNH 1946.1.2.54 at the Museum of Natural History, London, UK.

Originally described as *Dipsas cynodon* Boie, 1827.

Diagnosis: *Boiga cynodon* and all other species in the complex as defined herein (namely *B. cynodon* from Java, Sumatra, Bali and adjacent islands, *B. donagheyae* sp. nov. from most of Peninsula Malaysia, *B. germaineagreerae* sp. nov. from Mindanao Island in the Philippines and *B. mickpitmani* sp. nov. from northern Borneo), are separated from all other *Boiga* species by the following suite of characters: Anterior palatine teeth are strongly enlarged; posterior chin-shields are larger than the anterior; scales in 23 midbody rows; ventrals 248-290; single anal; 114-156 subcaudals; one preocular, extending to the upper surface of the head; rostral is scarcely visible from above.

B. cynodon is separated from the other species in the complex (*B. donagheyae* sp. nov., *B. germaineagreerae* sp. nov. and *B. mickpitmani* sp. nov.) by the following characters: A post-ocular stripe that is obviously wavy or irregular, versus even or nearly even upper and lower lines in the other species.

While colouration varies, *B. cynodon* is characterised by the following configuration: Yellowish or pale reddish brown above, with dark brown or black transverse spots or cross-bars; a dark postocular streak of irregular thickness on each side of the head, yellowish belly that may be uniform in colour or marbled with brown.

B. donagheyae sp. nov. is separated from the other species in the complex by having 270 or more subcaudals, versus 268 or less in all other species. *B. donagheyae* sp. nov. is further separated from the other species by having a significantly widening (posteriorly) dark post-ocular stripe versus either not or only slightly widening in the other species as well as having significant yellow speckling over the fore and mid body.

While colouration varies, *B. donagheyae* sp. nov. is characterised by the following configuration:

Dark brown or black above, with more or less distinct lighter cross-bars; flanks usually with a series of whitish spots on or close to the ventrals; belly black, or yellowish speckled with black; head is brown above, speckled with black; a black postocular streak on each side of the head behind the eye widening significantly near the back of the head and neck; labials have black vertical lines on the sutures.

B. germaineagreerae sp. nov. is readily separated from the other species in the complex by the lower subcaudal count of 132 or less, versus 142 or more in the other species. Colouration is fawn-colour, without spots or markings, or with traces of darker cross-bands. This colouration is also found in specimens of *B. mickpitmani* sp. nov. from northern Borneo, but they are readily separated by their higher subcaudal count.

Both *B. germaineagreerae* sp. nov. and *B. mickpitmani* sp. nov. are separated from the other two species in the complex by the fact that the dark postocular stripe is even on the boundaries and thin to the rear of the head, as opposed to widening slightly or significantly in the other species. In both species the stripe also runs anterior to the eye, either distinctly in the form of a dark streak or patch, or sometimes by way of an indistinct darkening.

B. mickpitmani sp. nov. can be the same colouration and general colour configuration as either *B. germaineagreerae* sp. nov. or *B. cynodon*. *B. mickpitmani* sp. nov. is separated from *B. germaineagreerae* sp. nov. by the higher subcaudal count, 142 or more, versus 132 or less in *B. germaineagreerae* sp. nov..

B. mickpitmani sp. nov. is separated from *B. cynodon* by having a thin postocular stripe of even thickness and borders, versus a postocular stripe of variable width in *B. cynodon*.

B. donagheyae sp. nov. is separated from *B. mickpitmani* sp. nov. by having 270 or more subcaudals, versus 268 or less in all other species including *B. mickpitmani* sp. nov.. *B. donagheyae* sp. nov. is further separated from the other species (including *B. mickpitmani* sp. nov.) by having a significantly widening (posteriorly) dark post-ocular stripe versus either not or only slightly widening in the other species as well as having significant yellow speckling over the fore and mid body. Such speckling occurs in *B. mickpitmani* sp. nov. but is not prominent beyond the fore-body and is usually far less than seen in *B. donagheyae* sp. nov..

The two species within *Boiga sensu lato* (or predating Hoser 2012) most commonly confused with these above diagnosed species are *Mulvanyus angulatus* (Peters, 1861), from the Philippines, which while superficially similar and presumably sympatric is characterised by 19 midbody rows.

The similar and closely related *Boiga siamensis* Nutaphand, 1971 is separated by having 25 as opposed to 23 dorsal midbody rows. This taxon appears to be allopatric to the other species.

The closely related species *Boiga hoeseli*, Orlov and Ryabov 2002 from the Nusa Tenggara Islands is separated from these (above described species), by the following characters: Body with indistinct bands and not interspaced with narrow bands, 25-27 midbody rows; 256-272 ventrals, 113-134 subcaudals.

Distribution: Java, Bali, Sumatra and nearby islands.

BOIGA DONAGHEYAE SP. NOV.

Holotype: A preserved female specimen at the Museum of Natural History, London, UK, specimen number: BMNH 1886.12.28.23, collected at Malacca, Peninsula Malaysia. It has 270 ventrals and 156 subcaudals.

The Museum of Natural History, London, UK is a facility that allows access to its holdings.

Diagnosis: *Boiga cynodon* and all other species in the complex as defined herein (namely *B. cynodon* from Java, Sumatra, Bali and adjacent islands, *B. donagheyae* sp. nov. from most of Peninsula Malaysia, *B. germaineagreerae* sp. nov. from Mindanao Island in the Philippines and *B. mickpitmani* sp. nov. from northern Borneo), are separated from all other *Boiga* species by the following suite of characters: Anterior palatine teeth are strongly enlarged; posterior chin-shields are larger than the anterior; scales in 23 midbody rows; ventrals 248-290; single anal; 114-156 subcaudals; one preocular, extending to the upper surface of the head; rostral is scarcely visible from above.

B. cynodon is separated from the other species in the complex by the following characters: A post-ocular stripe that is obviously wavy or irregular, versus even or nearly even upper and lower lines in the other species.

While colouration varies, *B. cynodon* is characterised by the following configuration: Yellowish or pale reddish brown above, with dark brown or black transverse spots or cross-bars; a dark postocular streak of irregular thickness on each side of the head, yellowish belly that may be uniform in colour or marbled with brown.

B. donagheyae sp. nov. is separated from the other species in the complex by having 270 or more subcaudals, versus 268 or less in all other species. *B. donagheyae* sp. nov. is further separated from the other species by having a significantly widening (posteriorly) dark post-ocular stripe versus either not or only slightly widening in the other species as well as having significant yellow speckling over the fore and mid body.

While colouration varies, *B. donagheyae* sp. nov. is characterised by the following configuration:

Dark brown or black above, with more or less distinct lighter cross-bars; flanks usually with a series of whitish spots on or

close to the ventrals; belly black, or yellowish speckled with black; head is brown above, speckled with black; a black postocular streak on each side of the head behind the eye widening significantly near the back of the head and neck; labials have black vertical lines on the sutures.

B. germaineagreerae sp. nov. is readily separated from the other species by the lower subcaudal count of 132 or less, versus 142 or more in the other species. Colouration is fawn-colour, without spots or markings, or with traces of darker cross-bands. This colouration is also found in specimens of *B. mickpitmani* sp. nov. from northern Borneo, but they are readily separated by their higher subcaudal count.

Both *B. germaineagreerae* sp. nov. and *B. mickpitmani* sp. nov. are separated from the other two species by the fact that the dark postocular stripe is even on the boundaries and thin to the rear of the head, as opposed to widening slightly or significantly in the other species. In both species the stripe also runs anterior to the eye, either distinctly in the form of a dark streak or patch, or sometimes by way of an indistinct darkening.

B. mickpitmani sp. nov. can be the same colouration and general colour configuration as either *B. germaineagreerae* sp. nov. or *B. cynodon*. *B. mickpitmani* sp. nov. is separated from *B. germaineagreerae* sp. nov. by the higher subcaudal count, 142 or more, versus 132 or less in *B. germaineagreerae* sp. nov..

B. mickpitmani sp. nov. is separated from *B. cynodon* by having a thin postocular stripe of even thickness and borders, versus a postocular stripe of variable width in *B. cynodon* (or significantly wider posteriorly in *B. donagheyae* sp. nov.).

B. donagheyae sp. nov. is separated from *B. mickpitmani* sp. nov. by having 270 or more subcaudals, versus 268 or less in all other species including *B. mickpitmani* sp. nov.. *B. donagheyae* sp. nov. is further separated from the other species (including *B. mickpitmani* sp. nov.) by having a significantly widening (posteriorly) dark post-ocular stripe versus either not or only slightly widening in the other species as well as having significant yellow speckling over the fore and mid body. Such speckling occurs in *B. mickpitmani* sp. nov. but is not prominent beyond the fore-body and is usually far less than seen in *B. donagheyae* sp. nov..

The two species within *Boiga sensu lato* (or predating Hoser 2012) most commonly confused with these above diagnosed species are *Mulvanyus angulatus* (Peters, 1861), from the Philippines, which while superficially similar and presumably sympatric is characterised by 19 midbody rows.

The similar and closely related *Boiga siamensis* Nutaphand, 1971 is separated by having 25 as opposed to 23 dorsal midbody rows. This taxon appears to be allopatric to the other species.

The closely related species *Boiga hoeseli*, Orlov and Ryabov 2002 from the Nusa Tenggara Islands is separated from these (above described species), by the following characters: Body with indistinct bands and not interspaced with narrow bands, 25-27 midbody rows; 256-272 ventrals, 113-134 subcaudals.

Distribution: Known from the region of Malacca, Peninsula Malaysia. It is presumably found in regions north of here to southern Thailand.

Etymology: Named in honour of Kathleen Donaghey a journalist with News Corporation (*Courier Mail*) in recognition to her skills as a journalist in having the courage to report on the eco-terrorist Teri Irwin and her evil "Australia Zoo" business. Few other journalists in Australia have the guts to take on the ruthless Irwin business empire to expose its rotten underbelly. This no doubt is a result of the repeated lies and deception by the Irwin business as well as including when necessary the repeated threats made either by Teri Irwin herself, or more often the thugs induced to act unlawfully on her behalf.

Donaghey has published a number of news reports in the period to 2016 detailing numerous acts of animal cruelty and the like at Teri Irwin's Australia Zoo business on the Sunshine Coast, in

Queensland Australia and/or associated business enterprises (e.g. Donaghey 2015a-c, 2016a-b).

The legacy of Steve Irwin and the business that remains after he died in 2006 when illegally tormenting a stingray in 2006 has been an ongoing wildlife conservation disaster for Australia.

Besides the endemic misinformation that emanates from this business monster, the Irwin family business has very efficiently and effectively sucked up resources and money that would otherwise be earmarked for and given to genuine wildlife conservation enterprises.

These wildlife conservationists now find themselves unable to compete with the fundraising business monster of the Irwin "Wildlife Warriors", related business entities and other similarly placed government owned or backed "zoos" that have copied the same business model.

These enterprises are more into self-promotion than any real wildlife conservation efforts.

By way of example, in 2012 the Irwin's Wildlife Warriors business in the USA received \$31,797 from well-meaning American donors and others, all hoping their money would be spent on wildlife conservation.

Instead the entire amount was paid to the Irwin's staff who raised the money and it was self evident that effectively not a single cent of this money made it to genuine wildlife conservation projects. Papers leaked to the media showed that the relevant employee was paid a salary of \$33,954, which conveniently approximated the earnings of the so-called (largely tax exempt) charity (Donaghey 2016a).

Genuine wildlife conservation efforts by others are in effect being usurped and undermined by commercial shams and scams either run by the Irwin business, or alternatively (and even more seriously) by others now copying the Irwin's "successful" business model.

In the Australian space, the main offenders here include the various government-owned zoo businesses, which are now rebranding themselves as wildlife conservation charities (invariably shams rather than the real thing) and like the Irwin business, getting government wildlife departments to regulate their competitors out of existence.

This is done by the improper creation of excessive and targeted red-tape for the purpose of entrapping victims to breach rules, that may not even be properly defined. If and when this tactic fails the alternative is simply organising illegal armed raids on competitors that have become too successful and risk attracting funds away from the government's own or preferred business (Court of Appeal 2014, VCAT 2015).

Of course the other shocking legacy of the late Steve Irwin, is a general belief that it is perfectly reasonable to torment and attack reptiles and other animals to get them to bite and attack. As a direct result of this, dozens of young snake handlers worldwide have died from venomous snakebites after copying Irwin in the hope of becoming "the next Steve Irwin".

The conservation benefit of this is not only zero, but negative, as every time a young person dies from an avoidable snakebite, governments tend to react by putting more improper rules and restrictions on the majority of law-abiding reptile keepers and handlers who do the right things by both reptiles and other people.

As to why so few people from within the Irwin business speak out about the atrocities that happen in front of them, the reason is in fact very simple. Before one is allowed to work for the business, one is forced to sign a court-enforceable "gag order".

The order itself is probably illegal as the forced signing of the document is unconscionable conduct, but in terms of this particular "gag order" this has not yet been tested in a court of law, as so far, those who have signed such documents have justifiably been afraid to take on the Irwin business by acting in breach of the document's demands.

The document itself is also meant to be "confidential", but one very disgruntled ex-employee of the Irwin business managed to pass a scanned copy of her "confidentiality deed" document to a journalist to view and republish if and when they saw fit to do so and I in turn received a copy.

BOIGA GERMAINEGREERAE SP. NOV.

Holotype: A preserved female specimen in the Museum of Natural History, London, UK, specimen number: BMNH 1877.10.9.63 collected from Mindanao, Philippines. It has 268 ventrals and 132 subcaudals. The Museum of Natural History, London, UK is a facility that allows access to its holdings.

Diagnosis: *Boiga germainegreerae sp. nov.* appears to be the most divergent member of the *Boiga cynodon* species complex. *B. cynodon* and all other species in the complex as defined herein (namely *B. cynodon* from Java, Sumatra, Bali and adjacent islands, *B. donagheyae sp. nov.* from most of Peninsula Malaysia, *B. germainegreerae sp. nov.* from Mindanao Island in the Philippines and *B. mickpitmani sp. nov.* from northern Borneo), are separated from all other *Boiga* species by the following suite of characters: Anterior palatine teeth are strongly enlarged; posterior chin-shields are larger than the anterior; scales in 23 midbody rows; ventrals 248-290; single anal; 114-156 subcaudals; one preocular, extending to the upper surface of the head; rostral is scarcely visible from above.

B. cynodon is separated from the other species in the complex by the following characters: A post-ocular stripe that is obviously wavy or irregular, versus even or nearly even upper and lower lines in the other species.

While colouration varies, *B. cynodon* is characterised by the following configuration: Yellowish or pale reddish brown above, with dark brown or black transverse spots or cross-bars; a dark postocular streak of irregular thickness on each side of the head, yellowish belly that may be uniform in colour or marbled with brown.

B. donagheyae sp. nov. is separated from the other species in the complex by having 270 or more subcaudals, versus 268 or less in all other species. *B. donagheyae sp. nov.* is further separated from the other species by having a significantly widening (posteriorly) dark post-ocular stripe versus either not or only slightly widening in the other species as well as having significant yellow speckling over the fore and mid body.

While colouration varies, *B. donagheyae sp. nov.* is characterised by the following configuration:

Dark brown or black above, with more or less distinct lighter cross-bars; flanks usually with a series of whitish spots on or close to the ventrals; belly black, or yellowish speckled with black; head is brown above, speckled with black; a black postocular streak on each side of the head behind the eye widening significantly near the back of the head and neck; labials have black vertical lines on the sutures.

B. germainegreerae sp. nov. is readily separated from the other species in the complex by the lower subcaudal count of 132 or less, versus 142 or more in the other species. Colouration is fawn-colour, without spots or markings, or with traces of darker cross-bands. This colouration is also found in specimens of *B. mickpitmani sp. nov.* from northern Borneo, but they are readily separated by their higher subcaudal count.

Both *B. germainegreerae sp. nov.* and *B. mickpitmani sp. nov.* are separated from the other two species by the fact that the dark postocular stripe is even on the boundaries and thin to the rear of the head, as opposed to widening slightly or significantly in the other species. In both species the stripe also runs anterior to the eye, either distinctly in the form of a dark streak or patch, or sometimes by way of an indistinct darkening.

B. mickpitmani sp. nov. can be the same colouration and general colour configuration as either *B. germainegreerae sp. nov.* or *B. cynodon*. *B. mickpitmani sp. nov.* is separated from *B. germainegreerae sp. nov.* by the higher subcaudal count, 142 or more, versus 132 or less in *B. germainegreerae sp. nov.*

B. mickpitmani sp. nov. is separated from *B. cynodon* by having a thin postocular stripe of even thickness and borders, versus a postocular stripe of variable width in *B. cynodon* (or significantly wider posteriorly in *B. donagheyae* sp. nov.).

B. donagheyae sp. nov. is separated from *B. mickpitmani* sp. nov. by having 270 or more subcaudals, versus 268 or less in all other species including *B. mickpitmani* sp. nov. *B. donagheyae* sp. nov. is further separated from the other species (including *B. mickpitmani* sp. nov.) by having a significantly widening (posteriorly) dark post-ocular stripe versus either not or only slightly widening in the other species as well as having significant yellow speckling over the fore and mid body. Such speckling occurs in *B. mickpitmani* sp. nov. but is not prominent beyond the fore-body and is usually far less than seen in *B. donagheyae* sp. nov.

The two species within *Boiga sensu lato* (or predating Hoser 2012) most commonly confused with these above diagnosed species are *Mulvanyus angulatus* (Peters, 1861), from the Philippines, which while superficially similar and presumably sympatric is characterised by 19 midbody rows.

The similar and closely related *Boiga siamensis* Nutaphand, 1971 is separated by having 25 as opposed to 23 dorsal midbody rows. This taxon appears to be allopatric to the other species.

The closely related species *Boiga hoesei*, Orlov and Ryabov 2002 from the Nusa Tenggara Islands is separated from these (above described species), by the following characters: Body with indistinct bands and not interspaced with narrow bands, 25-27 midbody rows; 256-272 ventrals, 113-134 subcaudals.

Distribution: Known from Mindanao Island in the Philippines, but presumably also found on most of the major islands in the archipelago.

Etymology: Named in honour of Germaine Greer (born 29 January 1939). She is best known as an Australian-born writer, regarded as one of the major voices of the second-wave feminist movement in the latter half of the 20th century. As of 2016 she lives in the United Kingdom, where she has held academic positions, specializing in English literature, at the University of Warwick and Newnham College, Cambridge. She is also an avid wildlife conservationist.

At the time of the death of police-protected criminal and animal tormentor Steve Irwin in 2006, she took on the financial might of the Irwin family business by correctly blaming Irwin for his own death via a media column (Greer 2006).

For this action, she copped hatred and abuse from the Irwin business and those trolls acting on their behalf on social media via a massive number of questionable accounts.

Her comments at the time, written in a blog, were among the few true comments the tabloid media printed at the time (Greer 2006).

Elsewhere the friends of the politically well-connected Steve Irwin in the media and elsewhere eulogised about the apparent freak death of Steve Irwin, whom they recklessly mislabelled a wildlife conservationist.

This lie has been built on by Teri Irwin, Irwin's father, Bob Irwin and the Australia Zoo business in the decade since his death, even though most of what Steve Irwin did was anti-conservation in every sense of the word.

Correctly in her blog in 2006, Greer wrote:

"As a Melbourne boy, Irwin should have had a healthy respect for stingrays, which are actually commoner, and bigger, in southern waters than they are near Port Douglas, where he was killed. The film-makers maintain that the ray that took Irwin out was a "bull ray", or *Dasyatis brevicaudata*, but this is not usually found as far north as Port Douglas. Marine biologist Dr Meredith Peach has been quoted as saying, "It's really quite unusual for divers to be stung unless they are grappling with the animal and, knowing Steve Irwin, perhaps that may have been the case." Not

much sympathy there then ...

There was not an animal he (Steve Irwin) was not prepared to manhandle. Every creature he brandished at the camera was in distress. Every snake badgered by Irwin was at a huge disadvantage, with only a single possible reaction to its terrifying situation, which was to strike. Easy enough to avoid, if you know what's coming. Even my cat knew that much. Those of us who live with snakes, as I do with no fewer than 12 front-fanged venomous snake species in my bit of Queensland rainforest, know that they will get out of our way if we leave them a choice. Some snakes are described as aggressive, but, if you're a snake, unprovoked aggression doesn't make sense. Snakes on a plane only want to get off. But Irwin was an entertainer, a 21st-century version of a lion-tamer, with crocodiles instead of lions.

...

The animal world has finally taken its revenge on Irwin, but probably not before a whole generation of kids in shorts seven sizes too small has learned to shout in the ears of animals with hearing 10 times more acute than theirs, determined to become millionaire animal-loving zoo-owners in their turn."

Greer has in her 2006 editorial that corrected the historical record on the evil monster Steve Irwin made a significant contribution to wildlife conservation globally.

In the context of Australia, she had the courage to speak out against the Irwin business monster at a time when everyone else in the wildlife space was too scared and intimidated to speak out.

This was due to a very real fear that the Irwins may get mates in the Australian government to do a potentially illegal armed raid on them, fabricate criminal charges or the like, all which had become a hallmark of the way that Steve Irwin and his business did things.

BOIGA MICKPITMANI SP. NOV.

Holotype: A preserved specimen in the Museum of Natural History, London, UK, specimen number: BMNH 1887.2.7.20 collected from Sarawak, Borneo. It has 261 ventrals and 143 subcaudals. The Museum of Natural History, London, UK is a facility that allows access to its holdings.

Diagnosis: *Boiga cynodon* and all other species in the complex as defined herein (namely *B. cynodon* from Java, Sumatra, Bali and adjacent islands, *B. donagheyae* sp. nov. from most of Peninsula Malaysia, *B. germainegreerae* sp. nov. from Mindanao Island in the Philippines and *B. mickpitmani* sp. nov. from northern Borneo), are separated from all other *Boiga* species by the following suite of characters: Anterior palatine teeth are strongly enlarged; posterior chin-shields are larger than the anterior; scales in 23 midbody rows; ventrals 248-290; single anal; 114-156 subcaudals; one preocular, extending to the upper surface of the head; rostral is scarcely visible from above.

B. cynodon is separated from the other species in the complex by the following characters: A post-ocular stripe that is obviously wavy or irregular, versus even or nearly even upper and lower lines in the other species.

While colouration varies, *B. cynodon* is characterised by the following configuration: Yellowish or pale reddish brown above, with dark brown or black transverse spots or cross-bars; a dark postocular streak of irregular thickness on each side of the head, yellowish belly that may be uniform in colour or marbled with brown.

B. donagheyae sp. nov. is separated from the other species by having 270 or more subcaudals, versus 268 or less in all other species. *B. donagheyae* sp. nov. is further separated from the other species by having a significantly widening (posteriorly) dark post-ocular stripe versus either not or only slightly widening in the other species as well as having significant yellow speckling over the fore and mid body.

While colouration varies, *B. donagheyae* sp. nov. is characterised by the following configuration:

Dark brown or black above, with more or less distinct lighter cross-bars; flanks usually with a series of whitish spots on or close to the ventrals; belly black, or yellowish speckled with black; head is brown above, speckled with black; a black postocular streak on each side of the head behind the eye widening significantly near the back of the head and neck; labials have black vertical lines on the sutures.

B. germaineagreerae sp. nov. is readily separated from the other species by the lower subcaudal count of 132 or less, versus 142 or more in the other species. Colouration is fawn-colour, without spots or markings, or with traces of darker cross-bands. This colouration is also found in specimens of *B. mickpitmani* sp. nov. from northern Borneo, but they are readily separated by their higher subcaudal count.

Both *B. germaineagreerae* sp. nov. and *B. mickpitmani* sp. nov. are separated from the other two species by the fact that the dark postocular stripe is even on the boundaries and thin to the rear of the head, as opposed to widening slightly or significantly in the other species. In both species the stripe also runs anterior to the eye, either distinctly in the form of a dark streak or patch, or sometimes by way of an indistinct darkening.

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Distribution: Northern Borneo in or near hillier regions.

Etymology: Named in honour of Australia's original "Crocodile Hunter" Mick Pitman, after whom the hit movie "Crocodile Dundee" was modelled. Pitman's successful crocodile conservation business based in Queensland was effectively destroyed by a business rival named Steve Irwin.

A police-protected criminal and shrewd businessman, Steve Irwin cultivated a close relationship with corrupt government officials who acted as his paid thugs to repeatedly engage in illegal armed raids of Pitman's home and business in order to shut him down.

Irwin also effectively stole his (at the time unregistered) common-law trademark by quietly applying for registration of it (in two classes) on 2 September 1998, via IP Australia through a

family connected business. After obtaining registration for the trademarks (unopposed), Irwin then took action to stop Pitman using the name for himself.

Once Pitman was prohibited from trading as "the Crocodile Hunter", the result being that business was instead channelled to the Irwin enterprise and in the face of non-stop illegal armed raids (including more than 26 in two years) at Steve Irwin's instigation, Pitman had to completely shut down his enterprise and move to the Northern Territory, in effect as a fugitive.

While Irwin ended up making many millions of dollars through government hands-outs to his family business in cash or in kind and became famous globally for his on-TV acts of extreme animal cruelty and abuse, Pitman was forced to languish in poverty and obscurity.

Other dedicated wildlife conservationists who had their businesses shut down following illegal armed raids instigated by Steve Irwin included Robert (Bob) Buckley of Herberton in Queensland and Bob Withey of Niagra Park, New South Wales (see Hoser, 1996 for details).

Employees and former employees of the Australia Zoo business who were disgusted with the animal cruelty and other potentially illegal practices at the Australia Zoo did not speak out publicly and for good reason.

Based on the well-known case of Mick Pitman, there was a very real fear of serious reprisals for anyone who dared to speak out.

Securing the silence of all employees and former employees was a contract signed by all employees demanding silence on such matters. This "Confidentiality Deed" demanded of all potential employees, contractors and the like to be signed before they commenced with the zoo meant that they were effectively prohibited from speaking out publicly about anything at any time (Nolan 2008).

Besides the knowledge of the very real likelihood of police raids or charges should they speak out, this "Confidentiality Deed" guaranteed a lifetime of financial ruin for anyone who transgressed.

Significantly and not widely known, is that such a "Confidentiality Deed" as also demanded by most government owned zoos in Australia, are themselves highly illegal, as the demanding of them to be signed is what is called "unconscionable conduct". "Unconscionable conduct" is where a big business or government authority demands a manifestly unfair agreement or contract of a weaker party, including in the context of an offer of paid employment.

Karma kicked in for Steve Irwin on 4 September 2006, when after illegally mistreating and abusing a stingray, Irwin was killed by its tail barb that penetrated his chest (Greer 2006).

Following his death, Irwin's family attempted to re-write history by alleging Steve Irwin had been a tireless wildlife conservation icon. In fact nothing could have been further from the truth!

By diverting well meaning people's donations from other wildlife charities to his own business enterprise, Irwin directly contributed to the declines of and potential extinctions of many animal species.

The so-called conservation charities of the Irwin business were more into self-promotion than any real wildlife conservation efforts.

By way of example, in 2012 the Irwin's Wildlife Warriors business in the USA received \$31,797 from well-meaning American and other donors.

No doubt the donors all hoped their money would be spent on wildlife conservation.

Instead the entire amount was paid to the Irwin's staff who raised the money and it was self evident that effectively not a single cent of this money made it to genuine wildlife conservation projects. Papers leaked to the media showed that the relevant employee was paid a salary of \$33,954, which conveniently approximated the earnings of the so-called (largely

CONFIDENTIALITY DEED



Home of The

Crocodile Hunter V



AUSTRALIA ZOO • Whale Encounters • WILDLIFE

THE PARTIES:

- 1. SILVERBACK STAFF SERVICES PTY LTD or AUSTRALIA ZOO WILDLIFE WARRIORS WORLDWIDE LTD or AUSTRALIA ZOO TRAVEL PTY LTD or AUSTRALIA ZOO ADVENTURE CRUISES PTY LTD

Of Steve Irwin Way WARRIORS
Beerwah, Queensland 45 19 Australia
("Company")

- 2. NAME:

ADDRESS:

POSITION: Employee.

(Employee/volunteer/individual) ("Individual")

The Individual will have disclosed to him/her Confidential Information in the course of their engagement at the Company

IT IS AGREED:

1. In this Deed "Confidential Information" includes but is not limited to all information acquired by the Individual in the course of his/her engagement with the Company including the communications and discussions amongst the Company's staff and personnel and the business affairs of the Company. It is expressly acknowledged that the Individual may witness discussions and otherwise be privy to communications between personnel who manage or work at the Company and principals of the Company and all these conversations and communications are to similarly be treated as "Confidential Information".

- 2. The Individual agrees that he/she shall:

(a) not divulge or disclose to any person (whether directly or indirectly) the "Confidential Information" without the Company's prior written permission;

(b) take all reasonable precautions to prevent disclosure of the "Confidential Information" to third parties;

(c) not make any use whatever of the "Confidential Information";

(d) At the conclusion of any services rendered by the Individual or otherwise on request by the Company immediately deliver to the Company all documents and materials (and all copies) comprising and/or relating to the "Confidential Information".

DULY EXECUTED BY THE PARTIES AS A DEED

on (Date) 20110108

DULY EXECUTED BY

AUSTRALIA ZOO PTY LIMITED or WILDLIFE WARRIORS WORLDWIDE LTD or AUSTRALIA ZOO TRAVEL PTY LTD or AUSTRALIA ZOO ADVENTURE CRUISES in accordance with its Constitution in the presence of:

Witness Signature

BONNIE NOLAN
Witness Name

"Conservation
exciting education"

[Signature]

through

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tax exempt) charity (Donaghey 2016a), thereby allowing the Irwin enterprise to claim a tax loss and claw back more money from the government.

The lizard genus *Pitmansaurus* Hoser, 2014 is also named in honour of Mick Pitman (Hoser, 2014).

MULVANYUS GEN. NOV.

Type species: *Dipsas drapiezii* Boie, 1827.

(Known in most contemporary texts as *Boiga drapiezii*).

Diagnosis: These are a long vine-like snake with strongly laterally compressed body shape, vertebral ridge, large head shields and vertical pupils.

Mulvanyus gen. nov. are separated from snakes of the genus *Boiga* and *Dorsisous* Hoser, 2012 by their greatly enlarged and blunt triangular head (distinctly blunt snout) as well as their unusually large and bulbous eyes (even when compared to other *Boiga* species).

There are 19 smooth dorsal mid-body scale rows, 250-285 ventrals, 114-168 divided subcaudals, and a single anal. The body comes in various colours depending on locality and species.

Most specimens are reddish or brownish with some sort of transverse bands not contacting the ventrals often with irregularly shaped white ventrolateral blotches occurring along the length of the body and tail, and with a brownish head.

Slopboiga Hoser, 2013 has a divided anal as opposed to single in *Mulvanyus gen. nov.*

Distribution: From southern Thailand, south and east through Indonesia through Sumatra, Java and Borneo and possibly islands further east as well as the Philippines.

Etymology: Named in honour of Paul Mulvany of Blackburn, Victoria, Australia. He is the unseen handyman who kept all the Snakebusters cages in tip-top shape and our reptiles in immaculate health over many years.

He deserves recognition for his generally unpaid efforts towards improving the welfare of our captive reptiles used for the invaluable public education of millions of Australians.

CONTENT OF GENUS MULVANYUS GEN. NOV.

Mulvanyus drapiezii (Boie, 1827) (Type species)

Mulvanyus angulata (Peters, 1861)

Mulvanyus philippina (Peters, 1867)

Mulvanyus schultzei (Taylor, 1923)

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CONFLICT OF INTEREST

The author has no known relevant conflicts of interest.

A logical break-up of the genus *Telescopus* Wagler, 1830 (Serpentes: Colubridae) along phylogenetic and morphological lines.

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Received 2 September 2016, Accepted 18 December 2016, Published 20 July 2017.

ABSTRACT

The Catsnake genus *Telescopus* Wagler, 1830 as currently understood includes a diverse assemblage of distantly related and morphologically similar snakes from south-west Asia, southern Europe and north, central and southern Africa.

The various species groups are self-evidently morphologically and regionally distinct and so it is surprising that not all have been formally named in accordance with the *International Code of Zoological Nomenclature* (Ride *et al.* 1999) or earlier codes.

This paper breaks up the genus along logical lines, the result being as follows:

Telescopus Wagler, 1830 (type species: *Coluber obtusus* Reuss, 1834) includes the North African assemblage commonly referred to in the literature as "the *dhara-obtusum* group".

Tarbophis Fleischmann, 1831 (type species: *Tarbophis fallax* Fleischmann, 1831) is treated as a subgenus of *Telescopus* and includes the species with a distribution centred on the Middle-east and nearby parts of southern Europe and south-west Asia.

Ruivenkorporum subgen. nov. is erected to accommodate two divergent species within *Telescopus* with a distribution centred on Pakistan and Iran.

Elfakhariorumserpens gen. nov. is erected to accommodate the very different four described species-level taxa from south-west Africa, and another from sub-Saharan Africa, with *Matsonserpens* subgen. nov. erected to accommodate the sub-Saharan African species *Dipsas variegata* Reinhardt, 1843.

Two species, formerly treated as variants of "*Tarbophis nigriceps* Ahl, 1924" are herein formally named as *Telescopus* (*Tarbophis*) *mannixi* sp. nov. and *Telescopus* (*Tarbophis*) *gocmeni* sp. nov..

Keywords: Taxonomy; nomenclature; snakes; *Telescopus*; Africa; Southern Africa; Middle-East; Catsnake; Colubridae; *Tarbophis*; *semiannulatus*; *variegatus*; *nigriceps*; new genus; *Elfakhariorumserpens*; new subgenus; *Ruivenkorporum*; *Matsonserpens*; new species; *mannixi*; *gocmeni*.

INTRODUCTION

The very distinctive Catsnake genus *Telescopus* Wagler, 1830 as currently understood includes a diverse assemblage of distantly related and morphologically similar snakes from south-west Asia, southern Europe and north, central and southern Africa.

An audit was done on the genus as currently understood with the following general results.

At the species level, it appears that most, but not all extant species have been named, with numerous synonyms for many being available.

Numerous papers have been published over the past two hundred years dealing with the species-level taxonomy in detail and so as of 2017, species level taxonomy of the group is largely resolved.

The various species groups are self-evidently morphologically and regionally distinct and so it is quite surprising that not all have been formally named in accordance with the *International Code of Zoological Nomenclature* (Ride *et al.* 1999) at either genus or subgenus level.

The type species for *Telescopus* Wagler, 1830 is *Coluber*

obtusus Reuss, 1834 and this is clearly the appropriate name for the north African assemblage.

The divergent lineage from Eurasia, with a centre of distribution in the Middle-East has the available name *Tarbophis* Fleischmann, 1831 (type species: *Tarbophis fallax* Fleischmann, 1831).

However the sub-Saharan species, which clearly constitute a different lineage remain unnamed at either the genus or subgenus level.

Noting the deep divergences within these groups it is appropriate that this unnamed sub-Saharan group be afforded recognition at the genus level. This is formally done in this paper.

As the four species from south-west Africa are significantly different from the central African species, it too is afforded genus level recognition, being treated herein as a subgenus within the south-west African group, although I note that this central African taxon may in time be elevated to a full genus.

In terms of the divergent Asian form *Dipsas rhinopoma* Blanford, 1874 from the region of Iran, Afghanistan and Pakistan, it, along with *Tarbophis tessellatus* Wall, 1908 is placed in a subgenus.

The species *Tarbophis nigriceps* Ahl, 1924, now placed in that subgenus, as currently understood has a centre of distribution on the Middle-east, ranging from Israel to Iran. It has been shown by previous authors to consist of a number of morphologically divergent populations.

Distribution records were matched against known landforms and barriers to reveal two separate and very distinct populations, separated by the Euphrates River Valley. There is no doubt that they are separate species and so the southern population is herein named for the first time as a new species.

The northern populations also appear to be split by the Tigris River and tributaries and so the Turkish populations to the east of this basin are also herein described as a new species, separate to *Telescopus (Tarbophis) nigriceps* Ahl, 1924.

Similar splits of related species in the Syrian region have also been found in geckos within the *Hemidactylus turcicus* species complex (Moravec *et al.* 2011).

Endemism of fauna and flora in Anatolia and adjacent ranges is also well known and documented (Davis 1971, Ekim and Güner 1986).

The taxon *Dipsas variegata* Reinhardt, 1843, currently better known as *Telescopus variegatus* (Reinhardt, 1843), is herein treated as being of a single species.

However there is a strong likelihood that more than one species is being included within this wide-ranging putative taxon.

Hence in finality this paper breaks up the genus *Telescopus* as currently recognized on the most logical basis, the result being as follows:

Telescopus Wagler, 1830 (type species: *Coluber obtusus* Reuss, 1834) includes the North African assemblage commonly referred to in the literature as "the *dhara-obtusus* group".

Tarbophis Fleischmann, 1831 (type species: *Tarbophis fallax* Fleischmann, 1831) is treated as a subgenus of *Telescopus* and includes the species with a distribution centred on the Middle-east and nearby parts of southern Europe and south-west Asia. *Ruivenkampungum* subgen. nov. is erected to accommodate the species *Telescopus rhinopoma* (Blanford, 1874) and *Telescopus tessellatus* (Wall, 1908).

Elfakhariorumserpens gen. nov. is erected to accommodate the very different four described species-level taxa from south-west Africa, and that from sub-Saharan Africa, with *Matsonserpens* subgen. nov. erected to accommodate the sub-Saharan African species *Dipsas variegata* Reinhardt, 1843.

Two species until now treated as populations of *Telescopus (Tarbophis) nigriceps* Ahl, 1924 are herein named *Telescopus mannixi* sp. nov. and *T. gocmeni* sp. nov..

MATERIALS AND METHODS

These are not formally explained in a number of my recent papers under the heading "Materials and methods" or similar, on the basis they are self evident to any vaguely perceptive reader. However, the process by which the following taxonomy and nomenclature in this and other recent papers by myself of similar form (in *Australasian Journal of Herpetology* issues 1-33), has been arrived at, is explained herein for the benefit of people who have recently published so-called "criticisms" online of some of my recent papers. They have alleged a serious "defect" by myself not formally explaining "Materials and Methods" under such a heading.

The process involved in creating the final product for this and other relevant papers has been via a combination of the following:

Genera and component species have been audited to see if their classifications are correct on the basis of known type specimens, locations and the like when compared with known phylogenies and obvious morphological differences between relevant specimens and similar putative species.

Original descriptions and contemporary concepts of the species are matched with available specimens from across the ranges of the species to see if all conform to accepted norms.

These as a matter of course include those held in museums, private collections, collected in the field, photographed, posted on the internet in various locations or held by individuals, and only when the location data is good and any other relevant and verifiable data is available.

Where specimens do not appear to comply with the described species or genera (and accepted concept of each), this non-conformation is looked at with a view to ascertaining if it is worthy of taxonomic recognition or other relevant considerations on the basis of differences that can be tested for antiquity or deduced from earlier studies.

When this appears to be the case (non-conformation), the potential target taxon is inspected as closely as practicable with a view to comparing with the nominate form or forms to see if other similar taxa have been previously named.

Other relevant data is also reviewed, including any available molecular studies which may indicate likely divergence of populations.

Where molecular studies are unavailable for the relevant taxon or group, other studies involving species and groups constrained by the same geographical or geological barriers or factors, or with like distribution patterns are inspected as they give reasonable indications of the likely divergences of the taxa being studied herein.

Additionally other studies involving geological history, sea level and habitat changes associated with long-term climate change, including recent ice age changes in sea levels, versus known sea depths are utilized to predict past movements of species and genus groups in order to further ascertain likely divergences between extant populations (as done in this very paper).

When all available information checks out to show taxonomically distinct populations worthy of recognition, they are then recognized herein according to the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

This means that if a name has been properly proposed in the past, it is used as is done in this very paper for the name *Tarbophis* Fleischmann, 1831.

Alternatively, if no name is available, one is proposed according to the rules of the Code as is done in this paper for one genus and one subgenus (and two species).

As a matter of trite I mention that if a target taxon or group does check out as being "in order" or properly classified, a paper is usually not published unless some other related taxon is named for the first time.

The published literature relevant to *Telescopus* Wagler, 1830

sensu lato and the taxonomic judgments herein include: Ahl (1924, 1925), Al-Quran (2009), Amaral (1927), Ananjeva *et al.* (2006), Anderson (1895), Anderson (1963), Arakelyan *et al.* (2011), Arnold (1980), Auerbach (1987), Aylmer (1922), Beard (1987), Baier *et al.* (2009), Baran (1976), Barbour (1922), Barbour and Amaral (1927), Bar and Haimovitch (2012), Bauer *et al.* (1993), Bauer and Branch (2003), Berger-Dell'mour (1986), Beshkov and Nanev (2006), Beyhaghi (2016), Bischoff (2002), Blanford (1874), Boettger (1877, 1880), Böhme (1977, 2010), Böhme *et al.* (1989), Boulenger (1888, 1895a, 1895b, 1896, 1913), Branch (1987, 1993), Broadley (1959, 1962, 1994), Broadley and Blaylock (2013), Broadley and Cotterill (2004), Broadley and Howell (1991), Broadley *et al.* (2003), Broggi (2014), Buchert and Buchert (2011), Cattaneo (1990), Chabanaud (1916), Chirio and Ineich (2006), Chirio and Lebreton (2007), Corkill and Cochrane (1966), Cox *et al.* (2012), Crochet *et al.* (2008), Das and Naresh (1998), Davis (1971), Disi (1993), Disi *et al.* (2001, 2017), Domergue (1955, 1959), Duméril *et al.* (1854), Egan (2007), Ehrlich and Trapp (2010), Ekim and Güner (1986), Engelmann *et al.* (1983), Esterbauer (1985a, 1985b), Fleischmann (1831), Forskål (1775), Frör and Beutler (1978), Gardner *et al.* (2009), Geniez (2015), Geniez *et al.* (2004), Göçmen *et al.* (2007, 2009), Goldberg (2015), Grillitsch and Grillitsch (2002), Grossmann (2012, 2013), Gruber (1974), Gruber and Fuchs (1977), Günther (1888), Haacke (2013), Haagner *et al.* (2000), Haas and Battersby (1959), Herrmann and Branch (2013), Hoser (2012, 2013), Hraoui-Bloquet *et al.* (2002), Hughes (2013), Ilgaz *et al.* (2007), Jongbloed (2000), Kasapidis *et al.* (1996), Kirchner (2009), Kucharzewski (2015), Kumlatius *et al.* (2004), Kwet (2010), Kwet and Trapp (2014), Kyriazi *et al.* (2013), Lanza (1990), Lagen and Spawls (2010), Lagen and Rasmussen (1993), Leviton *et al.* (1992), Loveridge (1929, 1956), Marias (2004), Martens (1993), Marx (1968), Mattison (1995, 2007), Mazuch (2013), Menzies (1966), Meyer (1985), Moravec *et al.* (2011), Nicolay (1987), Nilson and Padial (2006), Parker (1949), Pichler (2014), Pietersen *et al.* (2013), Pitman (1974), Pyron *et al.* (2013), Rasmussen and Hughes (1996), Reinhardt (1843), Reuss (1834), Ride *et al.* (1999), Robertson *et al.* (1963), Schleich *et al.* (1996), Schlüter (2006, 2009), Schmid (2015), Schmidt (1939), Schmidt and Gruschwitz (2004), Schmidt and Marx (1950), Schneider (1983), Schweiger (2012), Scortecci (1935), Sehnal and Schuster (1999), Sindaco *et al.* (2000, 2006, 2013, 2014), Smith (1849), Smith (1943), Sochurek (1979), Sowig (1985), Spawls *et al.* (2002), Sternfeld (2010), Steward (1971), Tóth *et al.* (2002), Trape and Mané (2002, 2006, 2015), Trapp (2007), Trutnau (1975), Uhrin *et al.* (2016), Ullenbruch *et al.* (2010), van der Kooij (2001), Veith (1991), Venchi and Sindaco (2006), Wagler (1830), Wall (1908, 1913), Wallach *et al.* (2014), Warnecke (1988), Werner (1897, 1909, 1917, 1919, 1936), Werner (1983, 1988), Wettstein (1952), Zinner (1977) and sources cited therein.

Some material within descriptions below may be repeated for different described taxa and this is in accordance with the provisions of the *International Code of Zoological Nomenclature* and the legal requirements for each description. I make no apologies for this.

I also note that, notwithstanding the theft of relevant materials from this author in an illegal armed raid on 17 August 2011, which were not returned in breach of undertakings to the court (Court of Appeal Victoria 2014 and VCAT 2015), I have made a decision to publish this paper.

This is in view of the conservation significance attached to the formal recognition of unnamed taxa at all levels and on the basis that further delays may in fact put these presently unnamed or potentially improperly assigned taxa at greater risk of extinction.

This comment is made noting the extensive increase in human population in Africa, the Middle-east, south-west Asia and southern Europe and the general environmental destruction across these and/or other areas as documented by Hoser

(1991), including low density areas without a large permanent human population.

I also note the abysmal environmental record of various National, State and Local governments in many regions in the past 200 years as detailed by Hoser (1989, 1991, 1993 and 1996).

NOTES ON THE DESCRIPTIONS FOR ANY POTENTIAL REVISORS

Unless mandated by the rules of the *International Code of Zoological Nomenclature*, none of the spellings of the newly proposed names should be altered in any way. Should one or more newly named taxa be merged by later authors to be treated as a single genus-level group, the order of priority of retention of names should be the order (page priority) of the descriptions within this text.

The genus *Telescopus* Wagler, 1830 and subgenus *Tarbophis* Fleischmann, 1831 are also both redefined below so that herpetologists can be well aware of the differences between the various biological entities.

GENUS TELESCOPUS WAGLER, 1830.

Type species: *Coluber obtusus* Reuss, 1834.

Diagnosis: The genus *Telescopus* Wagler, 1830 are separated from all other Colubrinae snakes by the following suite of characters: 10 to 12 maxillary teeth, the ones anterior being longest, gradually decreasing in size posteriorly and followed, after an interspace by a pair of enlarged, grooved fangs, situated below the posterior border of the eye; the anterior mandibular teeth strongly enlarged. Head is distinct from the neck; eye is moderate in size, with a vertically elliptical pupil. Body is cylindrical or slightly compressed; scales smooth, oblique, with apical pits, in 19 to 23 rows; ventrals rounded. Tail moderate; subcaudals divided into two rows as well as one or more of the following three suites of characters:

1/ Loreal enters or nearly enters the eye, or:

2/ Loreal is separated from the eye by the preocular, 19 or 21 mid-body rows and anal entire, or:

3/ Loreal is separated from the eye by the preocular 21 or 23 mid-body rows and anal divided.

The subgenus *Tarbophis* Fleischmann, 1831 (type species: *Tarbophis fallax* Fleischmann, 1831) is separated from *Telescopus* and *Ruivenkamporum* subgen. nov. by the loreal entering, or nearly entering, the eye, 19 mid-body rows, less than 230 ventrals and 47-59 subcaudals.

The subgenus *Ruivenkamporum* subgen. nov. is separated from both *Telescopus* and *Tarbophis* by the loreal entering, or nearly entering, the eye, having 21 or 23 mid-body rows, more than 230 ventrals and 59-79 subcaudals.

The subgenus *Telescopus* Wagler, 1830 is separated from both *Tarbophis* and *Ruivenkamporum* subgen. nov. by the loreal being separated from the eye by the preocular and one or other of:

A/ Scales in 19 or 21 midbody rows and a single anal plate, or:

B/ Scales in 21 or 23 midbody rows and a divided anal scale.

The genus *Elfakhariumserpens* gen. nov. is essentially similar to *Telescopus* Wagler, 1830 and generally conforms to the diagnosis just given, except for the following details.

Elfakhariumserpens gen. nov. can be separated from *Telescopus* by the following suite of characters: The loreal is separated from the eye by the preocular, always 19 midbody rows and a divided anal scale.

Matsonserpens subgen. nov. is separated from the nominate subgenus *Elfakhariumserpens* subgen. nov. by having two labials entering the eye as opposed to three in all other *Elfakhariumserpens* gen. nov..

Distribution: *Telescopus* occurs in Southern Eurasia, west of the Indian Subcontinent, including the Middle-east and also northern Africa.

Content: *Telescopus obtusus* (Reuss, 1834) (Type species); *T.*

dhara (Forksals, 1775); *T. fallax* (Fleischmann, 1831); *T. gezirae* Broadley, 1994; *T. gocmeni* sp. nov.; *T. hoogstraali* Schmidt and Marx, 1956; *T. mannixi* sp. nov.; *T. nigriceps* (Ahl, 1924); *T. pulcher* (Scortecci, 1935); *T. rhinopoma* (Blanford, 1874); *T. somalicus* (Parker, 1949); *T. tessellatus* (Wall, 1908); *T. tripolitanus* (Werner, 1909).

SUBGENUS *TARBOPHIS* FLEISCHMANN, 1831

Type species: *Tarbophis fallax* Fleischmann, 1831.

Diagnosis: The subgenus *Tarbophis* Fleischmann, 1831 (type species: *Tarbophis fallax* Fleischmann, 1831) is separated from *Telescopus* and *Ruivenkamporumus* subgen. nov. by the loreal entering, or nearly entering, the eye, 19 mid-body rows, less than 230 ventrals and 47-59 subcaudals.

The subgenus *Ruivenkamporumus* subgen. nov. is separated from both *Telescopus* and *Tarbophis* by the loreal entering, or nearly entering, the eye, having 21 or 23 mid-body rows, more than 230 ventrals and 59-79 subcaudals.

The subgenus *Telescopus* Wagler, 1830 is separated from both *Tarbophis* and *Ruivenkamporumus* subgen. nov. by the loreal being separated from the eye by the preocular and one or other of:

A/ Scales in 19 or 21 midbody rows and a single anal plate, or:
B/ Scales in 21 or 23 midbody rows and a divided anal scale.

The genus *Telescopus* Wagler, 1830 are separated from all other Colubrinae snakes by the following suite of characters: 10 to 12 maxillary teeth, the ones anterior being longest, gradually decreasing in size posteriorly and followed, after an interspace by a pair of enlarged, grooved fangs, situated below the posterior border of the eye; the anterior mandibular teeth strongly enlarged. Head is distinct from the neck; eye is moderate in size, with a vertically elliptical pupil. Body is cylindrical or slightly compressed; scales smooth, oblique, with apical pits, in 19 to 23 rows; ventrals rounded. Tail moderate; subcaudals divided into two rows as well as one or more of the following three suites of characters:

1/ Loreal enters or nearly enters the eye, or:
2/ Loreal is separated from the eye by the preocular, 19 or 21 mid-body rows and anal entire, or:
3/ Loreal is separated from the eye by the preocular 21 or 23 mid-body rows and anal divided.

The genus *Elfakharioumserpens* gen. nov. is essentially similar to *Telescopus* Wagler, 1830 and generally conforms to the diagnosis just given, except for the following details.

Elfakharioumserpens gen. nov. can be separated from *Telescopus* by the following suite of characters: The loreal is separated from the eye by the preocular, always 19 midbody rows and a divided anal scale.

Matsonserpens subgen. nov. is separated from the nominate subgenus *Elfakharioumserpens* subgen. nov. by having two labials entering the eye as opposed to three in all other *Elfakharioumserpens* gen. nov..

Distribution: *Tarbophis* occurs in Southern Europe, eastwards to Iran and including the Middle-east.

Content: *Telescopus* (*Tarbophis*) *fallax* Fleischmann, 1831 (Type species); *T. (Tarbophis) gocmeni* sp. nov.; *T. (Tarbophis) hoogstraali* Schmidt and Marx, 1956; *T. (Tarbophis) mannixi* sp. nov.; *T. (Tarbophis) nigriceps* (Ahl, 1924).

SUBGENUS *RUIVENKAMPORUMUS* SUBGEN. NOV.

Type species: *Dipsas rhinopoma* Blanford, 1874.

Diagnosis: The subgenus *Ruivenkamporumus* subgen. nov. is separated from both *Telescopus* and *Tarbophis* by the loreal entering, or nearly entering, the eye, having 21 or 23 mid-body rows, more than 230 ventrals and 59-79 subcaudals.

The subgenus *Tarbophis* Fleischmann, 1831 (type species: *Tarbophis fallax* Fleischmann, 1831) is separated from *Telescopus* and *Ruivenkamporumus* subgen. nov. by the loreal entering, or nearly entering, the eye, 19 mid-body rows, less than 230 ventrals and 47-59 subcaudals.

The subgenus *Telescopus* Wagler, 1830 is separated from both *Tarbophis* and *Ruivenkamporumus* subgen. nov. by the loreal being separated from the eye by the preocular and one or other of:

A/ Scales in 19 or 21 midbody rows and a single anal plate, or:
B/ Scales in 21 or 23 midbody rows and a divided anal scale.

The genus *Telescopus* Wagler, 1830 are separated from all other Colubrinae snakes by the following 10 to 12 maxillary teeth, the ones anterior being longest, gradually decreasing in size posteriorly and followed, after an interspace by a pair of enlarged, grooved fangs, situated below the posterior border of the eye; the anterior mandibular teeth strongly enlarged. Head is distinct from the neck; eye is moderate in size, with a vertically elliptical pupil. Body is cylindrical or slightly compressed; scales smooth, oblique, with apical pits, in 19 to 23 rows; ventrals rounded. Tail moderate; subcaudals divided into two rows as well as one or more of the following three suites of characters:

1/ Loreal enters or nearly enters the eye, or:
2/ Loreal is separated from the eye by the preocular, 19 or 21 mid-body rows and anal entire, or:
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Matsonserpens subgen. nov. is separated from the nominate subgenus *Elfakharioumserpens* subgen. nov. by having two labials entering the eye as opposed to three in all other *Elfakharioumserpens* gen. nov..

Distribution: *Ruivenkamporumus* subgen. nov. occurs in the region of Iran, Afghanistan and Pakistan.

Etymology: Named in honour of Nathan and Katrina Ruivenkamp of Warrandyte, Victoria, Australia in recognition of logistical assistances to the Snakebusters, Australia's best reptiles, wildlife displays, associated wildlife conservation and scientific research projects over more than a decade.

Content: *Telescopus* (*Ruivenkamporumus*) *rhinopoma* (Blanford, 1874) (type species); *T. (Ruivenkamporumus) tessellatus* (Wall, 1908).

SUBGENUS *TELESCOPUS* WAGLER, 1830.

Type species: *Coluber obtusus* Reuss, 1834.

Diagnosis: The genus *Telescopus* Wagler, 1830 are separated from all other Colubrinae snakes by the following suite of characters: 10 to 12 maxillary teeth, the ones anterior being longest, gradually decreasing in size posteriorly and followed, after an interspace by a pair of enlarged, grooved fangs, situated below the posterior border of the eye; the anterior mandibular teeth strongly enlarged. Head is distinct from the neck; eye is moderate in size, with a vertically elliptical pupil. Body is cylindrical or slightly compressed; scales smooth, oblique, with apical pits, in 19 to 23 rows; ventrals rounded. Tail moderate; subcaudals divided into two rows as well as one or more of the following three suites of characters:

1/ Loreal enters or nearly enters the eye, or:
2/ Loreal is separated from the eye by the preocular, 19 or 21 mid-body rows and anal entire, or:
3/ Loreal is separated from the eye by the preocular 21 or 23 mid-body rows and anal divided.

The subgenus *Tarbophis* Fleischmann, 1831 (type species: *Tarbophis fallax* Fleischmann, 1831) is separated from *Telescopus* and *Ruivenkamporumus* subgen. nov. by the loreal entering, or nearly entering, the eye, 19 mid-body rows, less than 230 ventrals and 47-59 subcaudals.

The subgenus *Ruivenkamporumus* subgen. nov. is separated

from both *Telescopus* and *Tarbophis* by the loreal entering, or nearly entering, the eye, having 21 or 23 mid-body rows, more than 230 ventrals and 59-79 subcaudals.

The subgenus *Telescopus* Wagler, 1830 is separated from both *Tarbophis* and *Ruivenkamporumus subgen. nov.* by the loreal being separated from the eye by the preocular and one or other of:

A/ Scales in 19 or 21 midbody rows and a single anal plate, or:
B/ Scales in 21 or 23 midbody rows and a divided anal scale.

The genus *Elfakhariormserpens gen. nov.* is essentially similar to *Telescopus* Wagler, 1830 and generally conforms to the diagnosis just given, except for the following details.

Elfakhariormserpens gen. nov. can be separated from *Telescopus* by the following suite of characters: The loreal is separated from the eye by the preocular, always 19 midbody rows and a divided anal scale.

Matsonserpens subgen. nov. is separated from the nominate subgenus *Elfakhariormserpens subgen. nov.* by having two labials entering the eye as opposed to three in all other *Elfakhariormserpens gen. nov.*

Distribution: The subgenus *Telescopus* occurs in the northern half of Africa and the Arabian Peninsula.

Content: *Telescopus obtusus* (Reuss, 1834) (Type species); *T. dhara* (Forksall, 1775); *T. gezirae* Broadley, 1994; *T. pulcher* (Scortecci, 1935); *T. somalicus* (Parker, 1949); *T. tripolitanus* (Werner, 1909).

GENUS ELFAKHARIORMSERPENS GEN. NOV.

Type species: *Telescopus semiannulatus* Smith, 1849.

Diagnosis: The genus *Elfakhariormserpens gen. nov.* is essentially similar to *Telescopus* Wagler, 1830 (as described immediately below) and conforms to that diagnosis, except for the following details. *Elfakhariormserpens gen. nov.* can be separated from *Telescopus* by the following suite of characters: The loreal is separated from the eye by the preocular, always 19 midbody rows and a divided anal scale.

Matsonserpens subgen. nov. is separated from the nominate subgenus *Elfakhariormserpens subgen. nov.* by having two labials entering the eye as opposed to three in all other *Elfakhariormserpens gen. nov.*

The genus *Telescopus* Wagler, 1830 are separated from all other Colubrinae snakes by the following suite of characters: 10 to 12 maxillary teeth, the ones anterior being longest, gradually decreasing in size posteriorly and followed, after an interspace by a pair of enlarged, grooved fangs, situated below the posterior border of the eye; the anterior mandibular teeth strongly enlarged. Head is distinct from the neck; eye is moderate in size, with a vertically elliptical pupil. Body is cylindrical or slightly compressed; scales smooth, oblique, with apical pits, in 19 to 23 rows; ventrals rounded. Tail moderate; subcaudals divided into two rows as well as one or more of the following three suites of characters:

1/ Loreal enters or nearly enters the eye, or:

2/ Loreal is separated from the eye by the preocular, 19 or 21 mid-body rows and anal entire, or:

3/ Loreal is separated from the eye by the preocular 21 or 23 mid-body rows and anal divided.

The subgenus *Tarbophis* Fleischmann, 1831 (type species: *Tarbophis fallax* Fleischmann, 1831) is separated from *Telescopus* and *Ruivenkamporumus subgen. nov.* by the loreal entering, or nearly entering, the eye, 19 mid-body rows, less than 230 ventrals and 47-59 subcaudals.

The subgenus *Ruivenkamporumus subgen. nov.* is separated from both *Telescopus* and *Tarbophis* by the loreal entering, or nearly entering, the eye, having 21 or 23 mid-body rows, more than 230 ventrals and 59-79 subcaudals.

The subgenus *Telescopus* Wagler, 1830 is separated from both *Tarbophis* and *Ruivenkamporumus subgen. nov.* by the loreal being separated from the eye by the preocular and one or other

of:

1/ Scales in 19 or 21 midbody rows and a single anal plate, or:
2/ Scales in 21 or 23 midbody rows and a divided anal scale.

Distribution: Sub-Saharan Africa.

Etymology: Named in honour of Daniel, Akram and Moses El-Fahkri and their wives, all of Northcote, Victoria, Australia in recognition of their services to the taxi industry in Victoria, Australia over some decades as well as their many years of logistical support to the conservation efforts of Snakebusters, Australia's best reptiles, wildlife displays.

Content: *Elfakhariormserpens semiannulatus* (Smith, 1849) (Type species); *E. beetzi* (Barbour, 1922); *E. finkeldeyi* (Haacke, 2013); *E. polystictus* (Mertens, 1954); *E. variegatus* (Reinhardt, 1843).

SUBGENUS MATSONSERPENS SUBGEN. NOV.

Type species: *Dipsas variegata* Reinhardt, 1843.

Diagnosis: The genus *Elfakhariormserpens gen. nov.* is essentially similar to *Telescopus* Wagler, 1830 (as described immediately below) and conforms to that diagnosis, except for the following details.

Elfakhariormserpens gen. nov. can be separated from *Telescopus* by the following suite of characters: The loreal is separated from the eye by the preocular, always 19 midbody rows and a divided anal scale.

Matsonserpens subgen. nov. is separated from the nominate subgenus *Elfakhariormserpens subgen. nov.* by having two labials entering the eye as opposed to three in all other *Elfakhariormserpens gen. nov.*

The genus *Telescopus* Wagler, 1830 are separated from all other Colubrinae snakes by the following suite of characters: 10 to 12 maxillary teeth, the ones anterior being longest, gradually decreasing in size posteriorly and followed, after an interspace by a pair of enlarged, grooved fangs, situated below the posterior border of the eye; the anterior mandibular teeth strongly enlarged. Head is distinct from the neck; eye is moderate in size, with a vertically elliptical pupil. Body is cylindrical or slightly compressed; scales smooth, oblique, with apical pits, in 19 to 23 rows; ventrals rounded. Tail moderate; subcaudals divided into two rows as well as one or more of the following three suites of characters:

1/ Loreal enters or nearly enters the eye, or:

2/ Loreal is separated from the eye by the preocular, 19 or 21 mid-body rows and anal entire, or:

3/ Loreal is separated from the eye by the preocular 21 or 23 mid-body rows and anal divided.

The subgenus *Tarbophis* Fleischmann, 1831 (type species: *Tarbophis fallax* Fleischmann, 1831) is separated from *Telescopus* and *Ruivenkamporumus subgen. nov.* by the loreal entering, or nearly entering, the eye, 19 mid-body rows, less than 230 ventrals and 47-59 subcaudals.

The subgenus *Ruivenkamporumus subgen. nov.* is separated from both *Telescopus* and *Tarbophis* by the loreal entering, or nearly entering, the eye, having 21 or 23 mid-body rows, more than 230 ventrals and 59-79 subcaudals.

The subgenus *Telescopus* Wagler, 1830 is separated from both *Tarbophis* and *Ruivenkamporumus subgen. nov.* by the loreal being separated from the eye by the preocular and one or other of:

1/ Scales in 19 or 21 midbody rows and a single anal plate, or:

2/ Scales in 21 or 23 midbody rows and a divided anal scale.

Distribution: Sub-Saharan West and central Africa.

Etymology: Named in honour of Greg Matson of Harkaway, Victoria, Australia in recognition of his long term logistical support to the conservation efforts of Snakebusters, Australia's best reptiles, wildlife displays.

Content: *Elfakhariormserpens (Matsonserpens) variegatus* (Reinhardt, 1843) (monotypic).

SUBGENUS ELFAKHARIORUMSERPENS GEN. NOV.

Type species: *Telescopus semiannulatus* Smith, 1849.

Diagnosis: The genus *Elfakhariorumserpens* gen. nov. is essentially similar to *Telescopus* Wagler, 1830 (as described immediately below) and conforms to that diagnosis, except for the following details. *Elfakhariorumserpens* gen. nov. can be separated from *Telescopus* by the following suite of characters: The loreal is separated from the eye by the preocular, always 19 midbody rows and a divided anal scale.

Matsonserpens subgen. nov. is separated from the nominate subgenus *Elfakhariorumserpens* subgen. nov. by having two labials entering the eye as opposed to three in all other *Elfakhariorumserpens* gen. nov.

The genus *Telescopus* Wagler, 1830 are separated from all other Colubrinae snakes by the following suite of characters: 10 to 12 maxillary teeth, the ones anterior being longest, gradually decreasing in size posteriorly and followed, after an interspace by a pair of enlarged, grooved fangs, situated below the posterior border of the eye; the anterior mandibular teeth strongly enlarged. Head is distinct from the neck; eye is moderate in size, with a vertically elliptical pupil. Body is cylindrical or slightly compressed; scales smooth, oblique, with apical pits, in 19 to 23 rows; ventrals rounded. Tail moderate; subcaudals divided into two rows as well as one or more of the following three suites of characters:

1/ Loreal enters or nearly enters the eye, or:

2/ Loreal is separated from the eye by the preocular, 19 or 21 mid-body rows and anal entire, or:

3/ Loreal is separated from the eye by the preocular 21 or 23 mid-body rows and anal divided.

The subgenus *Tarbophis* Fleischmann, 1831 (type species: *Tarbophis fallax* Fleischmann, 1831) is separated from *Telescopus* and *Ruivenkamporum* subgen. nov. by the loreal entering, or nearly entering, the eye, 19 mid-body rows, less than 230 ventrals and 47-59 subcaudals.

The subgenus *Ruivenkamporum* subgen. nov. is separated from both *Telescopus* and *Tarbophis* by the loreal entering, or nearly entering, the eye, having 21 or 23 mid-body rows, more than 230 ventrals and 59-79 subcaudals.

The subgenus *Telescopus* Wagler, 1830 is separated from both *Tarbophis* and *Ruivenkamporum* subgen. nov. by the loreal being separated from the eye by the preocular and one or other of:

1/ Scales in 19 or 21 midbody rows and a single anal plate, or:

2/ Scales in 21 or 23 midbody rows and a divided anal scale.

Distribution: Southern Africa.

Etymology: Named in honour of Daniel, Akram and Moses El-Fahkri and their wives, all of Northcote, Victoria, Australia in recognition of their services to the taxi industry in Victoria, Australia over some decades as well as their many years of logistical support to the conservation efforts of Snakebusters, Australia's best reptiles, wildlife displays.

Content: *Elfakhariorumserpens* (*Elfakhariorumserpens*) *semiannulatus* (Smith, 1849) (Type species); *E. (Elfakhariorumserpens) beetzi* (Barbour, 1922); *E. (Elfakhariorumserpens) finkeldeyi* (Haacke, 2013); *E. (Elfakhariorumserpens) polystictus* (Mertens, 1954).

TELESCOPUS (TARBOPHIS) MANNIXI SP. NOV.

Holotype: A preserved specimen in the Field Museum of Natural History at Chicago, Illinois, USA, specimen number: FMNH Amphibians and Reptiles 11367, collected at Ar Rutbah, Iraq.

The female has a coal black belly and black head. The dorsal scale formula is 19-19-15; ventrals 187;

anal divided; subcaudals 55; upper labials nine-nine; lower labials 10-10; oculars one-two; temporals two-two; and total length 380 mm, tail 65 mm. The number of dorsal dark bands is 18 on the body and five on the tail.

The Field Museum of Natural History at Chicago, Illinois, USA allows public access to its holdings.

Diagnosis: *T. mannixi* sp. nov. has until now been treated as a variant of *T. nigriceps* (Ahl, 1924).

T. mannixi sp. nov. can be readily separated from both *T. nigriceps* and *T. gocmeni* sp. nov. by the lower number of cross bands on the body and tail (23 or less, versus 24 or more in *T. nigriceps* and *T. gocmeni* sp. nov.).

T. gocmeni sp. nov. is readily separated from *T. nigriceps* and *T. mannixi* sp. nov. by the ground coloration of the body which is pinkish gray instead of pale brown or pale gray in both other taxa.

T. gocmeni sp. nov. is further separated from the other two species by as a rule having 8/8 supralabials versus 9/9 in the other species.

T. nigriceps, *T. gocmeni* sp. nov. and *T. mannixi* sp. nov. can be distinguished from the similar and sometimes sympatric *T. fallax* Fleischmann, 1831 by the following combination of characters; relatively plump body, most have regular coal black cross bands which fuse with the shiny blackish venter, coal black-blackish gray or pinkish gray head, pinkish gray, pale brown or pale gray ground colour of dorsum, and an almost black and shiny venter dashed with pinkish gray spots and blotches. *T. nigriceps*, *T. gocmeni* sp. nov. and *T. mannixi* sp. nov. are also separated from *T. fallax* by the numbers of temporals, subcaudals, blotches on the dorsum of the body and the numbers of ventrals as detailed by Gocmen *et al.* (2007) (given for the species they defined as *T. nigriceps*).

T. hoogstrali Schmidt and Marx, 1956 is readily separated from *T. nigriceps*, *T. gocmeni* sp. nov., *T. mannixi* sp. nov. and *T. fallax* by the higher number of dorsal cross-bands, being around 40 on the dorsum between the neck and vent.

The five species *Telescopus (Tarbophis) fallax* Fleischmann, 1831 (Type species for the subgenus), *T. (Tarbophis) gocmeni* sp. nov., *T. (Tarbophis) hoogstrali* Schmidt and Marx, 1956; *T. (Tarbophis) mannixi* sp. nov. and *T. (Tarbophis) nigriceps* (Ahl, 1924), forming the subgenus *Tarbophis* Fleischmann, 1831 can be readily separated from *Telescopus* and *Ruivenkamporum* subgen. nov. by the loreal entering, or nearly entering, the eye, 19 mid-body rows, less than 230 ventrals and 47-59 subcaudals.

These snakes are found in the general region of Southern Europe, eastwards to Iran and including the Middle-east.

The subgenus *Ruivenkamporum* subgen. nov. is separated from both *Telescopus* and *Tarbophis* by the loreal entering, or nearly entering, the eye, having 21 or 23 mid-body rows, more than 230 ventrals and 59-79 subcaudals.

The subgenus *Telescopus* Wagler, 1830 is separated from both *Tarbophis* and *Ruivenkamporum* subgen. nov. by the loreal being separated from the eye by the preocular and one or other of:

A/ Scales in 19 or 21 midbody rows and a single anal plate, or:

B/ Scales in 21 or 23 midbody rows and a divided anal scale.

The genus *Telescopus* Wagler, 1830 are separated from all other Colubrinae snakes by the following suite of characters: 10 to 12 maxillary teeth, the ones anterior being longest, gradually decreasing in size posteriorly and followed, after an interspace by a pair of enlarged, grooved fangs, situated below the posterior border of the eye; the anterior mandibular teeth strongly enlarged. Head is distinct from the neck; eye is moderate in size, with a vertically elliptical pupil. Body is cylindrical or slightly compressed; scales smooth, oblique, with apical pits, in 19 to 23 rows; ventrals rounded. Tail moderate; subcaudals divided into two rows as well as one or more of the following three suites of characters:

1/ Loreal enters or nearly enters the eye, or:

2/ Loreal is separated from the eye by the preocular, 19 or 21 mid-body rows and anal entire, or:

3/ Loreal is separated from the eye by the preocular 21 or 23

mid-body rows and anal divided.

The genus *Elfakhariorumserpens* gen. nov. is essentially similar to *Telescopus* Wagler, 1830 and generally conforms to the diagnosis just given, except for the following details.

Elfakhariorumserpens gen. nov. can be separated from *Telescopus* by the following suite of characters: The loreal is separated from the eye by the preocular, always 19 midbody rows and a divided anal scale.

Matsonserpens subgen. nov. is separated from the nominate subgenus *Elfakhariorumserpens* subgen. nov. by having two labials entering the eye as opposed to three in all other *Elfakhariorumserpens* gen. nov..

Distribution: This taxon, *T. mannixi* sp. nov. is found in the elevated (non alluvial) region to the south of the Euphrates River in the Syrian desert and nearby hilly parts of Jordan, Israel and presumably western Lebanon.

Etymology: Named in honour of Daniel Mannix of West Sunshine, Victoria, Australia, owner of the Victorian Dog Training Academy (VDTA) in recognition for his services to animal welfare in Australia through his many years work as a leading dog trainer including through "snake avoidance training" thereby preventing dogs from killing snakes and the common effect of dog being killed by snake that defends itself when attacked and the snake is highly venomous.

Where the training is done, most, if not all local snakes are dangerously venomous to dogs and humans.

TELESCOPUS (TARBOPHIS) GOCMENI SP. NOV.

Holotype: A preserved female specimen at the Zoology Department of the Ege University (ZDEU), Bornova, Izmir-Turkey, specimen number: ZDEU 174/2007 collected at Polateli (Hayberi Mountain, 830 m, 36°50'44"N, 37°06'45"E), Kilis, Turkey, collected on 29 May 2007.

The Zoology Department of the Ege University (ZDEU), Bornova, Izmir-Turkey allows access to its holdings.

Paratype: A preserved male specimen at the Zoology Department of the Ege University (ZDEU), Bornova, Izmir-Turkey, specimen number: ZDEU 130/2007 collected at Akmagara (Tektek Mountain), Sanliurfa Province, Turkey on 28 April 2007.

Diagnosis: *T. gocmeni* sp. nov. like the species *T. mannixi* sp. nov. described above has until now been treated as a variant of *T. nigriceps* (Ahl, 1924).

T. mannixi sp. nov. can be readily separated from both *T. nigriceps* and *T. gocmeni* sp. nov. by the lower number of cross bands on the body and tail (23 or less, versus 24 or more in *T. nigriceps* and *T. gocmeni* sp. nov.).

T. gocmeni sp. nov. is readily separated from both *T. nigriceps* and *T. mannixi* sp. nov. by the ground coloration of the body which is pinkish gray instead of pale brown or pale gray in both other taxa.

T. gocmeni sp. nov. is further separated from the other two species by as a rule having 8/8 supralabials versus 9/9 in the other species.

T. nigriceps, *T. gocmeni* sp. nov. and *T. mannixi* sp. nov. can be distinguished from the similar and sometimes sympatric *T. fallax* Fleischmann, 1831 by the following combination of characters; relatively plump body, most have regular coal black cross bands which fuse with the shiny blackish venter, coal black-blackish gray or pinkish gray head, pinkish gray, pale brown or pale gray ground colour of dorsum, and an almost black and shiny venter dashed with pinkish gray spots and blotches. *T. nigriceps*, *T. gocmeni* sp. nov. and *T. mannixi* sp. nov. are also separated from *T. fallax* by the numbers of temporals, subcaudals, blotches on the dorsum of the body and the numbers of ventrals as detailed by Gocmen *et al.* (2007) (given for the species they defined as *T. nigriceps*) .

T. hoogstrali Schmidt and Marx, 1956 is readily separated from *T. nigriceps*, *T. gocmeni* sp. nov., *T. mannixi* sp. nov. and *T.*

fallax by the higher number of dorsal cross-bands, being around 40 on the dorsum between the neck and vent.

The five species *Telescopus* (*Tarbophis*) *fallax* Fleischmann, 1831 (Type species for the subgenus), *T. (Tarbophis) gocmeni* sp. nov., *T. (Tarbophis) hoogstrali* Schmidt and Marx, 1956; *T. (Tarbophis) mannixi* sp. nov. and *T. (Tarbophis) nigriceps* (Ahl, 1924), forming the subgenus *Tarbophis* Fleischmann, 1831 can be readily separated from *Telescopus* and *Ruivenkamporum* subgen. nov. by the loreal entering, or nearly entering, the eye, 19 mid-body rows, less than 230 ventrals and 47-59 subcaudals. These snakes are found in the general region of Southern Europe, eastwards to Iran and including the Middle-east.

The subgenus *Ruivenkamporum* subgen. nov. is separated from both *Telescopus* and *Tarbophis* by the loreal entering, or nearly entering, the eye, having 21 or 23 mid-body rows, more than 230 ventrals and 59-79 subcaudals.

The subgenus *Telescopus* Wagler, 1830 is separated from both *Tarbophis* and *Ruivenkamporum* subgen. nov. by the loreal being separated from the eye by the preocular and one or other of:

A/ Scales in 19 or 21 midbody rows and a single anal plate, or:
B/ Scales in 21 or 23 midbody rows and a divided anal scale.

The genus *Telescopus* Wagler, 1830 are separated from all other Colubrinae snakes by the following suite of characters: 10 to 12 maxillary teeth, the ones anterior being longest, gradually decreasing in size posteriorly and followed, after an interspace by a pair of enlarged, grooved fangs, situated below the posterior border of the eye; the anterior mandibular teeth strongly enlarged. Head is distinct from the neck; eye is moderate in size, with a vertically elliptical pupil. Body is cylindrical or slightly compressed; scales smooth, oblique, with apical pits, in 19 to 23 rows; ventrals rounded. Tail moderate; subcaudals divided into two rows as well as one or more of the following three suites of characters:

1/ Loreal enters or nearly enters the eye, or:

2/ Loreal is separated from the eye by the preocular, 19 or 21 mid-body rows and anal entire, or:

3/ Loreal is separated from the eye by the preocular 21 or 23 mid-body rows and anal divided.

The genus *Elfakhariorumserpens* gen. nov. is essentially similar to *Telescopus* Wagler, 1830 and generally conforms to the diagnosis just given, except for the following details.

Elfakhariorumserpens gen. nov. can be separated from *Telescopus* by the following suite of characters: The loreal is separated from the eye by the preocular, always 19 midbody rows and a divided anal scale.

Matsonserpens subgen. nov. is separated from the nominate subgenus *Elfakhariorumserpens* subgen. nov. by having two labials entering the eye as opposed to three in all other *Elfakhariorumserpens* gen. nov..

Distribution: Known from the region of South-eastern Anatolia, Turkey, west of the Tigris River drainage and north of the Euphrates River valley and alluvial flats.

Etymology: Named in honour of Bayram Gocmen of Bornova, Izmir-Turkey in recognition of his previous research work on the taxon of snake herein named in his honour.

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CONFLICT OF INTEREST

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

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A new genus-level classification of the Australian Funnel-web Spiders (Hexathelidae: Atracinae).

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Received 25 April 2017, Accepted 21 June 2017, Published 20 July 2017.

ABSTRACT

In 2010, Michael Gray, published a long overdue revision of the Australian Funnel-web Spiders (Hexathelidae: Atracinae), at the time referred to the genera *Atrax* Cambridge, 1877 and *Hadronyche* Koch, 1873.

While erecting a new monotypic genus *Illawarra* Gray, 2010 for a divergent species and placing three species in the genus *Atrax*, Gray placed the other 31 species into *Hadronyche*. In effect he created a very diverse assemblage.

Recognising this diversity, Gray (2010) created so-called "species groups" for similar species. However as the differences between the various species groups are themselves worthy of genus-level division, this paper uses the work of Gray to divide *Hadronyche* into five obvious genera, using two available names and erecting three new names according to the current edition of the *International Code of Zoological Nomenclature*.

A subgroup of four species within *Hadronyche sensu stricto* is also placed in a new subgenus.

Keywords: Taxonomy; nomenclature; spiders; Funnel-web; Australia; Hexathelidae; Atracinae; South Australia; New South Wales; Queensland; Victoria; *Atrax*; *Hadronyche*; *Illawarra*; *Anepsiada*; *Pseudatrax*; new genus; *Swilearanea*; *Shireenaranea*; *Grayaraneaus*; new subgenus; *Wongaraneaus*.

INTRODUCTION

In 2010, Michael Gray, published a long overdue revision of the Australian Funnel-web Spiders (Hexathelidae: Atracinae), at the time referred to the genera *Atrax* Cambridge, 1877 and *Hadronyche* Koch, 1873 by almost all previous authors.

Gray (2010) was the first ever significant overview and revision of the until then taxonomically neglected Funnel-web Spiders. His paper recognized a total of 35 species of which 21 were newly named for the first time. Even this total is regarded as a significant underestimation of the species diversity within the group, including by Gray himself Gray (2010) little work has been done on the group since 2010.

Work by Mark Wong at the ANU as published online (Wong 2014), indicates significant genetic variation within the putative species *Atrax sutherlandi* Gray, 2010 within a very small distance in populations separated by small areas of unsuitable habitat.

This in itself indicates dispersal problems for these spiders and a likelihood of far greater diversity than external convergently evolving morphology may suggest.

While erecting a new genus *Illawarra* Gray, 2010 for a divergent species and placing just three species in the genus *Atrax*, Gray (2010) placed the other 31 species into *Hadronyche* which effect created a very diverse assemblage.

Prior to that, genus-level placement of species had been inconsistent among earlier authors, with most simply assigning

their new species to one or other of *Atrax* or *Hadronyche*.

Gray (2010) in his paper effectively transferred everything out of *Atrax* to *Hadronyche* with the exception of the type species for *Atrax*, namely *A. robustus* Cambridge, 1877, which he in turn divided into three species.

Recognising the diversity of *Hadronyche*, Gray (2010) created so-called "species groups" for similar species. However as the differences between the various species groups are worthy of genus-level division in themselves, this paper uses the work of Gray to divide *Hadronyche* into five obvious genera, using two available names and erecting three new names according to the *International Code of Zoological Nomenclature* (Ride *et al.* 1999)

A subgroup of four species within *Hadronyche* is also placed in a new subgenus.

Gray (2010) also provides a significant bibliography of relevant sources and rather than recite them here, I merely refer readers to Gray (2010) for this list, noting that Gray (2010) has been republished online and is widely available to anyone with an internet connection.

That paper can be found at:

https://australianmuseum.net.au/uploads/journals/19162/1556_complete.pdf

In terms of the genus-level descriptions below, the diagnostic information for each group is also effectively lifted from Gray (2010) and I make no apologies for this.

I find this preferable to remanufacturing the data as “new” to claim some kind of scientific discovery. The basis of this paper is a review of Gray’s work and a finding that at the genus level, he should have split *Hadronyche* and yet failed to do so.

I should also note that I have worked extensively with Funnel web spiders across south-east Australia over the past 50 years and am by no means a novice when it comes to this group. In terms of the genus level descriptions, the following applies.

Unless mandated by the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999) or superseding publications, none of the spellings of the newly proposed names should be altered in any way. The names created herein have also been created with a view to avoiding any potential homonymy with earlier established names across all of zoology. Should one or more newly named taxa (genera) be merged by later authors to be treated as a single entity, the order of priority of retention of names should be the order (page priority) of the descriptions within this text (which is the same as that listed in the abstract).

Implicit in this taxonomic arrangement is recognition of all the genera, *Atrax*, *Hadronyche* and *Illawarra*, as well as the resurrection of the name *Anepsiada* Rainbow and Pulleine, 1918 for species within the so called *Hadronyche lamingtonensis* Gray, 2010 species group.

The genus name *Pseudatrx* Rainbow, 1914 is a subjective junior synonym of *Hadronyche sensu stricto* (applicable to the taxon first identified as *Atrax versutus* Rainbow, 1914) and is therefore not an available name for the species groups formally named within this paper.

The three newly named genera, *Swilearanea gen. nov.*, *Shireenaranea gen. nov.*, and *Grayaraneaus gen. nov.*, correspond in order to the so-called *Hadronyche infensa* (Hickman, 1964) species group, *H. anzses* Raven, 2000 species group and the *H. adelaidensis* (Gray, 1984) species group as identified by Gray (2010). The newly named subgenus *Wongaraneaus subgen. nov.* corresponds to a group of four species within *Hadronyche*, until now not commonly referred to a well-defined species group.

They consist of a putatively related group of four species from Victoria and Tasmania being *Hadronyche modesta* (Simon, 1891), *H. meridiana* Hogg, 1902, *H. jensenae* (Gray, 2010) and *H. pulvinator* (Hickman, 1927).

Hadronyche Koch, 1873 is herein confined to a group of species identified by (Gray, 2010) as the so-called “*cerberea* species group”. The taxon *Hadronyche cerberea* Koch, 1873 is the type species of the genus and therefore this group of species. The genus name *Anepsiada*, for the type species *Anepsiada ventricosa* Rainbow and Pulleine, 1918 is an available name. The type specimen is believed to be a species within the so-called “*lamingtonensis* species group” as identified by Gray (2010) and therefore that entire group of four described species (and potentially others not yet recognized) is referred to that genus. Those species, all named by Gray (2010) and placed by him in *Hadronyche*, are *lamingtonensis*, *raveni*, *annachristae* and *monteithi*.

The exact identity of the male type specimen of *Anepsiada ventricosa* Rainbow and Pulleine, 1918 is uncertain and it is therefore not known if this name “*ventricosa*” is a senior synonym of one of the other four, or alternatively a separate species (Gray 2010).

The species originally described as *Hadronyche anzses* Raven, 2000 was also placed by Gray (2010) into his so-called “*lamingtonensis* species group” (as the fifth and final species), but is clearly divergent from the others and therefore is herein transferred to a currently monotypic genus *Grayaraneaus gen. nov.* Hence *Hadronyche* Koch, 1873 as defined by Gray (2010) is now broken into five genera, namely *Hadronyche* Koch, 1873, *Anepsiada* Rainbow and Pulleine, 1918, *Swilearanea gen. nov.*, *Shireenaranea gen. nov.*, and *Grayaraneaus gen. nov.*

The three newly named genera are formally named below according to the rules of the *International Code of Zoological Nomenclature* (Fourth edition) (Ride *et al.* 1999).

All relevant measurements are given in millimetres (mm).

SWILEARANEA GEN. NOV.

Type species: *Atrax infensus* Hickman, 1964.

Diagnosis: *Swilearanea gen. nov.* are readily separated from other similar genera within what was formerly treated as *Hadronyche* Koch, 1873 and now including all of genera *Shireenaranea gen. nov.*, *Anepsiada* Rainbow and Pulleine, 1918 and *Grayaraneaus gen. nov.*, by the following suite of characters: Medium to large sized funnel web spiders. Male femora I, II without spines. Labium relatively long (LL/LW 0.85 mm-0.96 mm) (like the short labium in *Anepsiada* Rainbow and Pulleine, 1918 species). Central cheliceral tooth row long (except in that it is uniquely short and basal in *S. kaputarensis* (Gray, 2010)). Tibia II without apophysis, being either more or less sinuous (sometimes slightly thickened proximally) with ventral spines clustered in the proximal half; or more cylindrical with clustered to scattered spines. Metatarsus II without apophysis, cylindrical to weakly sinuous, sometimes slightly swollen mid-ventrally. Male palp with few spines (tibia 0-3, patella 0-1, femur 0-2). Embolus with shaft broad or narrow, moderately curved and weakly to not tapered. Distal part of embolus weakly to strongly twisted, twisting often extended back along the shaft as a deep, longitudinal fold, well developed in species with wider, weakly tapered emboli. Ratio of bulb length to palpal tibia length 0.78-0.95 (i.e. usually greater than in *Hadronyche* species). Posterior lateral spinnerets with moderately long apical segment (PLSAPW/L 0.32-0.37).

The genus *Hadronyche* Koch, 1873 and all of genera *Anepsiada* Rainbow and Pulleine, 1918, *Swilearanea gen. nov.*, *Shireenaranea gen. nov.*, and *Grayaraneaus gen. nov.*, differ from *Atrax* Cambridge, 1877 and *Illawarra* Gray, 2010 in tibia II being either unmodified or having a blunt, rounded apophysis or apophyseal swelling. They differ from both *Atrax* and *Illawarra* in having caput moderately to strongly raised and cheliceral paturon more robust. They differ from *Illawarra* by the male tarsi having two instead of three ventral spine rows.

Distribution: Coast and highlands from the Hawkesbury River region of mid-eastern New South Wales to southeastern Queensland.

Etymology: Named in honour of Marlene Swile of Mitchell’s Plain in South Africa, in recognition of her various services to the biological sciences in southern Africa. Both Marlene Swile and the relevant taxa also have hairs around their feet regions.

The “*aranea*” part of the genus name is the Latin word for spider.

Content: *Swilearanea infensa* (Hickman, 1964) (type species); *S. kaputarensis* (Gray, 2010); *S. levittgreggae* (Gray, 2010); *S. lynabrae* (Gray, 2010); *S. macquariensis* (Gray, 2010); *S. orana* (Gray, 2010); *S. valida* (Rainbow and Pulleine, 1918); *S. walker* (Gray, 2010).

SHIREENARANEA GEN. NOV.

Type species: *Atrax adelaidensis* Gray, 1984.

Diagnosis: *Shireenaranea gen. nov.* are readily separated from other similar genera within what was formerly treated as *Hadronyche* Koch, 1873 and now including all of genera *Swilearanea gen. nov.*, *Anepsiada* Rainbow and Pulleine, 1918 and *Grayaraneaus gen. nov.*, by the following suite of characters: They are small atracinae (CL 5.4 mm - 6.9 mm). Burrow entrance without triplines, with sidechamber closed by a trap-door. Carapace broad, strongly raised. Labium and sternum wide. Serrula absent. Cheliceral groove narrow with long central tooth row. STC teeth few (8-9). Male femora I, II with dorsal spines or bristles. Males without leg II apophyses; leg I modified (incrassate tibia and metatarsus) or unmodified. Male palpal tibia bulbous basally; patella wider than femur.

The genus *Hadronyche* Koch, 1873 and all of genera *Anepsiada* Rainbow and Pulleine, 1918, *Swilearanea gen. nov.*,

Shireenaranea gen. nov., and *Grayaraneaus gen. nov.*), differ from *Atrax* Cambridge, 1877 and *Illawarra* Gray, 2010 in tibia II being either unmodified or having a blunt, rounded apophysis or apophyseal swelling. They differ from both *Atrax* and *Illawarra* in having caput moderately to strongly raised and cheliceral paturon more robust. They differ from *Illawarra* by the male tarsi having two instead of three ventral spine rows.

Distribution: Confined to the Gulf Ranges region of south-east South Australia.

Etymology: Named in honour of my wife, Shireen Hoser, originally from a wild and untamed place called Athlone in (Cape Town) South Africa, in recognition of her various services to the biological sciences in southern Africa and Australia. Both Shireen Hoser and the relevant taxa also have hairs around their feet regions. The “aranea” part of the genus name is the Latin word for spider.

Content: *Shireenaranea adelaidensis* (Gray, 1984) (type species); *S. eyrei* (Gray, 1984); *S. flindersi* (Gray, 1984).

GRAYARANEAEUS GEN. NOV.

Type species: *Hadronyche anzses* Raven, 2000.

Diagnosis: The genera *Grayaraneaus gen. nov.* and *Anepsiada* Rainbow and Pulleine, 1918 are readily separated from other similar genera within what was formerly treated as *Hadronyche* Koch, 1873 and now including all of genera *Swilearanea gen. nov.* and *Shireenaranea gen. nov.* by the following suite of characters: Small to medium sized atracine spiders (CL 5.0 mm - 8.0 mm). Males without leg II apophyses; femora I, II typically without dorsal spines (rarely a bristle-like spine on femur II).

Middle haematodocha usually exposed between tegulum and subtegulum. Carapace broad, strongly raised (CW/CL 0.48 mm - 0.51 mm). Cheliceral groove narrow, central teeth few, basal. Posterior lateral spinnerets with short apical segment (PLSAPW/L 0.53 mm - 0.63 mm). Labium relatively short (LL/LW 0.74 mm - 0.83 mm), cuspule number usually low (44-102), but moderate in *Grayaraneaus gen. nov.* (mean = 213). Sternum moderately wide. Several species have swollen or “boat-shaped” tarsi III and IV. Palpal patella wider than femur; tibia without spines, rather short and basally broad.

Grayaraneaus gen. nov. is in turn separated from *Anepsiada* Rainbow and Pulleine, 1918 by having only a few basal teeth (3) on the cheliceral promargin and metatarsus I with fewer spines (c. 10); and from *Anepsiada raveni* (Gray, 2010) and *A. lamingtonensis* (Gray, 2010) by tarsi III, IV swollen and “boat-shaped”.

The genus *Hadronyche* Koch, 1873 and all of genera *Anepsiada* Rainbow and Pulleine, 1918, *Swilearanea gen. nov.*, *Shireenaranea gen. nov.*, and *Grayaraneaus gen. nov.*), differ from *Atrax* Cambridge, 1877 and *Illawarra* Gray, 2010 in tibia II being either unmodified or having a blunt, rounded apophysis or apophyseal swelling. They differ from both *Atrax* and *Illawarra* in having caput moderately to strongly raised and cheliceral paturon more robust. They differ from *Illawarra* by the male tarsi having two instead of three ventral spine rows.

Distribution: Known only from the type locality which is Mossman Bluff summit, 10 km west of Mossman, north-east Queensland, Australia, Latitude -16°26'54"S, Longitude 145°16'59"E.

Etymology: Named in honour of Michael Gray of the Australian Museum in Sydney, New South Wales, Australia in recognition of his significant works on the Funnel-web spiders in Australia. “araneaus” is the male gender Latin word for spider.

Content: *Grayaraneaus anzses* (Raven, 2000) (monotypic).

SUBGENUS WONGARANEAEUS SUBGEN. NOV.

Type species: *Atrax modesta* Simon, 1891.

Diagnosis: The genus *Hadronyche* Koch, 1873 as defined herein is the group of spiders identified by Gray (2010) as his so-called “*cerberaea* species group” the species *Hadronyche cerberaea* Koch, 1873 being the type species for the genus and this group of species.

The genus *Hadronyche* Koch, 1873 and the component subgenus *Wongaraneaus subgen. nov.* as defined and named herein are readily separated from other similar genera within what was formerly treated as *Hadronyche* Koch, 1873, these

being all of genera *Swilearanea gen. nov.*, *Shireenaranea gen. nov.*, *Grayaraneaus gen. nov.* and *Anepsiada* Rainbow and Pulleine, 1918 by the following suite of characters: Small to large sized Atracinae. Male femora I, II usually with dorsal spines, sometimes spines absent. Labium relatively long, (LL/LW 0.86 mm - 0.99 mm), sometimes shorter (LL/LW 0.64 mm - 0.79 mm). Male tibia II shape and spination variable: unmodified cylindrical to weakly sinuous, with a few ventral spines clustered proximally or scattered; or sinuous with a spinose, rounded apophysis or apophyseal swelling placed mid-ventrally to proximally. Metatarsus II either cylindrical to weakly sinuous and without an apophysis, or sinuous (often ventrally concave proximally) with a mid-ventral apophysis/apophyseal swelling. Male palp with embolus often moderately short and broad, weakly curved and twisted. Ratio of bulb length to palpal tibia length 0.64 mm - 0.77 mm. Central cheliceral tooth row long. Apical segment of posterior lateral spinnerets short to long (PLSAPW/L 0.29 mm - 0.51 mm).

Wongaraneaus subgen. nov. are readily separated from other species within *Hadronyche* Koch, 1873 by having a shorter labium (LL/LW 0.69 - 0.79), which is less than in all other *Hadronyche* except for the species *H. mascordi* Gray, 2010 (which is within the nominate subgenus). However in *H. mascordi* this is associated with the partial fusion of the labium with the sternum in this species.

The genus *Hadronyche* Koch, 1873 and all of genera *Anepsiada* Rainbow and Pulleine, 1918, *Swilearanea gen. nov.*, *Shireenaranea gen. nov.*, and *Grayaraneaus gen. nov.*), differ from *Atrax* Cambridge, 1877 and *Illawarra* Gray, 2010 in tibia II being either unmodified or having a blunt, rounded apophysis or apophyseal swelling. They differ from both *Atrax* and *Illawarra* in having caput moderately to strongly raised and cheliceral paturon more robust. They differ from *Illawarra* by the male tarsi having two instead of three ventral spine rows.

Distribution: Victoria and Tasmania.

Etymology: Named in honour of Mark Wong of the Australian National University in Canberra, ACT, Australia in recognition of his significant works on the Funnel-web spiders in Australia. The “araneaus” part of the genus name is the male gender Latin word for spider.

Content: *Hadronyche (Wongaraneaus) modesta* (Simon, 1891); *H. (Wongaraneaus) meridiana* Hogg, 1902; *H. (Wongaraneaus) jensenae* (Gray, 2010) and *H. (Wongaraneaus) pulvinator* (Hickman, 1927).

Content within the subgenus *Hadronyche* Koch, 1873:

Hadronyche (Hadronyche) cerberaea Koch, 1873 (type species); *H. (Hadronyche) alpina* Gray, 2010; *H. (Hadronyche) emmalizae* Gray, 2010; *H. (Hadronyche) formidabilis* (Rainbow, 1914); *H. (Hadronyche) marracoonda* Gray, 2010; *H. (Hadronyche) mascordi* Gray, 2010; *H. (Hadronyche) monaro* Gray, 2010; *H. (Hadronyche) nimoola* Gray, 2010; *H. (Hadronyche) tambo* Gray, 2010; *H. (Hadronyche) venenata* (Hickman, 1927); *H. (Hadronyche) versuta* (Rainbow, 1914).

Content of the genus *Anepsiada* Rainbow and Pulleine, 1918: *Anepsiada ventricosa* Rainbow and Pulleine, 1918 (type species) (see earlier comments on the status of the type specimen); *A. annachristiae* (Gray, 2010); *A. lamingtonensis* (Gray, 2010); *A. monteithi* (Gray, 2010); *A. raveni* (Gray, 2010).

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CONFLICT OF INTEREST

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

Taxonomic vandalism by Wolfgang Wüster and his gang of thieves continues. New names unlawfully coined by the rule-breakers for species and genera previously named according to the rules of the *International Code of Zoological Nomenclature*.

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Received 25 April 2017, Accepted 28 June 2017, Published 20 July 2017.

ABSTRACT

Hoser (2015a-f) detailed illegal actions by Welshman Wolfgang Wüster and his gang of thieves with respect to their campaign to undermine the *International Code of Zoological Nomenclature* as well as their attempts to usurp the authority of the International Commission of Zoological Nomenclature (ICZN).

Their business model was not unlike that of the terrorist group calling themselves "Islamic State" or ISIS in that nothing was outside of their domain in terms of acts they would do to further their aim.

Hoser (2015a) published a list of 31 names illegally coined by the Wüster gang with the express intent of illegally overwriting valid ICZN compliant names previously published to steal the intellectual property of others.

They use websites and journals they despotically control to push their illegally coined names on others, falsely alleging they are legal and code complaint, which they are not.

Wolfgang Wüster and his gang also suppress use of the correct legal names by others and aggressively encourage others to similarly steal the works of others.

Since Hoser (2015a) published a list of 31 illegally coined names in herpetology, the gang has continued to unlawfully create nomenclatural instability as part of their campaign to destroy the rules of nomenclature that have governed the biological sciences for centuries.

This paper presents a summary of ten of the gang's more recent acts of taxonomic vandalism and presents these 10 unlawfully coined names in a table with the correct names alongside, so that herpetologists can use the correct names instead.

The list from 2015 has also been republished as the information within it remains current.

Keywords: Taxonomy; nomenclature; *International Code of Zoological Nomenclature*; ICZN; herpetology; Wolfgang Wüster; Taxonomic Vandalism; Kaiser; terrorist; *Acanthophis cryptamydros*; *Acanthophis lancasteri*; *Oedura luritja*; *Oedura greeri*; *Malayodracon*; *Daraninagama*; *Solomonsaurus*; *Oxysaurus*; *Hapturosaurus*; *Shireenhosersaurea*; *Tribolonotus parkeri*; *Tribolonotus greeri*; Ahaetuliinae; Charlespiersonserpeniinae; *Mopanveldophis*; *Chrismaxwellus*; *Brachyseps*; *Oxyscincus*; *Flexiseps*; *Clarascincus*; *Propetribolonotus*; *Pediporus*; *Feretribolonotus*.

INTRODUCTION

Hoser (2015a-f) detailed illegal actions by Welshman Wolfgang Wüster and his gang of thieves with respect to their unlawful campaign to undermine the *International Code of Zoological Nomenclature* as well as their attempts to usurp the authority of the commissioners at the International Commission of Zoological Nomenclature (ICZN).

Their business model was not unlike that of the terrorist group calling themselves "Islamic State" or ISIS in that nothing was

outside of their domain in terms of acts they would do to further their aim.

The gang ruthlessly stalk social media sites like "Facebook" and "Twitter", trolling and attacking anyone who dares speak out against their acts of Taxonomic vandalism or more recently defined (by themselves) as "Taxonomic Terrorism".

Hoser (2015a) published a list of 31 names illegally coined by the Wüster gang with the express intent of illegally overwriting

valid ICZN compliant names previously published.

The gang's acts are nothing more than a blatant attempt to unlawfully steal the intellectual property of genuine law-abiding scientists.

Even after the publication of Hoser (2015a-f) and condemnation by people within their gang, the leaders of the group continue to act outside of the law and the rules of the ICZN.

They use websites and journals they despotically control to push their illegally coined names on others, falsely alleging that theirs are legal and code complaint, which they are not.

Wolfgang Wüster and his gang also suppress use of the correct legal ICZN complaint names by others and aggressively encourage others to similarly steal the works of others.

Wolfgang Wüster continually alleges their mob are "scientists" but there is absolutely nothing they do that could be remotely described as "scientific" in any accepted sense of the word.

They are better described as "anti-scientists".

Since Hoser (2015a) published a list of 31 illegally coined names in herpetology, the gang has continued to unlawfully create nomenclatural instability as part of their campaign to destroy the rules of nomenclature that have been in operation for centuries.

This paper presents a summary of some of the gang's more recent acts of taxonomic vandalism and presents ten of these unlawfully coined names in a table with the correct names alongside, so that herpetologists can use the correct names instead.

The list from 2015 has also been republished as the information within it remains current.

***Oedura greeri* Wells and Wellington, 1985 illegally renamed as *Oedura luritja* Oliver and McDonald, 2016.**

The species described as *Oedura luritja* Oliver and McDonald, 2016, is a junior subjective synonym of *Oedura greeri* Wells and Wellington, 1985. In their 2016 paper, Oliver and McDonald allege that the Wells and Wellington name is "*nomen nudum*".

The basis for this claim is an uncritical rehash of what was written by Shea and Sadlier (1999).

Oliver and McDonald alleged "*Oedura greeri* Wells & Wellington [37] (holotype: AMS R87677, Mt Doreen) was described without diagnosis and is regarded as a *nomen nudum* [38]."

Repeating the same claim in 2016, Oliver and Doughty wrote: "*Oedura greeri* Wells & Wellington, 1985 (holotype: AMS R87677) was described without diagnosis and is regarded as a *nomen nudum* (Shea & Sadlier 1999)."

A read of the original Wells and Wellington (1985) description confirms that this is not the case.

This remains so, whether one relies on the conditions set by the second or third editions of the *International Code of Zoological Nomenclature*, or for that matter the currently applicable fourth edition!

So while three separate publications by a small group of authors has repeated the claim that "*Oedura greeri* Wells & Wellington, 1985 (holotype: AMS R87677) was described without diagnosis and is regarded as a *nomen nudum*" the claim quite simply is not true.

For what it is worth, Wells and Wellington (1985) directs readers to a photo of their species *O. greeri* at Cogger (1983 plate 461, cited as *Oedura marmorata*). On the same page of this publication (at page 14) they also refer to comparative photos of others in what they describe as the "*Oedura marmorata* complex", including "Cogger (1983: plate 460" which they cite as its "congener *Oedura marmorata*", and Bustard (1970: plate 24), which is cited as their species *Oedura derelicta*."

While it is entirely reasonable to argue that the original descriptions of all the relevant geckos by Wells and Wellington are lousy and ambiguous, there is no doubt at all that they identify specific taxa (or alleged taxa) and by way of comparison with others.

Therefore the names are not *nomen nudum* and like it or not are "available" within the meaning of every relevant edition of the *International Code of Zoological Nomenclature*.

This remains the case even if another author has a strong personal hatred of Richard Wells or Ross Wellington!

***Acanthophis lancesteri* Wells and Wellington, 1985 illegally renamed as *Acanthophis cryptamydros* Maddock, Ellis, Doughty, Smith and Wüster, 2015.**

I need not mention that Paul Doughty (see above) at least is a card-carrying member of the Wüster gang of thieves, which in part explains his attempted name theft of the gecko species above.

He was also a party to another group within the gang of thieves who also recently attempted to steal name authority for another Wells and Wellington species, this one being *Acanthophis lancesteri* Wells and Wellington 1985, by falsely claiming it too was a *nomen nudum*. Their allegedly newly discovered species was named by them as *Acanthophis cryptamydros* Maddock, Ellis, Doughty, Smith and Wüster, 2015, which they then advertised to a global audience online and elsewhere as some kind of amazing new scientific discovery by the gang (e.g. Arnold 2015, Fang 2015, Mundy 2015).

This big lie was refuted in the first instance by Hoser (2016a) and then in more detail later in 2016 by Wellington (2016).

In summary the Wells and Wellington 1984 and 1985 descriptions of dozens of species were often lousy, but they were fully code complaint and therefore legal. Their name in the case of *Acanthophis lancesteri* Wells and Wellington 1985 is the legal one we are stuck with!

Now if one were to (validly) accuse Wells and Wellington of having (at times) substandard scientific descriptions, the same could be said for many other herpetologists including such names as Cope, Storr, Gray and Fitzinger, but if their names are available under the rules of the ICZN, they are used and no matter how "unscientific" their first descriptions were.

The take home message in all this is as follows: If you read a paper and see a claim by an author that an earlier name is "*nomen nudum*", don't take the author's word for it. Go to the original publication itself and grab a copy of the current and relevant issue/s of the *International Code of Zoological Nomenclature* or previous (if relevant) set of rules for cross referencing purposes.

Check the subject publication with the conditions and definitions within the code to see for yourself if the earlier name is valid and legal.

Based on statistical likelihood and my own personal experience, including for the last two species inspected, it almost certainly will be!

***Darinagama* Hoser, 2014 illegally renamed as *Malayodracon* Denzer, Manthey, Mahlow and Böhme, 2015.**

Hoser (2014) formally named the genus *Darinagama* Hoser, 2014 on the basis of well-established physical differences and divergence between the relevant species originally named as *Gonyocephalus robinsonii* Boulenger, 1908 and others in the genus it had been previously placed. As a taxonomic act it was completely unremarkable.

A year later in the online PRINO (peer reviewed in name only) journal *Zootaxa*, Denzer *et al.* (2015) published a paper with the express purpose of unlawfully renaming the genus *Darinagama* Hoser, 2014 with their illegally coined name *Malayodracon*. Their paper effectively remanufactured old research as new and claimed a discovery that the species monotypic for the genus was sufficiently divergent from others in the genus it had been placed in previously to be renamed at the genus level.

While it would be nice to think that their act of renaming the genus was mere oversight, that this was not the case was immediately obvious. Some of the authors as members of the

Wüster gang have been hyper critical of all things Hoser, including aggressively on social media platforms like “Facebook” and “Twitter”.

The gang also ensured that on a site they control called “The Reptile Database” controlled by Peter Uetz with a subcommittee including most of the Wüster gang as directors, did not have the correct Hoser name for the genus on the site. Instead the relevant species was identified as “*Malayodracon robinsonii* (BOULENGER, 1908)” and in spite of an extensive bibliography, there was no reference to any Hoser papers by Uetz on the webpage, in spite of him being sent all relevant issues of *Australasian Journal of Herpetology* (including Hoser (2014)) at times of publication and so was well aware at all times of the priority of the name *Darainagama* Hoser, 2014.

In any event, to justify their blatant illegal attempt at name authority theft, Denzer and the same group of authors who wrote Denzer *et al.* (2015) published a hate rant in 2016 in the form of a paper ostensibly critical of all Hoser publications on dragon species that they had decided they may want to illegally rename (Denzer *et al.* 2016).

Invariably the adverse claims against the Hoser papers were false and so they were systematically refuted by Hoser (2016c).

However the Wüster gang have made a point in suppressing this and any other paper that systematically expose their litany of lies and deception.

***Oxysaurus* Hoser, 2013 and *Shireenhosersaurea* Hoser, 2013 illegally renamed as *Solomonsaurus* Bucklitsch, Böhme and Koch, 2016 and *Hapturosaurus* Bucklitsch, Böhme and Koch, 2016.**

Wolfgang Böhme, has been working hard with the other Wolfgang (Wüster) to destabilize nomenclature and taxonomy (as seen above) and with the genera *Oxysaurus* Hoser, 2013 and *Shireenhosersaurea* Hoser, 2013.

Based on divergence and morphological differences, the erection of the two varanid genera by Hoser (2013c) were totally unremarkable and the only remarkable thing about the action was that it hadn't been done 20 years earlier!

After three years of denying the obvious and pretending that the creation of *Oxysaurus* Hoser, 2013 and *Shireenhosersaurea* Hoser, 2013, was an act of “taxonomic vandalism”, the Wüster gang decided to rename the genera instead.

So in an act of brazen theft and again utilizing the services of the online PRINO Journal *Zootaxa*, which they appear to have hijacked for their own nefarious agenda, the gang renamed both *Oxysaurus* Hoser, 2013 and *Shireenhosersaurea* Hoser, 2013 as *Solomonsaurus* Bucklitsch, Böhme and Koch 2016 and *Hapturosaurus* Bucklitsch, Böhme and Koch 2016 in the paper Bucklitsch *et al.* (2016).

The action was the same as for the illegal renaming of *Darainagama* by the same Wolfgang Böhme and his group of thieves. The paper was in the main a mere remanufacturing of previous research by others as “new” work by themselves with the only significant feature of the otherwise uninteresting paper being the alleged naming of two previously unnamed genera!

Of course rehashing old work as new is fraudulent, as is the deliberate renaming of genera already named.

Once again the relevant pages of the Wüster gang controlled “The Reptile Database” owned by Peter Uetz carried references to Bucklitsch *et al.* (2016) and their illegal dual nomenclature, but forcibly suppressed and did not have the more relevant publication of Hoser (2013c) or the names derived from that publication listed at all.

In otherwords “The Reptile Database” was anything but!

In passing I note that the Bucklitsch *et al.* (2016) names were assigned as subgenera, but everyone knows that according to the ICZN's rules, at the same level (e.g. genus) priority of names applies and so if the taxonomic concept of Bucklitsch *et al.* (2016) genuinely wanted to group the relevant varanid taxa as

subgenera, then they still had to use the legally available genus names, these being *Oxysaurus* Hoser, 2013 and *Shireenhosersaurea* Hoser, 2013.

***Feretribolonotus greeri* Hoser, 2016 renamed as *Tribolonotus parkeri* Rittmeyer and Austin, 2017.**

You'll see from the heading that the word “illegal” was omitted from the heading. That is because there is a remote chance that unlike for the previous cases, this action was a result of genuine oversight, as opposed to a planned name authority theft.

I say remote chance because the journal that published this piece of taxonomic vandalism was none other than the online PRINO journal *Zootaxa*!

Zootaxa as an online journal has been by far the main tool for the Wüster gang's attempts to unlawfully steal the intellectual property of others.

Surely one of the alleged peer reviewing scientists there would occasionally look at repositories such as *Zoobank* or *Zoological Record*, both of which indexed and archived the relevant contents of Hoser (2016b) when published a year earlier!

The paper Rittmeyer and Austin (2017) also named another species based on vague morphological evidence, but conspicuously in the absence of molecular data, giving doubt to the validity of that taxon.

That taxon name is however available under the rules of the ICZN and is therefore not relevant here.

Of significance is that if *Zootaxa* had quality peer review (as they allege to have), the continual overwriting of legal ICZN names in a journal that supposedly specializes in taxonomy wouldn't be happening.

However, even the best of peer reviewed journals get things wrong and mistakes do slip through.

In the case of the *Zootaxa* paper Rittmeyer and Austin (2017), the authors had renamed a species previously named a year earlier by myself (Hoser).

The genus placement (first of the binomial names) is not the issue in terms of the *Zootaxa* paper.

I must stress that it is what happens after a journal editor, author or both are advised of a mistake that separates quality scientific publications from PRINO rags like *Zootaxa*!

If a mistake is brought to the attention of author, editor or publisher, it should be corrected as fast as possible and any potential destabilization or damage either avoided or reduced as much as possible.

This is exactly how things are done in terms of myself and the *Australasian Journal of Herpetology*.

So here I take the opportunity to correct a rare error that has slipped through the various quality control processes at *Australasian Journal of Herpetology* and to make sure it is read by people I shall underline it as well!

The genus name *Feretribolonotus* Hoser, 2016 is in fact a subjective junior synonym of *Pediporus* Roux, 1930. Also, a new subgeneric name from the same paper, *Propetribolonotus* Hoser, 2016 (with the type species *Tribolonotus schmidti* Burt, 1930) is the junior objective synonym of *Pediporus* Roux, 1930.

In other words, based on the taxonomy proposed in the paper of Hoser (2016c), *Propetribolonotus* Hoser, 2016 should never be used and *Feretribolonotus* Hoser, 2016 is an available name at the subgenus level only, which according to the current taxonomy, should be used as such.

In terms of the error, I was first advised of it by email on 16 September 2016, by Andrei Barabanov of the Department of Herpetology, Zoological Institute Russian Academy of Sciences and besides publicly thanking him for drawing it to my attention, I note that it is correct for a scientist to renounce any work or idea that simply is found to be defective.

In the case of the two relevant genus-level names proposed by

Hoser (2016c) the taxonomy was correct and/or available, but the nomenclature was wrong.

One of these names is point blank unavailable and must never be used.

The erroneous nomenclature becomes illegal if promoted and used with the knowledge it is wrong and in breach of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

As I am a scientist and not a law-breaking thief, I will not promote illegal nomenclature and ask others not to do so as well.

Charlespiersonserpeniidae Hoser, 2013 illegally renamed Ahaetuliinae subfam. nov. Figuero *et al.*, 2016.

Another group of card-carrying members of the Wüster gang decided to illegally rename two more groups of snakes in 2016 in an online paper Figuero *et al.* (2016).

We know that the authors were well aware of the earlier names for the same taxon groups published by Hoser (2013a) because some of them were vocal supporters of the Wüster gang's war cry manifesto known widely as Kaiser *et al.* (2013). See also Kaiser (2012a, 2012b, 2013) or other war cry documents by the gang as listed in Hoser (2015a-f).

The paper was of a familiar script: Old findings rehashed as new, with a few nice graphics to complete the deception.

The constituent species taxa within Ahaetuliinae subfam. nov. Figuero *et al.*, 2016 are exactly the same as Charlespiersonserpeniidae Hoser, 2013, even though the type genus is different. Because taxonomic shifts within a given level (e.g. family) retain the same basis of nomenclature, even though the name proposed by the later authors is at the subfamily as opposed to family level, the name Charlespiersonserpeniidae takes priority and must be used according to the *International Code of Zoological Nomenclature*. In other words Figuero *et al.* 2016 should have called "their" subfamily Charlespiersonserpeniinae Hoser, 2013 and not Ahaetuliinae subfam. nov. (AKA Ahaetuliinae Figuero *et al.*, 2016).

As it stands Ahaetuliinae subfam. nov. is a subjective junior synonym of Charlespiersonserpeniidae Hoser, 2013 or for that matter, Charlespiersonserpeniinae Hoser, 2013 as proposed at the same time.

If one were to do some mental and taxonomic gymnastics to take the type genus of Ahaetuliinae subfam. nov. as the basis for a family-level name classification, it would still not be Ahaetuliinae Figuero *et al.* 2016. This is because the paper of Hoser (2013a), also created a tribe (family level classification), with the same type genus *Ahaetulla* Link, 1807, for the tribe Ahaetullini Hoser, 2013.

In summary the creation of the name Ahaetuliinae subfam. nov. by Figuero *et al.* (2016) was illegal and that name should not be used in any circumstance.

I should also add that the relevant authors and journal should publish a note to this effect!

Chrismaxwellus Hoser, 2013 illegally renamed Mopanveldophis Figuero *et al.*, 2016.

Figuero *et al.* (2016) in the same paper also decided to illegally rename *Chrismaxwellus* Hoser, 2013 which they illegally renamed *Mopanveldophis* Figuero *et al.*, 2016.

Both genera have the same type species, which is no great surprise, because the group is monotypic!

As *Mopanveldophis* is an objective junior synonym of *Chrismaxwellus* Hoser, 2013, the later name should never be used!

Perhaps I should also add that the relevant journal that published Figuero *et al.* (2016) claims to be peer reviewed. Noting that there was a three year gap between the publishing of Hoser (2013a) and Figuero *et al.* (2016), there can be no claim made that the authors or alleged peer reviewers were unaware

of the earlier publications of Hoser (2013a) and Hoser (2013b). Alternatively if the claim is raised that both authors and reviewers were unaware of the earlier Hoser names, then they should get a gold prize for failure to look at the relevant literature before publishing.

Of course as the paper Figuero *et al.* (2016) had no useful function beyond renaming two groups named three years prior, the authors and their hand-picked "peer reviewers" (if the latter actually existed) had to make a point of ignoring the most relevant prior work.

***Oxyscincus* Hoser, 2015 and *Clarascincus* Hoser, 2015 illegally renamed *Brachyseps* Erens *et al.*, 2016 and *Flexiseps* Erens *et al.*, 2016.**

Both renamed genera are subjective junior synonyms for the same taxonomic concepts and species assemblages.

Hoser (2015g) was a massive 128 page monograph that received considerable publicity at the time it was published. It also happened to be indexed in the usual places like *Zoobank* and *Zoological Record*.

Erens *et al.* (2016) first appeared online 18 months after the hard copy and month later online publication of Hoser (2015g).

In other words, it would be ludicrous for a relevant scientist working on these species to try to claim they were unaware of the publication of Hoser (2015g).

Rather than pretending not to know of the earlier Hoser (2015g) paper, as a basis for illegally renaming genera, as done in cases cited elsewhere, these authors cited the Wüster gang war cry manifesto, Kaiser *et al.* (2013) and said that this publication gave them authority to ignore and break the rules of the *International Code of Zoological Nomenclature* and the rulings of the ICZN commissioners themselves.

On the basis of the content of Kaiser *et al.* (2013) the authors illegally renamed two genera fully aware that they had already been legally named by Hoser (2015g) more than a year earlier.

The relevant paper by Erens *et al.* (2016) was also little more than a rehash of established information that they rebadged as "new" by adding a few nice graphics.

It is also noteworthy that the formal naming of their illegally named genera didn't comply with the established rules as set out in the *International Code of Zoological Nomenclature* (Fourth edition), meaning that their names are unavailable in the sense of the code anyway and therefore should not be used. Their "descriptions" do not provide a formal diagnosis for any of their genera at the time of naming and therefore according to the *International Code of Zoological Nomenclature* their names are invalid and unavailable.

However minor faults like not complying with the rules have never been an issue for members of the Wolfgang Wüster gang and this is unlikely to concern them now.

SUMMARY

With the ten illegally renamed species listed herein, this takes the total to 41 illegally named species genera or family in recent years, as itemised in this paper and associated tables listing relevant taxa.

It is also almost certain that some other illegally renamed taxa have been missed in terms of this paper, or Hoser (2015a) meaning the damage caused by Wolfgang Wüster and likeminded thieves is even greater than outlined here.

Wolfgang Wüster and his gang of thieves have caused instability in nomenclature on a scale never previously seen in the biological sciences.

It is the first time in more than a century that people have sought to undermine the rules of the ICZN from within!

If their current acts of illegally renaming species are not stopped or otherwise encouraged, there is no doubt that this cancer will affect wider areas of the biological sciences and potentially fatally destroy the *International Code of Zoological Nomenclature* as it is currently known.

Wolfgang Wüster and his gang of thieves intend setting up his form of mob rule with him in charge, over and above the rules of the ICZN and the general scientific community.

Wüster and their gang represent a noisy and destructive minority who need to be stopped and before the damage they cause to nomenclature and the wider fields of zoology, wildlife conservation and public safety gets worse.

In the interim the best thing practicing zoologists can do to mitigate the damage caused by the Wolfgang Wüster gang of thieves is to use the correct ICZN rule compliant names as indicated in this paper, and as best as possible try not to be cowed or harassed by the very real threats of violence and criminal damage made by Wüster's associates.

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CONFLICT OF INTEREST

The author has no known conflicts of interest in terms of this paper and conclusions within, other than a desire that rules of nomenclature be followed. However it is appropriate to note that some of the names illegally overwritten by Wolfgang Wüster and his gang of thieves have been formally assigned by this author, so there is the issue of ownership of intellectual property and potential financial benefits this brings.

| Non code-compliant name coined by associates of the Wüster gang and widely promoted by them. | Comments (reasons given of author for creating new name in breach of the Zoological Code). | Correct taxon name according to scientific ethics and the established rules of the ICZN's Zoological Code. |
|--|--|--|
| <i>Acanthophis cryptamydros</i> Maddock, Ellis, Doughty, Smith and Wüster, 2015 | Falsely alleged Wells and Wellington, 1985 name not code compliant. | <i>Acanthophis lancasteri</i> Wells and Wellington, 1985 |
| <i>Oedura luritja</i> Oliver and McDonald, 2016 | Falsely alleged Wells and Wellington, 1985 name not code compliant. | <i>Oedura greeri</i> Wells and Wellington, 1985 |
| <i>Malayodracon</i> Denzer, Manthey, Mahlow and Böhme, 2015 | No reason given. Later published hate rant (Denzer <i>et al.</i> 2016). | <i>Daraninagama</i> Hoser, 2014 |
| <i>Solomonsaurus</i> Bucklitsch, Böhme and Koch, 2016 | No reason given. Also co-published hate rant (Denzer <i>et al.</i> 2016). | <i>Oxysaurus</i> Hoser, 2013 |
| <i>Hapturosaurus</i> Bucklitsch, Böhme and Koch, 2016 | No reason given. Also co-published hate rant (Denzer <i>et al.</i> 2016). | <i>Shireenhosersaurea</i> Hoser, 2013 |
| <i>Tribolonotus parkeri</i> Rittmeyer and Austin, 2017 | No reason given. Remote possibility it was a genuine oversight. | <i>Pediporus (Feretribolonotus) greeri</i> Hoser, 2016 |
| Ahaetuliinae Figuero <i>et al.</i> , 2016. | No reason given. Due to time factor and authorship, oversight must have been deliberate. | Charlespiersonserpeniinae Hoser, 2013 |
| <i>Mopanveldophis</i> Figuero <i>et al.</i> , 2016. | No reason given. Due to time factor and authorship, oversight must have been deliberate. | <i>Chrismaxwellus</i> Hoser, 2013 |
| <i>Brachyseps</i> Erens <i>et al.</i> , 2016 | Cited Kaiser <i>et al.</i> (2013) as a basis to illegally ignore rules of ICZN's code. | <i>Oxyscincus</i> Hoser, 2015 |
| <i>Flexiseps</i> Erens <i>et al.</i> , 2016 | Cited Kaiser <i>et al.</i> (2013) as a basis to illegally ignore rules of ICZN's code. | <i>Clarascincus</i> Hoser, 2015 |

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| Non code-compliant name coined by associates of the Wüster gang and widely promoted by them. | Comments (reasons given of author for creating new name in breach of the Zoological Code). | Correct taxon name according to scientific ethics and the established rules of the Zoological Code. |
|--|--|---|
| <i>Afronaja</i> Wallach, Wüster and Broadley 2009. | Falsely alleged earlier Hoser paper not published according to Article 8 of Zoological Code. | <i>Spracklandus</i> Hoser, 2009. |
| <i>Amerotyphlops</i> Hedges <i>et al.</i> , 2014 | Author was a signatory to Kaiser <i>et al.</i> documents of 2012/2013. | <i>Altmantyphlops</i> Hoser, 2012 |
| <i>Antaresia stimsoni</i> (Smith, 1985) | Name published after Wells and Wellington, 1985, (date priority) but improperly not renounced. | <i>Antaresia saxacola</i> Wells and Wellington, 1985. Note: <i>Nomen nudem</i> claim on Wikipedia is false. |
| <i>Antillotyphlops</i> Hedges <i>et al.</i> , 2014 | Author was a signatory to Kaiser <i>et al.</i> documents of 2012/2013. | <i>Mosestyphlops</i> Hoser, 2012 |
| <i>Asiatyphlops</i> Hedges <i>et al.</i> , 2014 | Author was a signatory to Kaiser <i>et al.</i> documents of 2012/2013. | <i>Argyrophis</i> Gray, 1845 |
| <i>Bartleia</i> Hutchinson <i>et al.</i> 1990 | Deliberately ignored name authority to rename taxon (<i>nomen furtum</i>). | <i>Techmarscincus</i> Wells and Wellington, 1985 |
| <i>Bassiana</i> Hutchinson <i>et al.</i> 1990 | Deliberately ignored name authority to rename taxon (<i>nomen furtum</i>). | <i>Acritoscincus</i> Wells and Wellington, 1985 |
| <i>Broadleysaurus</i> Bates <i>et al.</i> , 2013 | Invoked Kaiser "veto". | <i>Funkisaurus</i> Hoser, 2013 |
| <i>Candoiidae</i> Pyron <i>et al.</i> , 2014 | No reason given, but authors and stated reviewers have attacked Hoser for years and over-written Hoser names previously. | <i>Candoiidae</i> Hoser, 2013 |
| <i>Cartula</i> Hutchinson <i>et al.</i> 1990 | Deliberately ignored name authority to rename taxon (<i>nomen furtum</i>). | <i>Harrisoniascincus</i> Wells and Wellington, 1984 |
| <i>Chelodina burringandjii</i> Thomson, Kennett and Georges, 2000 | Alleged Wells and Wellington, 1985 not code compliant when it was. | <i>Chelodina billabong</i> (Wells and Wellington, 1985) |
| <i>Chelodina canni</i> McCord and Thomson, 2002 | Falsely claimed Wells and Wellington, 1985 name was a <i>nomen nudem</i> . | <i>Chelodina rankini</i> Wells and Wellington, 1985 |
| <i>Cubatyphlops</i> Hedges <i>et al.</i> , 2014 | Author was a signatory to Kaiser <i>et al.</i> documents of 2012/2013. | <i>Dannytyphlops</i> Hoser, 2012 |
| <i>Emydura macquarii dharra</i> Cann 1998 | Alleged Wells and Wellington, 1985 not code compliant when it was. | <i>Emydura cooki</i> (Wells and Wellington, 1985) |
| <i>Emydura macquarii emmotti</i> Cann, McCord and Joseph-Ouni, 2003 | Alleged Wells and Wellington, 1985 not code compliant when it was. | <i>Emydura macquarii windorah</i> (Wells and Wellington, 1985) |
| <i>Indotyphlops</i> Hedges <i>et al.</i> , 2014 | Author was a signatory to Kaiser <i>et al.</i> documents of 2012/2013. | <i>Maxhoserus</i> Hoser, 2012 |
| <i>Leiopython meridionalis</i> Schleich, 2014 | Invoked Kaiser "veto". | <i>Leiopython hoserae</i> Hoser, 2000 |
| <i>Leiopython montanus</i> Schleich, 2014 | Invoked Kaiser "veto" | <i>Leiopython albertisi bennetti</i> Hoser, 2000 |
| <i>Lemuriatyphlops</i> Pyron and Wallach, 2014 | Invoked Kaiser "veto" | <i>Elliotttyphlopea</i> Hoser, 2012 |
| <i>Macrochelys apalachicola</i> Thomas <i>et al.</i> , 2014 | Falsely claimed no holotype ever existed. Claim rebutted by co-author. | <i>Macrochelys muscati</i> Hoser, 2013. |
| <i>Macrochelys suwanniensis</i> Thomas <i>et al.</i> , 2014 | Falsely claimed no holotype ever existed. Claim rebutted by co-author. | <i>Macrochelys maxhoseri</i> Hoser, 2013. |
| <i>Madatyphlops</i> Hedges <i>et al.</i> , 2014 | Author was a signatory to Kaiser <i>et al.</i> documents of 2012/2013. | <i>Ronhoserus</i> Hoser, 2012 |
| <i>Malayopython</i> Reynolds <i>et al.</i> , 2013a, 2013b, 2014 | Invoked Kaiser veto; also falsely claimed <i>Broghammerus</i> a <i>nomen nudum</i> | <i>Broghammerus</i> Hoser, 2004 |
| <i>Malayotyphlops</i> Hedges <i>et al.</i> , 2014 | Author was a signatory to Kaiser <i>et al.</i> documents of 2012/2013. | <i>Katrinahosertyphlops</i> Hoser, 2012 |
| <i>Matobosaurus</i> Bates <i>et al.</i> , 2013 | Invoked Kaiser "veto" | <i>Swilesaurus</i> Hoser, 2013 |
| <i>Myuchelys</i> Thomson and Georges, 2009 | Falsely claimed Wells 2007 breached article 8 of Zoological Code. | <i>Wollumbinia</i> Wells, 2007 |
| <i>Niveoscincus</i> Hutchinson <i>et al.</i> 1990 | Deliberately ignored name authority to rename taxon (<i>nomen furtum</i>). | <i>Litotescincus</i> Wells and Wellington, 1985 |
| <i>Paralaudakia</i> Baig <i>et al.</i> , 2012 | Author was a signatory to Kaiser <i>et al.</i> documents of 2012/2013. | <i>Adelynkimberlea</i> Hoser, 2012 |
| <i>Sundatyphlops</i> Hedges <i>et al.</i> , 2014 | Author was a signatory to Kaiser <i>et al.</i> documents of 2012/2013. | <i>Sivadictus</i> Wells and Wellington, 1985, (Note: <i>Anilios</i> Gray, 1845, is a different genus: Type sp. <i>australis</i>) |
| <i>Varanus teriae</i> Sprackland, 1991 | Allegedly overlooked name authority and then refused to renounce synonym. | <i>Varanus keithornei</i> (Wells and Wellington, 1985). (Note: genus assignment is in flux). |
| <i>Xerotyphlops</i> Hedges <i>et al.</i> , 2014 | Author was a signatory to Kaiser <i>et al.</i> documents of 2012/2013. | <i>Lenhosertyphlops</i> Hoser, 2012 |

A close-up photograph of a snake's head, showing its scales and eyes. The snake is coiled, and the background is a blurred continuation of its body. The lighting highlights the texture of the scales.

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

Australasian Journal of Herpetology

ISSUE 35, PUBLISHED 20 JULY 2017