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**Cover photos: Raymond Hoser. Front: 10 YO Black-headed Python.
Back: 4 YO Albino Carpet Pythons and 8 YO Green Tree Frogs.**

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Coming back up! The first ever documented cases of fur ball regurgitation by a Black-headed Python (Serpentes: Pythonidae: *Aspidites*).

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ABSTRACT

On two occasions in 2018 and 2019 a perfectly healthy, captive raised, adult Black-headed Python *Aspidites melanocephalus* (Krefft, 1864) was seen regurgitating fur balls that had been regurgitated up from the lower digestive tract. The consistency was similar to that of normal faeces and would have easily been confused as such were it not for the fact that the regurgitation was directly observed.

Keywords: Snake; python; black-headed python; *Aspidites*; *Aspidites melanocephalus*; White-lipped Python; *Leiopython*; *hoserae*; *albertisi*; *meridionalis*; faeces; fur ball; Australia.

INTRODUCTION

On 23 March 2009, I obtained a pair of captive-born hatchling Black Headed Pythons (Krefft, 1864) of the nominate Queensland form from well-known snake breeder Neil Sonnemann of Murmungee, near Beechworth in north-east Victoria, Australia.

The female died several years later of natural causes and as of 2019 the male remained alive and well. It appears on the cover of this journal in a photo taken on 30 May 2019.

At end 2018 and again in early 2019 the male Black-headed Python (acronym BHP) was seen regurgitating what are best described as fur balls, which is the subject of this paper and the detail follows:

MATERIALS METHODS AND RESULTS

Over the previous 10 years the male Black-headed Python had been fed a diet of mainly rodents (mainly mice as opposed to rats), with occasional meals including chicken necks or drumsticks, as purchased from the supermarket.

In its first year of life and when small, the snake was problematic in that while it ate, it did at times (3 times over 6 months) and without reasonable explanation regurgitate meals (mice) shortly after eating them. The regurgitated mice were in an effectively undigested state.

The female Black-headed Python and other snakes of similar size class and/or age in the collection, did not regurgitate when fed in similar situations and in same cage conditions such as cage size, layout, furnishings or temperature.

The relevant snake and others were fed mice from bags and many snakes fed at the same time and so it was easily determined that the regurgitation issue was due to this snake and not the mice being of a “bad” batch, or other potential factor, such as caging. It should be noted that all snakes in the facility were kept in an identical manner and only this snake had the (minor) regurgitation issue at times when young.

At the time the regurgitations happened the relevant male black-headed python was assumed to be a “problem” snake and this issue was dealt by way of ensuring in particular temperature in the cage was slightly warmer to aid digestion and that smaller food items were given so as to reduce risk of regurgitation.

The strategy worked well and was only employed for the first two feeds beyond each regurgitation and certainly beyond a year of age the snake was a perfectly normal and trouble free captive. That is, it ate and defecated as normal, eating normal sized food beyond that point.

This remained the case (and remains so) as of 2019, at which time the snake is just over 10 years of age.

The snake as an adult is exactly 7 foot (=210 cm) long (in total length including the tail) and of normal build and weight for the species and length. It has successfully bred at least once (eggs laid in 2017 of which 12 of 13 good eggs hatched, the non-hatching egg being centre of a mass that was incubated in an incubator as a whole mass).

As of 2019 this snake was still producing healthy sperm and semen, being a ten year old snake.

The relevant Black-headed Python is also one of many pythons used on a near daily basis for Snakebusters Hands on Reptiles Shows in Melbourne, as detailed on the website at: http://www.reptileshows.com.au

The snake has been doing such shows and being handled almost daily since before its first birthday in 2010.

The shows run by my company are the only ones in Australia that let people hold the animals and so every day our business does reptile shows and this snake is used (most days) the snake leaves our facility. At shows, it is handled by members of the public.

Any given snake, including this one may be handled for anything from a few minutes, to many hours at a time and without break.

Experience has shown that contrary to perceptions of inexperienced people, a healthy well adjusted snake used to being handled by members of the public, can be handled for many hours at a time, without break in many situations and the snake will exhibit zero signs of agitation, stress or other ill effect from the handling.

There are factors that may mitigate against this such as recent feeding history of the snake, whether or not the snake is about to shed its skin and a range of other factors, most of which would tend to reduce the likelihood a snake could be handled at length, without getting tired or otherwise agitated.

In other words, an optimal python snake for handling at our displays would be a healthy, captive-raised snake aged 4 years old and over and that has not eaten for some days and is not approaching a slough.

Most of our python snakes are managed to be in that state (not recently fed with food still in stomach) as required for our Reptile Shows and this is possible in part due to the fact we hold several dozen relevant pythons at any given time, which is more than enough than is needed to satisfy our reptile show commitments.

The relevant male Black-headed Python, subject of this paper is in effect treated no differently to all other pythons we use in our reptile shows, including (as of 2019), two other adult Black-headed Pythons, one Woma Sand Python *Aspidites ramsayi* (Macleay, 1882), two Rough-scaled Pythons *Jackypython carinata* (Smith, 1981), 4 Olive Pythons *Liasis olivaceus* Gray, 1842, 3 Green Pythons *Chondropython spp.* and a large number of Carpet Pythons *Morelia spp.* as well as various other pythons.

All snakes are kept in identical tub and rack style cages and managed the same way.

In summary management at reptile shows and displays and even at our facility in terms of husbandry is based on size, not species and pythons of similar size are often shipped together to displays in single boxes (sometimes several per box) and when handled are often handled more than one at a time in groups of same size class.

As an important part of the management protocol, no snake is taken out of our facility and used for reptile shows when there is food in the stomach and a potential risk of regurgitation. This may occur when the snake is handled, agitated and has the ability to regurgitate food, so we avoid the risk entirely by not using such snakes.

Beyond that, once a snake has digested food so that it is no longer in the stomach, this being at a well defined point slightly more than half-way down the body, the part digested meal is largely broken down where it then moves to the lower intestinal tract and is generally regarded as not at risk of being regurgitated.

In terms of the two incidents subject of this paper, on both relevant occasions the male Black-headed Python had been fed some days prior (5 days in both cases, being Monday feedings and then use in reptile shows the following Saturday).

Both feeds were 4 adult-sized mice, (thawed from a freezer).

Both incidents (in December 2018 and in March 2019) had a similar trajectory, so the first is detailed as being same for both.

At a reptile show, the snake was handed to me by a member of the public who had been holding the snake around their neck.

The snake appeared to be having tight muscle spasms and convulsions and was waving its head from side to side.

The snake was then seen to have an elongated lump moving from the lower body to the head and then regurgitated.

The material regurgitated was similar in smell and appearance to a normal faeces, the only obvious difference being the lack of a whitish-yellow lump of urates which usually precedes a faeces.

Were it not for the fact I had seen the material regurgitated myself, I would have immediately assumed that the material was faecal and regarded it as perfectly normal, routine and not worthy of a short paper.

The regurgitated material had the appearance of faeces and consisted in its entirety of tight blobs of rodent (mouse) fur, in turn covered and saturated with dark brown matter which essentially seemed faecal. It appeared to include all or most of the fur from the previously eaten mice, which begs the question, why didn't the snake simply pass this all out as faeces in the usual way?

CONCLUSIONS

The observation of the passing of the fur balls in both cases was by chance and fortuitous. That I was the first person known to observe and record this in this species is not altogether surprising.

Factors at play include the time duration that snakes were being handled, a situation a normal hobbyist keeper with a snake in a cage would never experience. After all, they would not be observing their snakes individually for several hours at a time on a regular basis.

The snake subject of this paper may have been pre-disposed to pass fur balls as a 10 year old adult due to its higher than usual propensity to regurgitate normal large meals as a hatchling and in its first year of life.

The timing of feeding and then handling (5 days apart in both cases) was also probably favourable for the fur ball regurgitation incidents observed.

It is possible that the extended handling of the snake could have contributed to the fur ball regurgitation as opposed to a normal passing of faeces. However this concept is rejected.

Rather I think that the regurgitation may have been brought forward by the handling as opposed to being caused by it.

Snakes handled and moved around that are due to pass faeces, will do this sooner than would otherwise be the case when the snakes are left in a cage and not handled. Every snake handler knows this and after doing hands on reptile shows for some decades, this is a statement of the obvious.

In the normal course of events and all cases I am aware of, save for the two documented herein, a snake about to pass faeces, when handled or even mishandled by someone as sometimes occurs with inexperienced members of the public will still pass the faeces. It does not regurgitate from the lower digestive tract instead.

Finally, in the period from end 2018 to mid 2019, faeces or what appears to be faeces passed by the relevant male Black-headed Python has been closely inspected when removed from its cage (where it usually lives on its own).

On at least two occasions (separate to the incidents referred to above) what appears to be faeces has been taken from the case in the absence of any urates, indicating it too may have been derived from a regurgitation rather than passed as faeces.

Because I did not observe either a bowel motion or regurgitation, I cannot determine what happened in these cases, noting that sometimes urates are passed separate to a main faeces.

White-lipped Pythons *Leiopython albertisi* (Peters and Doria, 1878) and *Leiopython hoserae* Hoser, 2000 have been alleged to regurgitate fur balls (Chris Williams, Taronga Zoo, personal communication), but whether the source of these is from the stomach or lower intestine (as happened with the snake subject of this paper) is unknown.

Other alleged species of *Leiopython* named by law-breaking German amateur snake hobbyist Wulf Schleip (e.g. *L. meridionalis* Schleip, 2014) are either fictitious (non-existent) taxon or unlawful junior synonyms, meaning all two snake species in the entirety of that genus pass furballs.

Relying on the preamble of Kaiser *et al.* (2013) which is hard to disagree with (it states taxa should only be named when there is a body of evidence to do so and proper peer review), I note that because Schleip's names are coined without a shred of scientific evidence and in journals that lack any credible form of peer review, the names must be rejected and not used.

Because all the several alleged species of *Leiopython* named by Schleip are in breach of Kaiser *et al.* (2013), including other versions as published by Kaiser (2012a, 2012b, 2013, 2014a and 2014b) and the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999), they are either unavailable according to these rules or alternatively illegally coined junior synonyms. A detailed appraisal of Schleip's taxonomic vandalism and of Kaiser *et al.* (2013) as amended since is detailed in Hoser

(2009, 2013 and 2015a-f) and the sources cited therein.

In summary the preceding indicates that while regurgitation of fur balls by rodent eating pythons is almost certainly not a ubiquitous trait among pythons, it may well be far more common than indicated by the paucity of documented cases so far.

It is important that fortuitous observations of such actions in snakes by hobbyists and other keepers, as well as other potentially unrecorded behavioural traits, be properly reported in the peer reviewed scientific literature.

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A new species of *Philocryphus* Fletcher, 1894 (Amphibia: Myobatrachidae) from north-east Victoria and south-east New South Wales.

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ABSTRACT

For some years it has been suspected by herpetologists that the frogs assigned to the species *Heleioporus australiacus* (Shaw and Nodder, 1795) in south-east Australia may comprise more than one species.

The nominate form from the Sydney basin and nearby parts of New South Wales differs morphologically and genetically from those specimens found in the vicinity of south-east New South Wales and nearby north-east Victoria.

In spite of known differences between the two populations, the southern population has not been taxonomically recognized.

Due to the long-term threats to the ongoing existence of this taxon, it is important that it be scientifically recognized and named sooner, rather than later and before extinction occurs.

The genetic data presented by Morgan *et al*. (2007) confirms that the relevant population is sufficiently divergent from that further north so as to warrant being formally named at the species level.

This paper formally names the new taxon *Philocryphus hoserae sp. nov.* in accordance with the rules set out by the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

The generic assignment of this taxon and the better known *Heleioporus australiacus* (Shaw and Nodder, 1795) in this paper is to the available genus *Philocryphus* Fletcher, 1894 in line with the placement by Wells and Wellington (1985). It is further supported by the genetic evidence of Morgan *et al*. (2007) at fig. 5.

Due to significant divergence from other west Australian *Heleioporus* Gray, 1841, the species until now known as *Heleioporus barycragus* Lee, 1967 is transferred to a new genus, *Paraheleioporus gen. nov.*.

Keywords: Taxonomy; nomenclature; Frogs; *Heleioporus*; *australiacus*; *barycragus*; new genus; *Paraheleioporus*; new species; *hoserae.*

INTRODUCTION

The Giant Burrowing frog, most widely known as *Heleioporus australiacus* (Shaw and Nodder, 1795) is a well known and iconic species of frog from the Sydney region and nearby sandstone parts of coastal New South Wales.

The species as is currently known is described in Hoser (1999), with photos of adult male and female specimens of the typical Sydney form depicted.

They are usually found in association with sandy heath-type habitats, although they do extend to nearby forested areas in places such as Kurringai Chase on Sydney's northern outskirts, (that is dry forest habitats in close proximity to sandy heaths).

A disjunct southern population from far southern New South Wales and nearby parts of North-east Victoria until now treated as conspecific is the main subject of this paper and herein formally named as a new species.

Morphologically the adult specimens are quite different and this has led to a strong suspicion by many herpetologists that it may in fact be a separate taxon, worthy of formal recognition.

This view was summed up by Graeme Gillespie, who in 2010 wrote the following in a report:

"*Subspecies*: A distinct disjunction of 100km occurs in the distribution of the Giant Burrowing Frog records between Jervis Bay and Narooma (Lemckert *et al.* 1998; Gillespie and Hines 1999). There is genetic, morphological and bioclimatic evidence that populations to the north and south of this gap are distinct and separate evolutionary lineages (Penman *et al*. 2005a; Mahony *et al.* unpublished data). It is my opinion that these data are strong evidence of two distinct sub-species, although they have not yet been formally described as such. It has also been argued that they represent separate species (Penman *et al.* 2004, 2005a). Based upon the available evidence, these populations are different evolutionary and ecological management units and therefore should be treated as distinct taxa from a conservation perspective; here-in referred to as northern and southern forms of the Giant Burrowing Frog."

Genetic evidence provided by Morgan *et al.* (2007), confirm that the level of genetic divergence between northern and southern populations is of a level to warrant division at the species level.

As a result of this data and obvious morphological divergence between the geographically disjunct populations, I have absolutely no hesitation in formally describing the southern population as a new species.

Wells and Wellington further transferred the species *H. australiacus* to the genus *Philocryphus* Fletcher, 1894 without an explicit description as to their reasoning. However anyone vaguely familiar with the said frogs, would have realised that their transfer of both *H. australiacus* and *H. barycragus* Lee, 1967 was due to the morphological divergence between these two and other members within *Heleioporus sensu lato.* The more recent genetic evidence of Morgan *et al.* (2007), confirms the divergence of both taxa from the other species within *Heleioporus*, but in turn shows both *H. australiacus* and *H. barycragus* to also be sufficiently divergent to be placed in separate genera.

Their estimated divergence was in the order of about 30 MYA from one another and in terms of *H. barycragus*, 20 MYA from all other *Heleioporus. H. australiacus* showed a 30 MYA divergence from other *Heleioporus.*

The newly described species in this paper is self-evidently placed in the genus *Philocryphus* as it is clearly a species closely associated with the other member of that genus and formally named below.

MATERIALS AND METHODS

From the abstract and introduction, these are self-evident. In summary live specimens of all known species within *Heleioporus sensu lato* have been inspected by this author over some decades. The taxonomic decisions made in this paper derive from these inspections and the findings made and published in relevant scientific literature. The final result of relevance in this paper being the formal description of a new south-east Australian species of frog and a new Western Australian genus of frog, herein treated as monotypic.

Literature relevant to the taxonomic and nomenclatural decisions made and acts taken in this paper are the following: Anstis (1974, 2002), Barker *et al.* (1995), Cogger (2014), Cogger *et al.* (1983), Fletcher (1894), Gillespie (1990, 1997, 2010), Gillespie and Hines (1999), Gray (1841), Hoser (1989), Hoser (1991), Lee (1967), Lemckert and Brassil (2003), Lemckert *et al.* (1998), Littlejohn and Martin (1967), Mahony (1993), Morgan *et al.* (2007), Penman *et al.* (2004, 2005a, 2005b, 2006, 2008a, 2008b). Ride *et al.* (1999), Shaw and Nodder (1795), Watson and Martin (1973), Wells and Wellington (1985), Westaway *et al.* (1990), White (1999) and sources cited therein.

In terms of the descriptions below, in line with the stated preferences of the ICZN (as per the written guidelines on www.zoobank.org as of 2017), the new genus description is done before the new species description.

The spellings of each name should not be altered unless absolutely mandatory according to the rules of the ICZN as published in the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

PARAHELEIOPORUS GEN. NOV.

LSID urn:lsid:zoobank.org:act:40E9BC08-F4EC-4566-9AE4-739B51B9CCC5

Type species: *Heleioporus barycragus* Lee, 1967.

Diagnosis: *Paraheleioporus gen. nov..* has until now been treated as a species within the genus *Heleioporus* Gray, 1841.

The genera *Heleioporus*, *Philocryphus* Fletcher, 1894 and *Paraheleioporus gen. nov.* (all until recently treated as being in the genus *Heleioporus*) are separated from all other Limnodynastidae frogs by the following suite of characters: Maxillary teeth are present; there are no bright red patches in the groin; no dentary pseudoteeth; fingers are without a trace of webbing; digits are without terminal discs; no frontoparietal foramen in adults; there are vomerine teeth between the choanae; inner metatarsal tubercle is white and unpigmented; adult sternum is calcified and bifid posteriorly.

Paraheleioporus gen. nov. is separated from all species of *Heleioporus* and *Philocryphus* Fletcher, 1894 by the following suite of characters: A back that is more-or-less uniform in colour, or otherwise lacking a marbled pattern and never with large white or yellow spots; dorsally a uniform chocolate-brown or dark grey with yellow or white spots restricted to the sides; inner metatarsal tubercle in adults is at least half the length of the fourth toe (versus less than half in *Philocryphus*); there are two rows of small papillae in the anterior corner of the eye (as opposed to a single flap in *Philocryphus*).

Distribution: Restricted to the Darling Range and foothills east of Perth in south-west Western Australia.

Content: *Paraheleioporus barycragus* (Lee, 1967) (Monotypic).

PHILOCRYPHUS HOSERAE SP. NOV.

LSID urn:lsid:zoobank.org:act:02EA8F4A-1826-403F-885A-306648D7B4AA

Holotype: A preserved specimen held at the National Museum of Victoria, Melbourne, Victoria, Australia, specimen number: D67390, collected on the Bruthen to Nowa Nowa Road, 3.5 km west of Stony Creek, East Gippsland, Victoria, Latitude -37.70 S., Longitude 147.98 E. The National Museum of Victoria, Melbourne, Victoria, Australia allows access to its holdings.

Paratype: A preserved specimen held at the National Museum of Victoria, Melbourne, Victoria, Australia, specimen number: D73039, collected from East Gippsland, at Latitude -37.38 S., Longitude 148.35 E.

Diagnosis: The species *Philocryphus hoserae sp. nov.* has until now been treated as a southern population of *Philocryphus australiacus* (Shaw and Nodder, 1795), better known in most contemporary texts as *Heleioporus australiacus* (Shaw and Nodder, 1795). Both taxa are readily separated from all other Australian frogs, as *H australiacus* by the keys and description in Cogger (2014).

Adult *P. hoserae sp. nov.* of both sexes are readily separated from adult *P. australiacus* of both sexes by colouration. Adult *P. hoserae sp. nov.* have numerous distinctive large yellow spots on each side of the flanks, numbering more than 25, versus few such spots and of significantly lesser size and intensity in *P. australiacus* always numbering less than 20, and usually far less than that.

In adult *P. hoserae sp. nov.* at the back of the upper jawline and below the ear is a thick yellow bar, which in adult *P. australiacus* is either thin or broken.

Adult female *P. australiacus* have noticeable significant lightening at the anterior of the upper snout, tending to a whiteish grey colour, which is not the case in adult female *P. hoserae sp. nov.*.

In tadpoles, *P. hoserae sp. nov.* has 5 teeth on either side of the top of the mouth versus 4 on either side in *P. australiacus.*

Philocryphus Fletcher, 1894 including the species *Philocryphus australiacus* (Shaw and Nodder, 1795) and *Philocryphus hoserae sp. nov.* (herein taken as including the entirety of the genus) are separated from all other species in *Paraheleioporus gen. nov.* and *Heleioporus* (all three genera treated as being the single genus *Heleioporus* in major texts such as Cogger (2014) preceding this paper) by the following suite of characters: A back that is not more-or-less uniform in colour or a back with a marbled pattern and with large white or yellow spots; dorsally a uniform chocolate-brown or dark grey with yellow or white spots restricted to the sides; inner metatarsal tubercle in adults is less than half the length of the fourth toe (versus at least half in *Paraheleioporus gen. nov.*); there is a single flap in the anterior corner of the eye (as opposed to two rows of small papillae in *Paraheleioporus gen. nov.*).

Distribution: South-east New South Wales, south from about Narooma, into north-east Victoria, being on the eastern side of the Great Dividing Range.

Etymology: Named in honour of my magnificent wife Shireen

Hoser in recognition of her monumental contributions to wildlife conservation over more than 2 decades.

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CONFLICT OF INTEREST

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A long overdue genus-level division of the gecko genus *Hemiphyllodactylus* Bleeker, 1860 *sensu lato*.

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ABSTRACT

The gecko genus *Hemiphyllodactylus* Bleeker, 1860 as defined by most recent authors is an assemblage of Asian geckos of conservative morphological divergence. Notwithstanding this, numerous molecular studies have shown the group to consist of a number of significantly ancient divergent lineages. This warrants a split of the genus as is currently recognized in accordance with the rules of the *International Code of Zoological Nomenclature* (Ride *et al*. 1999).

To bring the taxonomy of the group into line with other geckos, the genus *Hemiphyllodactylus* is divided four ways. The largest group of species remains in *Hemiphyllodactylus* but this is divided into two subgenera, the second formally named for the first time.

The available name *Cainodactylus* Barbour, 1924 is resurrected for the *Gehyra yunnanensis* Boulenger, 1903 species group, with it also being divided into two subgenera, the second formally named for the first time.
The so-called *Lepidodactylus harterti* Werner, 1900 group, most recently treated as part of *Hemiphyllodactylus* is split into two newly named genera, one split into two subgenera, all formally named for the first time.

Keywords: Geckos; Taxonomy; nomenclature; Asia; *Gehyra*; *Hemiphyllodactylus*; *Lepidodactylus*; *Cainodactylus*; new genera; *Cassandracambellea*; *Malayacolotes*; new subgenera; *Ferehemiphyllodactylus*; *Maculacruscalotes*; *Titiwangsacolotes*; new species; *cassandracambellae.*

INTRODUCTION

The Asian gecko genus *Hemiphyllodactylus* Bleeker, 1860 as defined by most recent authors is an assemblage of Asian geckos of conservative morphological divergence.
Over the past two centuries, geckos in this genus and morphologically similar species have been treated as being in a number of different genera including *Gehyra* Gray, 1834, *Hemidactylus* Oken, 1817 and *Lepidodactylus* Fitzinger, 1843.

Molecular studies have largely resolved the overall placement of species within the current taxonomy and available genus group names. However those remaining in the genus *Hemiphyllodactylus* as generally defined as of 2018 are one of a number of putative genus-level groups shown to be deeply divergent in terms of dates of common ancestry.
The relevant species groups are also morphologically divergent from one another.
In combination, this warrants a split of the genus as is currently recognized in accordance with the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

As part of a global audit of the planet's herpetofauna and to bring the taxonomy of the group into line with other geckos, the genus *Hemiphyllodactylus* is divided four ways. The largest group of species remains in *Hemiphyllodactylus* but this is divided into two subgenera, the second formally named for the first time

The available name *Cainodactylus* Barbour, 1924 is resurrected for the *Gehyra yunnanensis* Boulenger, 1903 species group, with it also being divided into two subgenera, the second formally named for the first time.
The so-called *Lepidodactylus harterti* Werner, 1900 group, most recently treated as part of *Hemiphyllodactylus* is split into two newly named genera, one split into two subgenera, all formally named for the first time.

MATERIALS, METHODS AND RESULTS

These are summarized in the introduction. The basis of the results came from an audit of the relevant species in terms of relevant literature over the past 200 years, combined with examinations of specimens when required.

As mentioned already, *Hemiphyllodactylus* is divided into four genera.

This is in an arrangement that matches phylogenies published by Grismer *et al.* (2017) and where relevant, also Pyron *et al.* (2013).
Two genera are formally named for the first time. 6 subgenera are also identified with three being formally named for the first time.
Even if a reclassification is done at the most conservative of levels, *Hemiphyllodactylus* would need to be split, with the second genus-level grouping being the so-called *Lepidodactylus harterti* Werner, 1900 group as identified by Grismer *et al.* 2017. However divergences between the two main clades are sufficiently deep to warrant a full genus-level split between the two.

More than ten unnamed species have been identified in the literature cited herein, but due to statements within these papers by the relevant authors that they intend formally naming them, they have been left unnamed and effectively ignored for the purposes of this paper.

Exceptional to this is a single species treated until now as a subpopulation of "*Hemiphyllodactylus titiwangsaensis* Zug, 2010" herein placed in a newly named genus, which no author has yet stated an intent on naming.

Relevant literature in terms of the taxonomic decisions herein include the following: Baker (2018), Barbour (1924), Bauer and Das (1999), Beddome (1870), Bleeker (1860), Bobrov and Semenov (2008), Boulenger (1885, 1887, 1900, 1903), Brongersma (1931), Brown and Alcala (1978), Chan-ard *et al.* (2015), Chandramouli *et al.* (2012), Cox *et al.* (1998), Daniels (1994), Das (2004), de Rooij (1915), Gaulke (2011), Gray (1842, 1845), Grismer (2011a, 2011b), Grismer, *et al.* (2010, 2013, 2014, 2015, 2017), Günther (1872), Guo *et al.* (2015), Koch (2012), Malkmus *et al.* (2002), Manthey and Grossmann (1997), Mertens (1930), Pyron *et al.* (2013), Röll (2006), Rösler (1995, 2017), Sang *et al.* (2009), Schröder and Röll (2004), Smith (1935), Somaweera and Somaweera (2009), Sukprasert *et al.* (2018), Sung *et al.* (2018), Taylor (1918, 1922, 1953, 1963), Tri *et al.* (2014), Werner (1900), Zhao and Adler (1993), Zhou and Liu (1981), Zhou *et al.* (1996), Zug (1991, 2010), Zug and Kaiser (2014) and sources cited therein.

In terms of the descriptions below the following should be noted. Spellings of names, gender or similar should not be altered in any way unless absolutely mandatory according to the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999). In the unlikely event that a later author or so-called "first reviser" seeks to merge named taxa, then the name to be used should be that first used in this paper, as dictated by page priority and order in the keywords of the abstract.

Material may be repeated in sequential descriptions in order to ensure that each complies wholly with the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

HEMIPHYLLODACTYLUS BLEEKER, 1860

Type species: *Hemiphyllodactylus typus* Bleeker, 1860.

Diagnosis: The genus *Hemiphyllodactylus* Bleeker, 1860 *sensu lato*, as defined to date is separated from other Asian gecko genera by the following suite of characters: Numerous adhesive lamellae on widened digits; tail is not lobulate; no skin fringe on the side of the body; terminal joints of digits are not united with the widened lamellae, subdigital lamellae are always divided; inner digit is vestigial, without free terminal joint; the claw is minute and often concealed.

Hemiphyllodactylus has now been divided into four genera, two named for the first time and while all conform to the preceding diagnosis, can be separated from one another by the following additional character suites:

Hemiphyllodactylus Bleeker, 1860 type species *H. typus*, as defined herein is separated from the other three genera by one or other of the following five suites of characters:

1/ Chin scales bordering mental scale posteriorly slightly or not enlarged, their size nearly same as more medial chin scales; caecum and gonadal-duct peritoneum pigmentation usually black; adult females with actively secreting precloacal and femoral pores; unisexual species, all individuals are females; adult size often more than 36 mm SVL, (subgenus *Hemiphyllodactylus* part), or:

2/ Six chin scales; no enlarged postmentals; five circumnasal scales; three or four scales between the supranasals; 12 supralabials; 24 or 25 dorsal scales; 14 ventral scales; a lamellar forefoot formula of 4-5-5-4, 5-5-5-4 or 4-4-5-4; a contiguous femoroprecloacal pore series of 42; five cloacal spurs in males; no enlarged subcaudal scales; no dark postorbital stripes or striping on body; small dark blotches on the upper body; a yellowish postsacral mark bearing anteriorly projecting arms; and a pigmented caecum and gonads (subgenus *Hemiphyllodactylus* part), or:

3/ Chin scales bordering mental scale posteriorly slightly or not enlarged, their size nearly same as more medial chin scales; caecum and gonadal-duct peritoneum pigmentation usually black, adult females with no or fewer than five secreting precloacal pores; adult size seldom greater than 38 mm SVL; three or four U-shaped digital lamellae under fourth digit of forefoot; dorsal trunk pattern muted, faded and small dark blotches or widely separated dark spots; postsacral mark with U- or V-shaped outer edge of yellow or red; dorsolateral spots yellow or red, (subgenus *Hemiphyllodactylus* part) or:

4/ Chin scales bordering mental scale posteriorly distinctly enlarged, appear as a pair of scales labelled postmentals in other geckos; caecum and gonadal peritoneum white; precloacal and femoral pore series separate; females commonly with precloacal pores; forefoot digital lamellar formula usually 4-4-4-4, (subgenus *Ferehemiphyllodactylus subgen. nov.* part), or:

5/ Chin scales bordering mental scale posteriorly distinctly enlarged appear as a pair of scales usually labelled postmentals in other geckos; caecum and gonadal peritoneum white; precloacal and femoral pore series continuous; females usually lack precloacal pores; forefoot digital lamellar formula 3-3-3-3 or 3-4-4-4; adults moderate size, usually less than 42 mm SVL; hindfoot digital lamellar formula usually 3-4-4-4, occasionally higher; postsacral mark without anterior arms; trunk usually without dark dorsolateral stripe; precloacal and femoral pore series continuous usually with less than 23 pores; precloacal and femoral pore series usually more than 18 pores (subgenus *Ferehemiphyllodactylus subgen. nov.* part).

The genera *Cainodactylus* Barbour, 1924, *Cassandracampbellea gen. nov.* and *Malayacolotes gen. nov.* are each separated from *Hemiphyllodactylus* and *Ferehemiphyllodactylus subgen. nov.* as defined below,

The genus *Cainodactylus* Barbour, 1924, type species *Cainodactylus yunnanensis* Barbour, 1924 is separated from the other three genera by one or other of the following three suites of characters:

1/ Chin scales bordering mental scale posteriorly distinctly enlarged appear as a pair of scales usually labelled postmentals in other geckos; caecum and gonadal peritoneum white; precloacal and femoral pore series continuous; females usually lack precloacal pores; forefoot digital lamellar formula 3-3-3-3 or 3-4-4-4; adults moderate size, usually less than 42 mm SVL; hindfoot digital lamellar formula usually 3-4-4-4, occasionally higher; postsacral mark without anterior arms; trunk usually without dark dorsolateral stripe; precloacal and femoral pore series continuous usually with less than 26 pores; precloacal and femoral pore series usually more than 23 pores; postsacral mark of anterior dark blotch and posterior larger light bar or alternatively this marking may be absent (subgenus *Cainodactylus* part), or:

2/ less than 39.5 mm SV length in adults; 7-10 chin scales; 5 circumnasal scales; 1-5 scales between supranasals; 9-12 supralabials; 8-11 infralabials; 16-18 dorsal scale rows; 8-10 ventral scale rows; lamellar formula on forefoot 4-4-4-4; lamellar formula on hindfoot 4-5-5-5; femoral pores absent in both sexes, 9 precloacal pores in males; 1 or 2 cloacal spurs on each side present in both sexes; dark postorbital stripe; no anteriorly projecting arms of postsacral mark, (subgenus *Cainodactylus* part), or:

3/ Chin scales bordering mental scale posteriorly slightly or not enlarged, their size nearly same as more medial chin scales; caecum and gonadal-duct peritoneum pigmentation usually black; adult females with no or fewer than five secreting precloacal pores; adult size seldom greater than 38 mm SVL; usually two U-shaped digital lamellae under the fourth digit of forefoot; dorsal trunk pattern is bold, transverse dark blotches, longitudinal series of white dorsolateral spots and postsacral mark of dark brown and orange, (subgenus *Maculacruscalotes subgen. nov.*).

The genus *Cassandracampbellea gen. nov.* type species *Lepidodactylus harterti* Werner, 1900, is separated from the other three genera by the following suite of characters: Chin scales bordering mental scale posteriorly distinctly enlarged and appear as a pair of scales labelled postmentals in other geckos; caecum and gonadal peritoneum white; precloacal and femoral pore series continuous; females usually lack precloacal pores; forefoot digital lamellar formula 3-3-3-3 or 3-4-4-4, rarely higher; adults of moderate size, usually less than 42 mm SVL; postsacral mark without anterior arms; trunk usually with a distinct dark dorsolateral stripe; precloacal and femoral pore series continuous with 44-45 pores in males and a single cloacal spur.

The genus *Malayacolotes gen. nov*. type species *Gehyra larutensis* Boulenger, 1900 is separated from the other three genera by one or other of the following suites of characters:

1/ Chin scales bordering mental scale posteriorly distinctly enlarged and appear as a pair of scales labelled postmentals in other geckos; caecum and gonadal peritoneum white; precloacal and femoral pore series continuous; females usually lack precloacal pores; forefoot digital lamellar formula 3-3-3-3 or 3-4-4-4, rarely higher; adults of moderate size, usually less than 42 mm SVL; postsacral mark without anterior arms; trunk usually with a distinct dark dorsolateral stripe; precloacal and femoral pore series continuous with 2-36 pores in males and two to three cloacal spurs (subgenus *Malayacolotes gen. nov.*), or:

2/ Adults large, usually more than 45 mm SVL; chin scales bordering mental scale posteriorly distinctly enlarged and appear as a pair of scales labelled postmentals in other geckos; caecum and gonadal peritoneum white; precloacal and femoral pore series continuous usually more than 22 (17-39) pores; females usually lack precloacal pores; forefoot digital lamellar formula 3-3-3-3 or 3-4-4-4, hindfoot digital lamellar formula is usually 4-4-5-5 or 4-5-5-5; postsacral mark with anterior arms (subgenus *Titiwangsacolotes subgen. nov.*).

Distribution: South-east Asia, mainly Indonesia, but introduced elsewhere in south-east Asia and the Pacific.

Content: *Hemiphyllodactylus typus* Bleeker, 1860 (type species); *H. changningensis* Guo, Zhou, Yan and Li, 2015; *H. chiangmaiensis* Grismer, Wood and Cota, 2014; *H. engganoensis* Grismer, Riyanto, Iskander and McGuire, 2014; *H. ganoklonis* Zug, 2010; *H. insularis* Taylor, 1918; *H. jinpingensis* (Zhou and Liu, 1981); *H. khlonglanensis* Sukprasert, Sutthiwises, Lauhachinda and Taksintum, 2018; *H. linnwayensis* Grismer, Wood, Thura, Zin, Quah, Murdoch, Grismer, Li, Kyaw and Lwin, 2017; *H. longlingensis* (Zhou and Liu, 1981); *H. margarethae* Brongersma, 1931; *H. montawaensis* Grismer, Wood, Thura, Zin, Quah, Murdoch, Grismer, Li, Kyaw and Lwin, 2017; *H. tonywhitteni* Grismer, Wood, Thura, Zin, Quah, Murdoch, Grismer, Li, Kyaw and Lwin, 2017.

SUBGENUS *FEREHEMIPHYLLODACTYLUS SUBGEN. NOV.*

LSID urn:lsid:zoobank.org:act:41718D5B-5496-4215-9996-084000CF3FB1

Type species: *Hemiphyllodactylus yunnanensis jinpingensis* Zhou and Liu, 1981.

Diagnosis: The genus *Hemiphyllodactylus* Bleeker, 1860 *sensu lato*, as defined to date is separated from other Asian gecko genera by the following suite of characters: Numerous adhesive lamellae on widened digits; tail is not lobulate; no skin fringe on the side of the body; terminal joints of digits are not united with the widened lamellae, subdigital lamellae are always divided; inner digit is vestigial, without free terminal joint; the claw is minute and often concealed.

Hemiphyllodactylus has now been divided into four genera, two named for the first time and while all conform to the preceding diagnosis, can be separated from one another by the following additional character suites:

Hemiphyllodactylus Bleeker, 1860 type species *H. typus*, as defined herein is separated from the other three genera by one or other of the following five suites of characters:

1/ Chin scales bordering mental scale posteriorly slightly or not enlarged, their size nearly same as more medial chin scales; caecum and gonadal-duct peritoneum pigmentation usually black; adult females with actively secreting precloacal and femoral pores; unisexual species, all individuals are females; adult size often more than 36 mm SVL, (subgenus *Hemiphyllodactylus* part), or:

2/ Six chin scales; no enlarged postmentals; five circumnasal scales; three or four scales between the supranasals; 12 supralabials; 24 or 25 dorsal scales; 14 ventral scales; a lamellar forefoot formula of 4-5-5-4, 5-5-5-4 or 4-4-5-4; a contiguous femoroprecloacal pore series of 42; five cloacal spurs in males; no enlarged subcaudal scales; no dark postorbital stripes or striping on body; small dark blotches on the upper body; a yellowish postsacral mark bearing anteriorly projecting arms; and a pigmented caecum and gonads (subgenus *Hemiphyllodactylus* part), or:

3/ Chin scales bordering mental scale posteriorly slightly or not enlarged, their size nearly same as more medial chin scales; caecum and gonadal-duct peritoneum pigmentation usually black, adult females with no or fewer than five secreting precloacal pores; adult size seldom greater than 38 mm SVL; three or four U-shaped digital lamellae under fourth digit of forefoot; dorsal trunk pattern muted, faded and small dark blotches or widely separated dark spots; postsacral mark with U- or V-shaped outer edge of yellow or red; dorsolateral spots yellow or red, (subgenus *Hemiphyllodactylus* part) or:

4/ Chin scales bordering mental scale posteriorly distinctly enlarged, appear as a pair of scales labelled postmentals in other geckos; caecum and gonadal peritoneum white; precloacal and femoral pore series separate; females commonly with precloacal pores; forefoot digital lamellar formula usually 4-4-4-4, (subgenus *Ferehemiphyllodactylus subgen. nov.* part), or:

5/ Chin scales bordering mental scale posteriorly distinctly enlarged appear as a pair of scales usually labelled postmentals in other geckos; caecum and gonadal peritoneum white; precloacal and femoral pore series continuous; females usually lack precloacal pores; forefoot digital lamellar formula 3-3-3-3 or 3-4-4-4; adults moderate size, usually less than 42 mm SVL; hindfoot digital lamellar formula usually 3-4-4-4, occasionally higher; postsacral mark without anterior arms; trunk usually without dark dorsolateral stripe; precloacal and femoral pore series continuous usually with less than 23 pores; precloacal and femoral pore series usually more than 18 pores (subgenus *Ferehemiphyllodactylus subgen. nov.* part).

The genus *Cainodactylus* Barbour, 1924, type species *Cainodactylus yunnanensis* Barbour, 1924 is separated from the other three genera by one or other of the following three suites of characters:

1/ Chin scales bordering mental scale posteriorly distinctly enlarged appear as a pair of scales usually labelled postmentals in other geckos; caecum and gonadal peritoneum white; precloacal and femoral pore series continuous; females usually lack precloacal pores; forefoot digital lamellar formula 3-3-3-3 or 3-4-4-4; adults moderate size, usually less than 42 mm SVL; hindfoot digital lamellar formula usually 3-4-4-4, occasionally higher; postsacral mark without anterior arms; trunk usually without dark dorsolateral stripe; precloacal and femoral pore series continuous usually with less than 26 pores; precloacal and femoral pore series usually more than 23 pores; postsacral mark of anterior dark blotch and posterior larger light bar or alternatively this marking may be absent (subgenus *Cainodactylus* part), or:

2/ less than 39.5 mm SV length in adults; 7-10 chin scales; 5 circumnasal scales; 1-5 scales between supranasals; 9-12 supralabials; 8-11 infralabials; 16-18 dorsal scale rows; 8-10 ventral scale rows; lamellar formula on forefoot 4-4-4-4; lamellar formula on hindfoot 4-5-5-5; femoral pores absent in both sexes, 9 precloacal pores in males; 1 or 2 cloacal spurs on each side present in both sexes; dark postorbital stripe; no anteriorly projecting arms of postsacral mark, (subgenus *Cainodactylus* part), or:

3/ Chin scales bordering mental scale posteriorly slightly or not enlarged, their size nearly same as more medial chin scales; caecum and gonadal-duct peritoneum pigmentation usually black; adult females with no or fewer than five secreting precloacal pores; adult size seldom greater than 38 mm SVL; usually two U-shaped digital lamellae under the fourth digit of forefoot; dorsal trunk pattern is bold, transverse dark blotches, longitudinal series of white dorsolateral spots and postsacral mark of dark brown and orange, (subgenus *Maculacruscalotes subgen. nov.*).

The genus *Cassandracampbellea gen. nov.* type species *Lepidodactylus harterti* Werner, 1900, is separated from the other three genera by the following suite of characters: Chin scales bordering mental scale posteriorly distinctly enlarged and appear as a pair of scales labelled postmentals in other geckos; caecum and gonadal peritoneum white; precloacal and femoral pore series continuous; females usually lack precloacal pores; forefoot digital lamellar formula 3-3-3-3 or 3-4-4-4, rarely higher; adults of moderate size, usually less than 42 mm SVL; postsacral mark without anterior arms; trunk usually with a distinct dark dorsolateral stripe; precloacal and femoral pore series continuous with 44-45 pores in males and a single cloacal spur.

The genus *Malayacolotes gen. nov*. type species *Gehyra larutensis* Boulenger, 1900 is separated from the other three genera by one or other of the following suites of characters:

1/ Chin scales bordering mental scale posteriorly distinctly enlarged and appear as a pair of scales labelled postmentals in other geckos; caecum and gonadal peritoneum white; precloacal and femoral pore series continuous; females usually lack precloacal pores; forefoot digital lamellar formula 3-3-3-3 or 3-4-4-4, rarely higher; adults of moderate size, usually less than 42 mm SVL; postsacral mark without anterior arms; trunk usually with a distinct dark dorsolateral stripe; precloacal and femoral pore series continuous with 2-36 pores in males and two to three cloacal spurs (subgenus *Malayacolotes gen. nov.*), or:

2/ Adults large, usually more than 45 mm SVL; chin scales bordering mental scale posteriorly distinctly enlarged and appear as a pair of scales labelled postmentals in other geckos; caecum and gonadal peritoneum white; precloacal and femoral pore series continuous usually more than 22 (17-39) pores; females usually lack precloacal pores; forefoot digital lamellar formula 3-3-3-3 or 3-4-4-4, hindfoot digital lamellar formula is usually 4-4-5-5 or 4-5-5-5; postsacral mark with anterior arms (subgenus *Titiwangsacolotes subgen. nov.*).

Distribution: Southern China, Thailand and Myanmar.

Etymology: In Latin *Ferehemiphyllodactylus* means not quite *Hemiphyllodactylus.*

Content: *Hemiphyllodactylus* (*Ferehemiphyllodactylus*) *jinpingensis* (Zhou and Liu, 1981) (type species); *H.* (*Ferehemiphyllodactylus*) *changningensis* Guo, Zhou, Yan and Li, 2015; *H.* (*Ferehemiphyllodactylus*) *chiangmaiensis* Grismer, Wood and Cota, 2014; *H.* (*Ferehemiphyllodactylus*) *khlonglanensis* Sukprasert, Sutthiwises, Lauhachinda and Taksintum, 2018; *H.* (*Ferehemiphyllodactylus*) *linnwayensis* Grismer, Wood, Thura, Zin, Quah, Murdoch, Grismer, Li, Kyaw and Lwin, 2017; *H.* (*Ferehemiphyllodactylus*) *longlingensis* (Zhou and Liu, 1981); *H.* (*Ferehemiphyllodactylus*) *montawaensis* Grismer, Wood, Thura, Zin, Quah, Murdoch, Grismer, Li, Kyaw and Lwin, 2017; *H.* (*Ferehemiphyllodactylus*) *tonywhitteni* Grismer, Wood, Thura, Zin, Quah, Murdoch, Grismer, Li, Kyaw and Lwin, 2017.

Content of the nominate subgenus *Hemiphyllodactylus* Bleeker, 1860: *Hemiphyllodactylus typus* Bleeker, 1860 (type species); *H.* (*Hemiphyllodactylus*) *engganoensis* Grismer, Riyanto, Iskander and McGuire, 2014; *H.* (*Hemiphyllodactylus*) *ganoklonis* Zug, 2010; *H.* (*Hemiphyllodactylus*) *insularis* Taylor, 1918; *H.* (*Hemiphyllodactylus*) *margarethae* Brongersma, 1931.

GENUS *CAINODACTYLUS* BARBOUR, 1924.

Type species: *Gehyra yunnanensis* Boulenger, 1903.

Diagnosis: The genus *Hemiphyllodactylus* Bleeker, 1860 *sensu lato*, as defined to date is separated from other Asian gecko genera by the following suite of characters: Numerous adhesive lamellae on widened digits; tail is not lobulate; no skin fringe on the side of the body; terminal joints of digits are not united with the widened lamellae, subdigital lamellae are always divided; inner digit is vestigial, without free terminal joint; the claw is minute and often concealed.

Hemiphyllodactylus has now been divided into four genera, two named for the first time and while all conform to the preceding diagnosis, can be separated from one another by the following additional character suites:

Hemiphyllodactylus Bleeker, 1860 type species *H. typus*, as defined herein is separated from the other three genera by one or other of the following five suites of characters:

1/ Chin scales bordering mental scale posteriorly slightly or not enlarged, their size nearly same as more medial chin scales; caecum and gonadal-duct peritoneum pigmentation usually black; adult females with actively secreting precloacal and femoral pores; unisexual species, all individuals are females; adult size often more than 36 mm SVL, (subgenus *Hemiphyllodactylus* part), or:

2/ Six chin scales; no enlarged postmentals; five circumnasal scales; three or four scales between the supranasals; 12 supralabials; 24 or 25 dorsal scales; 14 ventral scales; a lamellar forefoot formula of 4-5-5-4, 5-5-5-4 or 4-4-5-4; a contiguous femoroprecloacal pore series of 42; five cloacal spurs in males; no enlarged subcaudal scales; no dark postorbital stripes or striping on body; small dark blotches on the upper body; a yellowish postsacral mark bearing anteriorly projecting arms; and a pigmented caecum and gonads (subgenus *Hemiphyllodactylus* part), or:

3/ Chin scales bordering mental scale posteriorly slightly or not enlarged, their size nearly same as more medial chin scales; caecum and gonadal-duct peritoneum pigmentation usually black, adult females with no or fewer than five secreting precloacal pores; adult size seldom greater than 38 mm SVL; three or four U-shaped digital lamellae under fourth digit of forefoot; dorsal trunk pattern muted, faded and small dark blotches or widely separated dark spots; postsacral mark with U- or V-shaped outer edge of yellow or red; dorsolateral spots yellow or red, (subgenus *Hemiphyllodactylus* part) or:

4/ Chin scales bordering mental scale posteriorly distinctly enlarged, appear as a pair of scales labelled postmentals in other geckos; caecum and gonadal peritoneum white; precloacal and femoral pore series separate; females commonly with precloacal pores; forefoot digital lamellar formula usually 4-4-4-4, (subgenus *Ferehemiphyllodactylus subgen. nov.* part), or:

5/ Chin scales bordering mental scale posteriorly distinctly enlarged appear as a pair of scales usually labelled postmentals in other geckos; caecum and gonadal peritoneum white; precloacal and femoral pore series continuous; females usually lack precloacal pores; forefoot digital lamellar formula 3-3-3-3 or 3-4-4-4; adults moderate size, usually less than 42 mm SVL; hindfoot digital lamellar formula usually 3-4-4-4, occasionally higher; postsacral mark without anterior arms; trunk usually without dark dorsolateral stripe; precloacal and femoral pore series continuous usually with less than 23 pores; precloacal and femoral pore series usually more than 18 pores (subgenus *Ferehemiphyllodactylus subgen. nov.* part).

The genera *Cainodactylus* Barbour, 1924, *Cassandracampbellea gen. nov.* and *Malayacolotes gen. nov.* are each separated from *Hemiphyllodactylus* and *Ferehemiphyllodactylus subgen. nov.* as defined below,

The genus *Cainodactylus* Barbour, 1924, type species *Cainodactylus yunnanensis* Barbour, 1924 is separated from the other three genera by one or other of the following three suites of characters:

1/ Chin scales bordering mental scale posteriorly distinctly enlarged appear as a pair of scales usually labelled postmentals in other geckos; caecum and gonadal peritoneum white; precloacal and femoral pore series continuous; females usually lack precloacal pores; forefoot digital lamellar formula 3-3-3-3 or 3-4-4-4; adults moderate size, usually less than 42 mm SVL; hindfoot digital lamellar formula usually 3-4-4-4, occasionally higher; postsacral mark without anterior arms; trunk usually without dark dorsolateral stripe; precloacal and femoral pore series continuous usually with less than 26 pores; precloacal and femoral pore series usually more than 23 pores; postsacral mark of anterior dark blotch and posterior larger light bar or alternatively this marking may be absent (subgenus *Cainodactylus* part), or:

2/ less than 39.5 mm SV length in adults; 7-10 chin scales; 5 circumnasal scales; 1-5 scales between supranasals; 9-12 supralabials; 8-11 infralabials; 16-18 dorsal scale rows; 8-10 ventral scale rows; lamellar formula on forefoot 4-4-4-4; lamellar formula on hindfoot 4-5-5-5; femoral pores absent in both sexes, 9 precloacal pores in males; 1 or 2 cloacal spurs on each side present in both sexes; dark postorbital stripe; no anteriorly projecting arms of postsacral mark, (subgenus *Cainodactylus* part), or:

3/ Chin scales bordering mental scale posteriorly slightly or not enlarged, their size nearly same as more medial chin scales; caecum and gonadal-duct peritoneum pigmentation usually black; adult females with no or fewer than five secreting precloacal pores; adult size seldom greater than 38 mm SVL; usually two U-shaped digital lamellae under the fourth digit of forefoot; dorsal trunk pattern is bold, transverse dark blotches, longitudinal series of white dorsolateral spots and postsacral mark of dark brown and orange, (subgenus *Maculacruscalotes subgen. nov.*).

The genus *Cassandracampbellea gen. nov.* type species *Lepidodactylus harterti* Werner, 1900, is separated from the other three genera by the following suite of characters: Chin scales bordering mental scale posteriorly distinctly enlarged and appear as a pair of scales labelled postmentals in other geckos; caecum and gonadal peritoneum white; precloacal and femoral pore series continuous; females usually lack precloacal pores; forefoot digital lamellar formula 3-3-3-3 or 3-4-4-4, rarely higher; adults of moderate size, usually less than 42 mm SVL; postsacral mark without anterior arms; trunk usually with a distinct dark dorsolateral stripe; precloacal and femoral pore series continuous with 44-45 pores in males and a single cloacal spur.

The genus *Malayacolotes gen. nov.* type species *Gehyra larutensis* Boulenger, 1900 is separated from the other three genera by one or other of the following suites of characters:

1/ Chin scales bordering mental scale posteriorly distinctly enlarged and appear as a pair of scales labelled postmentals in other geckos; caecum and gonadal peritoneum white; precloacal and femoral pore series continuous; females usually lack precloacal pores; forefoot digital lamellar formula 3-3-3-3 or 3-4-4-4, rarely higher; adults of moderate size, usually less than 42 mm SVL; postsacral mark without anterior arms; trunk usually with a distinct dark dorsolateral stripe; precloacal and femoral pore series continuous with 2-36 pores in males and two to three cloacal spurs (subgenus *Malayacolotes gen. nov.*), or:

2/ Adults large, usually more than 45 mm SVL; chin scales bordering mental scale posteriorly distinctly enlarged and appear as a pair of scales labelled postmentals in other geckos; caecum and gonadal peritoneum white; precloacal and femoral pore series continuous usually more than 22 (17-39) pores; females usually lack precloacal pores; forefoot digital lamellar formula 3-3-3-3 or 3-4-4-4, hindfoot digital lamellar formula is usually 4-4-5-5 or 4-5-5-5; postsacral mark with anterior arms (subgenus *Titiwangsacolotes subgen. nov.*).

Content: *Cainodactylus yunnanensis* (Boulenger, 1903) (type species); *C. aurantiacus* (Beddome, 1870);

C. banaensis (Tri, Grismer, Thai and Wood, 2014); *C. dushanensis* (Zhou and Liu, 1981); *C. flaviventris* (Sukprasert, Sutthiwises, Lauhachinda and Taksintum, 2018); *C. hongkongensis* (Sung, Lee, Ng, Zhang and Yang, 2018); *C. huishuiensis* (Yan, Lin, Guo, Li and Zhou, 2016); *C. kiziriani* (Nguyen, Botov, Le Duc, Nophaseud, Bonkowski and Zeigler, 2014); *C. zugi* (Nguyen, Lehmann, Le Duc, Duong, Bonkowski and Ziegler, 2013).

Distribution: Southern Asia from China to the Indian Subcontinent.

SUBGENUS *MACULACRUSCALOTES SUBGEN. NOV.*

LSID urn:lsid:zoobank.org:act:3DBAE10D-3395-4D61-8959-DCAFA332AF96

Type species: *Hemidactylus aurantiacus* Beddome, 1870.

Diagnosis: The genus *Hemiphyllodactylus* Bleeker, 1860 *sensu lato*, as defined to date is separated from other Asian gecko genera by the following suite of characters: Numerous adhesive lamellae on widened digits; tail is not lobulate; no skin fringe on the side of the body; terminal joints of digits are not united with the widened lamellae, subdigital lamellae are always divided; inner digit is vestigial, without free terminal joint; the claw is minute and often concealed.

Hemiphyllodactylus has now been divided into four genera, two named for the first time and while all conform to the preceding diagnosis, can be separated from one another by the following additional character suites:

Hemiphyllodactylus Bleeker, 1860 type species *H. typus*, as defined herein is separated from the other three genera by one or other of the following five suites of characters:

1/ Chin scales bordering mental scale posteriorly slightly or not enlarged, their size nearly same as more medial chin scales; caecum and gonadal-duct peritoneum pigmentation usually black; adult females with actively secreting precloacal and femoral pores; unisexual species, all individuals are females; adult size often more than 36 mm SVL, (subgenus *Hemiphyllodactylus* part), or:

2/ Six chin scales; no enlarged postmentals; five circumnasal scales; three or four scales between the supranasals; 12 supralabials; 24 or 25 dorsal scales; 14 ventral scales; a lamellar forefoot formula of 4-5-5-4, 5-5-5-4 or 4-4-5-4; a contiguous femoroprecloacal pore series of 42; five cloacal spurs in males; no enlarged subcaudal scales; no dark postorbital stripes or striping on body; small dark blotches on the upper body; a yellowish postsacral mark bearing anteriorly projecting arms; and a pigmented caecum and gonads (subgenus *Hemiphyllodactylus* part), or:

3/ Chin scales bordering mental scale posteriorly slightly or not enlarged, their size nearly same as more medial chin scales; caecum and gonadal-duct peritoneum pigmentation usually black, adult females with no or fewer than five secreting precloacal pores; adult size seldom greater than 38 mm SVL; three or four U-shaped digital lamellae under fourth digit of forefoot; dorsal trunk pattern muted, faded and small dark blotches or widely separated dark spots; postsacral mark with U- or V-shaped outer edge of yellow or red; dorsolateral spots yellow or red, (subgenus *Hemiphyllodactylus* part) or:

4/ Chin scales bordering mental scale posteriorly distinctly enlarged, appear as a pair of scales labelled postmentals in other geckos; caecum and gonadal peritoneum white; precloacal and femoral pore series separate; females commonly with precloacal pores; forefoot digital lamellar formula usually 4-4-4-4, (subgenus *Ferehemiphyllodactylus subgen. nov.* part), or:

5/ Chin scales bordering mental scale posteriorly distinctly enlarged appear as a pair of scales usually labelled postmentals in other geckos; caecum and gonadal peritoneum white; precloacal and femoral pore series continuous; females usually lack precloacal pores; forefoot digital lamellar formula 3-3-3-3 or 3-4-4-4; adults moderate size, usually less than 42 mm SVL; hindfoot digital lamellar formula usually 3-4-4-4, occasionally higher; postsacral mark without anterior arms; trunk usually without dark dorsolateral stripe; precloacal and femoral pore series continuous usually with less than 23 pores; precloacal and femoral pore series usually more than 18 pores (subgenus *Ferehemiphyllodactylus subgen. nov.* part).

The genera *Cainodactylus* Barbour, 1924, *Cassandracampbellea gen. nov.* and *Malayacolotes gen. nov.* are each separated from *Hemiphyllodactylus* and *Ferehemiphyllodactylus subgen. nov.* as defined below,

The genus *Cainodactylus* Barbour, 1924, type species *Cainodactylus yunnanensis* Barbour, 1924 is separated from the other three genera by one or other of the following three suites of characters:

1/ Chin scales bordering mental scale posteriorly distinctly enlarged appear as a pair of scales usually labelled postmentals in other geckos; caecum and gonadal peritoneum white; precloacal and femoral pore series continuous; females usually lack precloacal pores; forefoot digital lamellar formula 3-3-3-3 or 3-4-4-4; adults moderate size, usually less than 42 mm SVL; hindfoot digital lamellar formula usually 3-4-4-4, occasionally higher; postsacral mark without anterior arms; trunk usually without dark dorsolateral stripe; precloacal and femoral pore series continuous usually with less than 26 pores; precloacal and femoral pore series usually more than 23 pores; postsacral mark of anterior dark blotch and posterior larger light bar or alternatively this marking may be absent (subgenus *Cainodactylus* part), or:

2/ less than 39.5 mm SV length in adults; 7-10 chin scales; 5 circumnasal scales; 1-5 scales between supranasals; 9-12 supralabials; 8-11 infralabials; 16-18 dorsal scale rows; 8-10 ventral scale rows; lamellar formula on forefoot 4-4-4-4; lamellar formula on hindfoot 4-5-5-5; femoral pores absent in both sexes, 9 precloacal pores in males; 1 or 2 cloacal spurs on each side present in both sexes; dark postorbital stripe; no anteriorly projecting arms of postsacral mark, (subgenus *Cainodactylus* part), or:

3/ Chin scales bordering mental scale posteriorly slightly or not enlarged, their size nearly same as more medial chin scales; caecum and gonadal-duct peritoneum pigmentation usually black; adult females with no or fewer than five secreting precloacal pores; adult size seldom greater than 38 mm SVL; usually two U-shaped digital lamellae under the fourth digit of forefoot; dorsal trunk pattern is bold, transverse dark blotches, longitudinal series of white dorsolateral spots and postsacral mark of dark brown and orange, (subgenus *Maculacruscalotes subgen. nov.*) the preceding being diagnostic for the subgenus *Maculacruscalotes subgen. nov.*. *Maculacruscalotes subgen. nov.* is treated herein as monotypic for *M. aurantiacus* (Beddome, 1870). However there are number of unnamed species currently identified as the single taxon which await formal scientific description.

The genus *Cassandracampbellea gen. nov.* type species *Lepidodactylus harterti* Werner, 1900, is separated from the other three genera by the following suite of characters: Chin scales bordering mental scale posteriorly distinctly enlarged and appear as a pair of scales labelled postmentals in other geckos; caecum and gonadal peritoneum white; precloacal and femoral pore series continuous; females usually lack precloacal pores; forefoot digital lamellar formula 3-3-3-3 or 3-4-4-4, rarely higher; adults of moderate size, usually less than 42 mm SVL; postsacral mark without anterior arms; trunk usually with a distinct dark dorsolateral stripe; precloacal and femoral pore series continuous with 44-45 pores in males and a single cloacal spur.

The genus *Malayacolotes gen. nov.* type species *Gehyra larutensis* Boulenger, 1900 is separated from the other three genera by one or other of the following suites of characters:

1/ Chin scales bordering mental scale posteriorly distinctly enlarged and appear as a pair of scales labelled postmentals in other geckos; caecum and gonadal peritoneum white; precloacal and femoral pore series continuous; females usually lack precloacal pores; forefoot digital lamellar formula 3-3-3-3 or 3-4-4-4, rarely higher; adults of moderate size, usually less than 42 mm SVL; postsacral mark without anterior arms; trunk usually with a distinct dark dorsolateral stripe; precloacal and femoral pore series continuous with 2-36 pores in males and two to three cloacal spurs (subgenus *Malayacolotes gen. nov.*), or:

2/ Adults large, usually more than 45 mm SVL; chin scales bordering mental scale posteriorly distinctly enlarged and appear as a pair of scales labelled postmentals in other geckos; caecum and gonadal peritoneum white; precloacal and femoral pore series continuous usually more than 22 (17-39) pores; females usually lack precloacal pores; forefoot digital lamellar formula 3-3-3-3 or 3-4-4-4, hindfoot digital lamellar formula is usually 4-4-5-5 or 4-5-5-5; postsacral mark with anterior arms (subgenus *Titiwangsacolotes subgen. nov.*).

Distribution: India (mainly western Ghats) and one or more locations in the Himalayan foothills and nearby ranges to the east, generally at high elevation localities.

Etymology: In Latin *Maculacruscalotes* means spotted legged gecko.

Content: *Maculacruscalotes aurantiacus* (Beddome, 1870) (type species) (species complex).

GENUS *CASSANDRACAMPBELLEA GEN. NOV.*

LSID urn:lsid:zoobank.org:act:2D47E3D4-7344-482C-B6BF-EEAEA45DE201

Type species: *Lepidodactylus harterti* Werner, 1900.

Diagnosis: The genus *Hemiphyllodactylus* Bleeker, 1860 *sensu lato*, as defined to date is separated from other Asian gecko genera by the following suite of characters: Numerous adhesive lamellae on widened digits; tail is not lobulate; no skin fringe on the side of the body; terminal joints of digits are not united with the widened lamellae, subdigital lamellae are always divided; inner digit is vestigial, without free terminal joint; the claw is minute and often concealed.

Hemiphyllodactylus has now been divided into four genera, two named for the first time and while all conform to the preceding diagnosis, can be separated from one another by the following additional character suites:

Hemiphyllodactylus Bleeker, 1860 type species *H. typus*, as defined herein is separated from the other three genera by one or other of the following five suites of characters:

1/ Chin scales bordering mental scale posteriorly slightly or not enlarged, their size nearly same as more medial chin scales; caecum and gonadal-duct peritoneum pigmentation usually black; adult females with actively secreting precloacal and femoral pores; unisexual species, all individuals are females; adult size often more than 36 mm SVL, (subgenus *Hemiphyllodactylus* part), or:

2/ Six chin scales; no enlarged postmentals; five circumnasal scales; three or four scales between the supranasals; 12 supralabials; 24 or 25 dorsal scales; 14 ventral scales; a lamellar forefoot formula of 4-5-5-4, 5-5-5-4 or 4-4-5-4; a contiguous femoroprecloacal pore series of 42; five cloacal spurs in males; no enlarged subcaudal scales; no dark postorbital stripes or striping on body; small dark blotches on the upper body; a yellowish postsacral mark bearing anteriorly projecting arms; and a pigmented caecum and gonads (subgenus *Hemiphyllodactylus* part), or:

3/ Chin scales bordering mental scale posteriorly slightly or not enlarged, their size nearly same as more medial chin scales; caecum and gonadal-duct peritoneum pigmentation usually black, adult females with no or fewer than five secreting precloacal pores; adult size seldom greater than 38 mm SVL; three or four U-shaped digital lamellae under fourth digit of forefoot; dorsal trunk pattern muted, faded and small dark blotches or widely separated dark spots; postsacral mark with U- or V-shaped outer edge of yellow or red; dorsolateral spots yellow or red, (subgenus *Hemiphyllodactylus* part) or:

4/ Chin scales bordering mental scale posteriorly distinctly enlarged, appear as a pair of scales labelled postmentals in other geckos; caecum and gonadal peritoneum white; precloacal and femoral pore series separate; females commonly with precloacal pores; forefoot digital lamellar formula usually 4-4-4-4, (subgenus *Ferehemiphyllodactylus subgen. nov.* part), or:

5/ Chin scales bordering mental scale posteriorly distinctly enlarged appear as a pair of scales usually labelled postmentals in other geckos; caecum and gonadal peritoneum white; precloacal and femoral pore series continuous; females usually lack precloacal pores; forefoot digital lamellar formula 3-3-3-3 or 3-4-4-4; adults moderate size, usually less than 42 mm SVL; hindfoot digital lamellar formula usually 3-4-4-4, occasionally higher; postsacral mark without anterior arms; trunk usually without dark dorsolateral stripe; precloacal and femoral pore series continuous usually with less than 23 pores; precloacal and femoral pore series usually more than 18 pores (subgenus *Ferehemiphyllodactylus subgen. nov.* part).

The genera *Cainodactylus* Barbour, 1924, *Cassandracampbellea gen. nov.* and *Malayacolotes gen. nov.* are each separated from *Hemiphyllodactylus* and *Ferehemiphyllodactylus subgen. nov.* as defined below (next page):

The genus *Cainodactylus* Barbour, 1924, type species *Cainodactylus yunnanensis* Barbour, 1924 is separated from the other three genera by one or other of the following three suites of characters:
1/ Chin scales bordering mental scale posteriorly distinctly enlarged appear as a pair of scales usually labelled postmentals in other geckos; caecum and gonadal peritoneum white; precloacal and femoral pore series continuous; females usually lack precloacal pores; forefoot digital lamellar formula 3-3-3-3 or 3-4-4-4; adults moderate size, usually less than 42 mm SVL; hindfoot digital lamellar formula usually 3-4-4-4, occasionally higher; postsacral mark without anterior arms; trunk usually without dark dorsolateral stripe; precloacal and femoral pore series continuous usually with less than 26 pores; precloacal and femoral pore series usually more than 23 pores; postsacral mark of anterior dark blotch and posterior larger light bar or alternatively this marking may be absent (subgenus *Cainodactylus* part), or:

2/ less than 39.5 mm SV length in adults; 7-10 chin scales; 5 circumnasal scales; 1-5 scales between supranasals; 9-12 supralabials; 8-11 infralabials; 16-18 dorsal scale rows; 8-10 ventral scale rows; lamellar formula on forefoot 4-4-4-4; lamellar formula on hindfoot 4-5-5-5; femoral pores absent in both sexes, 9 precloacal pores in males; 1 or 2 cloacal spurs on each side present in both sexes; dark postorbital stripe; no anteriorly projecting arms of postsacral mark, (subgenus *Cainodactylus* part), or:

3/ Chin scales bordering mental scale posteriorly slightly or not enlarged, their size nearly same as more medial chin scales; caecum and gonadal-duct peritoneum pigmentation usually black; adult females with no or fewer than five secreting precloacal pores; adult size seldom greater than 38 mm SVL; usually two U-shaped digital lamellae under the fourth digit of forefoot; dorsal trunk pattern is bold, transverse dark blotches, longitudinal series of white dorsolateral spots and postsacral mark of dark brown and orange, (subgenus *Maculacruscalotes subgen. nov.*).
Maculacruscalotes subgen. nov. is treated herein as monotypic for *M. aurantiacus* (Beddome, 1870). However there are number of unnamed species currently identified as the single taxon which await formal scientific description.

The genus *Cassandracampbellea gen. nov.* type species *Lepidodactylus harterti* Werner, 1900, is separated from the other three genera by the following suite of characters and diagnosis: Chin scales bordering mental scale posteriorly distinctly enlarged and appear as a pair of scales labelled postmentals in other geckos; caecum and gonadal peritoneum white; precloacal and femoral pore series continuous; females usually lack precloacal pores; forefoot digital lamellar formula 3-3-3-3 or 3-4-4-4, rarely higher; adults of moderate size, usually less than 42 mm SVL; postsacral mark without anterior arms; trunk usually with a distinct dark dorsolateral stripe; precloacal and femoral pore series continuous with 44-45 pores in males and a single cloacal spur.

The genus *Malayacolotes gen. nov.* type species *Gehyra larutensis* Boulenger, 1900 is separated from the other three genera by one or other of the following suites of characters:

1/ Chin scales bordering mental scale posteriorly distinctly enlarged and appear as a pair of scales labelled postmentals in other geckos; caecum and gonadal peritoneum white; precloacal and femoral pore series continuous; females usually lack precloacal pores; forefoot digital lamellar formula 3-3-3-3 or 3-4-4-4, rarely higher; adults of moderate size, usually less than 42 mm SVL; postsacral mark without anterior arms; trunk usually with a distinct dark dorsolateral stripe; precloacal and femoral pore series continuous with 2-36 pores in males and two to three cloacal spurs (subgenus *Malayacolotes gen. nov.*), or:

2/ Adults large, usually more than 45 mm SVL; chin scales bordering mental scale posteriorly distinctly enlarged and appear as a pair of scales labelled postmentals in other geckos; caecum and gonadal peritoneum white; precloacal and femoral pore series continuous usually more than 22 (17-39) pores; females usually lack precloacal pores; forefoot digital lamellar formula 3-3-3-3 or 3-4-4-4, hindfoot digital lamellar formula is usually 4-4-5-5 or 4-5-5-5; postsacral mark with anterior arms (subgenus *Titiwangsacolotes subgen. nov.*).

Distribution: Restricted to West Malaysia.

Etymology: Named in honour of Cassandra Campbell, of Bexley, NSW, Australia, a lawyer working with Alex Tees (also a lawyer from Sydney, NSW), for services to wildlife conservation spanning some decades.

Content: *Cassandracampbellea harterti* (Werner, 1900) (type species); *C. bintik* (Grismer, Wood, Anuar, Quah, Muin, Onn, Sumarli and Loredo, 2015); *C. cicak* (Cobos, Grismer, Wood, Quah, Anuar and Muin, 2016).

GENUS *MALAYOCOLOTES GEN. NOV.*

LSID urn:lsid:zoobank.org:act:5034000B-77C0-49FC-B436-133563B3D80A

Type species: *Gehyra larutensis* Boulenger, 1900.

Diagnosis: The genus *Hemiphyllodactylus* Bleeker, 1860 *sensu lato*, as defined to date is separated from other Asian gecko genera by the following suite of characters: Numerous adhesive lamellae on widened digits; tail is not lobulate; no skin fringe on the side of the body; terminal joints of digits are not united with the widened lamellae, subdigital lamellae are always divided; inner digit is vestigial, without free terminal joint; the claw is minute and often concealed.

Hemiphyllodactylus has now been divided into four genera, two named for the first time and while all conform to the preceding diagnosis, can be separated from one another by the following additional character suites:

Hemiphyllodactylus Bleeker, 1860 type species *H. typus*, as defined herein is separated from the other three genera by one or other of the following five suites of characters:
1/ Chin scales bordering mental scale posteriorly slightly or not enlarged, their size nearly same as more medial chin scales; caecum and gonadal-duct peritoneum pigmentation usually black; adult females with actively secreting precloacal and femoral pores; unisexual species, all individuals are females; adult size often more than 36 mm SVL, (subgenus *Hemiphyllodactylus* part), or:

2/ Six chin scales; no enlarged postmentals; five circumnasal scales; three or four scales between the supranasals; 12 supralabials; 24 or 25 dorsal scales; 14 ventral scales; a lamellar forefoot formula of 4-5-5-4, 5-5-5-4 or 4-4-5-4; a contiguous femoroprecloacal pore series of 42; five cloacal spurs in males; no enlarged subcaudal scales; no dark postorbital stripes or striping on body; small dark blotches on the upper body; a yellowish postsacral mark bearing anteriorly projecting arms; and a pigmented caecum and gonads (subgenus *Hemiphyllodactylus* part), or:

3/ Chin scales bordering mental scale posteriorly slightly or not enlarged, their size nearly same as more medial chin scales; caecum and gonadal-duct peritoneum pigmentation usually black, adult females with no or fewer than five secreting precloacal pores; adult size seldom greater than 38 mm SVL; three or four U-shaped digital lamellae under fourth digit of forefoot; dorsal trunk pattern muted, faded and small dark blotches or widely separated dark spots; postsacral mark with U- or V-shaped outer edge of yellow or red; dorsolateral spots yellow or red, (subgenus *Hemiphyllodactylus* part) or:

4/ Chin scales bordering mental scale posteriorly distinctly enlarged, appear as a pair of scales labelled postmentals in other geckos; caecum and gonadal peritoneum white; precloacal and femoral pore series separate; females commonly with precloacal pores; forefoot digital lamellar formula usually 4-4-4-4, (subgenus *Ferehemiphyllodactylus subgen. nov.* part), or:

5/ Chin scales bordering mental scale posteriorly distinctly enlarged appear as a pair of scales usually labelled postmentals in other geckos; caecum and gonadal peritoneum white; precloacal and femoral pore series continuous; females usually lack precloacal pores; forefoot digital lamellar formula 3-3-3-3 or 3-4-4-4; adults moderate size, usually less than 42 mm SVL; hindfoot digital lamellar formula usually 3-4-4-4, occasionally higher;

postsacral mark without anterior arms; trunk usually without dark dorsolateral stripe; precloacal and femoral pore series continuous usually with less than 23 pores; precloacal and femoral pore series usually more than 18 pores (subgenus *Ferehemiphyllodactylus subgen. nov.* part).

The genera *Cainodactylus* Barbour, 1924, *Cassandracampbellea gen. nov.* and *Malayacolotes gen. nov.* are each separated from *Hemiphyllodactylus* and *Ferehemiphyllodactylus subgen. nov.* as defined below,

The genus *Cainodactylus* Barbour, 1924, type species *Cainodactylus yunnanensis* Barbour, 1924 is separated from the other three genera by one or other of the following three suites of characters:
1/ Chin scales bordering mental scale posteriorly distinctly enlarged appear as a pair of scales usually labelled postmentals in other geckos; caecum and gonadal peritoneum white; precloacal and femoral pore series continuous; females usually lack precloacal pores; forefoot digital lamellar formula 3-3-3-3 or 3-4-4-4; adults moderate size, usually less than 42 mm SVL; hindfoot digital lamellar formula usually 3-4-4-4, occasionally higher; postsacral mark without anterior arms; trunk usually without dark dorsolateral stripe; precloacal and femoral pore series continuous usually with less than 26 pores; precloacal and femoral pore series usually more than 23 pores; postsacral mark of anterior dark blotch and posterior larger light bar or alternatively this marking may be absent (subgenus *Cainodactylus* part), or:

2/ less than 39.5 mm SV length in adults; 7-10 chin scales; 5 circumnasal scales; 1-5 scales between supranasals; 9-12 supralabials; 8-11 infralabials; 16-18 dorsal scale rows; 8-10 ventral scale rows; lamellar formula on forefoot 4-4-4-4; lamellar formula on hindfoot 4-5-5-5; femoral pores absent in both sexes, 9 precloacal pores in males; 1 or 2 cloacal spurs on each side present in both sexes; dark postorbital stripe; no anteriorly projecting arms of postsacral mark, (subgenus *Cainodactylus* part), or:

3/ Chin scales bordering mental scale posteriorly slightly or not enlarged, their size nearly same as more medial chin scales; caecum and gonadal-duct peritoneum pigmentation usually black; adult females with no or fewer than five secreting precloacal pores; adult size seldom greater than 38 mm SVL; usually two U-shaped digital lamellae under the fourth digit of forefoot; dorsal trunk pattern is bold, transverse dark blotches, longitudinal series of white dorsolateral spots and postsacral mark of dark brown and orange, (subgenus *Maculacruscalotes subgen. nov.*). *Maculacruscalotes subgen. nov.* is treated herein as monotypic for *M. aurantiacus* (Beddome, 1870). However there are number of unnamed species currently identified as the single taxon which await formal scientific description.

The genus *Cassandracampbellea gen. nov.* type species *Lepidodactylus harterti* Werner, 1900, is separated from the other three genera by the following suite of characters: Chin scales bordering mental scale posteriorly distinctly enlarged and appear as a pair of scales labelled postmentals in other geckos; caecum and gonadal peritoneum white; precloacal and femoral pore series continuous; females usually lack precloacal pores; forefoot digital lamellar formula 3-3-3-3 or 3-4-4-4, rarely higher; adults of moderate size, usually less than 42 mm SVL; postsacral mark without anterior arms; trunk usually with a distinct dark dorsolateral stripe; precloacal and femoral pore series continuous with 44-45 pores in males and a single cloacal spur.

The genus *Malayacolotes gen. nov.* type species *Gehyra larutensis* Boulenger, 1900 is separated from the other three genera by way of diagnosis by one or other of the following suites of characters:

1/ Chin scales bordering mental scale posteriorly distinctly enlarged and appear as a pair of scales labelled postmentals in other geckos; caecum and gonadal peritoneum white; precloacal and femoral pore series continuous; females usually lack precloacal pores; forefoot digital lamellar formula 3-3-3-3 or 3-4-4-4, rarely higher; adults of moderate size, usually less than 42 mm SVL; postsacral mark without anterior arms; trunk usually with a distinct dark dorsolateral stripe; precloacal and femoral pore series continuous with 2-36 pores in males and two to three cloacal spurs (subgenus *Malayacolotes gen. nov.*), or:

2/ Adults large, usually more than 45 mm SVL; chin scales bordering mental scale posteriorly distinctly enlarged and appear as a pair of scales labelled postmentals in other geckos; caecum and gonadal peritoneum white; precloacal and femoral pore series continuous usually more than 22 (17-39) pores; females usually lack precloacal pores; forefoot digital lamellar formula 3-3-3-3 or 3-4-4-4, hindfoot digital lamellar formula is usually 4-4-5-5 or 4-5-5-5; postsacral mark with anterior arms (subgenus *Titiwangsacolotes subgen. nov.*).

Distribution: Peninsular Malaysia.

Etymology: *Malayacolotes* in Latin means gecko from Malaya.

Content: *Malayacolotes larutensis* (Boulenger, 1900) (type species); *M. cassandracampbellae sp. nov.*; *M. tehtarik* (Grismer, Wood Jnr., Anuar, Muin, Quah, McGuire, Brown, Tri and Thai, 2013); *M. titiwangsaensis* (Zug, 2010)

SUBGENUS *TITIWANGSACOLOTES SUBGEN. NOV.*

LSID urn:lsid:zoobank.org:act:ED618285-C7A5-4F26-8CBF-4F21D7AB9297

Type species: *Hemiphyllodactylus titiwangsaensis* Zug, 2010.

Diagnosis: The genus *Hemiphyllodactylus* Bleeker, 1860 *sensu lato*, as defined to date is separated from other Asian gecko genera by the following suite of characters: Numerous adhesive lamellae on widened digits; tail is not lobulate; no skin fringe on the side of the body; terminal joints of digits are not united with the widened lamellae, subdigital lamellae are always divided; inner digit is vestigial, without free terminal joint; the claw is minute and often concealed.

Hemiphyllodactylus has now been divided into four genera, two named for the first time and while all conform to the preceding diagnosis, can be separated from one another by the following additional character suites:

Hemiphyllodactylus Bleeker, 1860 type species *H. typus*, as defined herein is separated from the other three genera by one or other of the following five suites of characters:
1/ Chin scales bordering mental scale posteriorly slightly or not enlarged, their size nearly same as more medial chin scales; caecum and gonadal-duct peritoneum pigmentation usually black; adult females with actively secreting precloacal and femoral pores; unisexual species, all individuals are females; adult size often more than 36 mm SVL, (subgenus *Hemiphyllodactylus* part), or:

2/ Six chin scales; no enlarged postmentals; five circumnasal scales; three or four scales between the supranasals; 12 supralabials; 24 or 25 dorsal scales; 14 ventral scales; a lamellar forefoot formula of 4-5-5-4, 5-5-5-4 or 4-4-5-4; a contiguous femoroprecloacal pore series of 42; five cloacal spurs in males; no enlarged subcaudal scales; no dark postorbital stripes or striping on body; small dark blotches on the upper body; a yellowish postsacral mark bearing anteriorly projecting arms; and a pigmented caecum and gonads (subgenus *Hemiphyllodactylus* part), or:

3/ Chin scales bordering mental scale posteriorly slightly or not enlarged, their size nearly same as more medial chin scales; caecum and gonadal-duct peritoneum pigmentation usually black, adult females with no or fewer than five secreting precloacal pores; adult size seldom greater than 38 mm SVL; three or four U-shaped digital lamellae under fourth digit of forefoot; dorsal trunk pattern muted, faded and small dark blotches or widely separated dark spots; postsacral mark with U- or V-shaped outer edge of yellow or red; dorsolateral spots yellow or red, (subgenus *Hemiphyllodactylus* part) or:

4/ Chin scales bordering mental scale posteriorly distinctly enlarged, appear as a pair of scales labelled postmentals in other geckos; caecum and gonadal peritoneum white; precloacal and femoral pore series separate; females commonly with precloacal pores; forefoot digital lamellar formula usually 4-4-4-4, (subgenus *Ferehemiphyllodactylus subgen. nov.* part), or:

5/ Chin scales bordering mental scale posteriorly distinctly enlarged appear as a pair of scales usually labelled postmentals in other geckos; caecum and gonadal peritoneum white; precloacal and femoral pore series continuous; females usually lack precloacal pores; forefoot digital lamellar formula 3-3-3-3 or 3-4-4-4; adults moderate size, usually less than 42 mm SVL; hindfoot digital lamellar formula usually 3-4-4-4, occasionally higher; postsacral mark without anterior arms; trunk usually without dark dorsolateral stripe; precloacal and femoral pore series continuous usually with less than 23 pores; precloacal and femoral pore series usually more than 18 pores (subgenus *Ferehemiphyllodactylus subgen. nov.* part).

The genera *Cainodactylus* Barbour, 1924, *Cassandracampbellea gen. nov.* and *Malayacolotes gen. nov.* are each separated from *Hemiphyllodactylus* and *Ferehemiphyllodactylus subgen. nov.* as defined below,

The genus *Cainodactylus* Barbour, 1924, type species *Cainodactylus yunnanensis* Barbour, 1924 is separated from the other three genera by one or other of the following three suites of characters:
1/ Chin scales bordering mental scale posteriorly distinctly enlarged appear as a pair of scales usually labelled postmentals in other geckos; caecum and gonadal peritoneum white; precloacal and femoral pore series continuous; females usually lack precloacal pores; forefoot digital lamellar formula 3-3-3-3 or 3-4-4-4; adults moderate size, usually less than 42 mm SVL; hindfoot digital lamellar formula usually 3-4-4-4, occasionally higher; postsacral mark without anterior arms; trunk usually without dark dorsolateral stripe; precloacal and femoral pore series continuous usually with less than 26 pores; precloacal and femoral pore series usually more than 23 pores; postsacral mark of anterior dark blotch and posterior larger light bar or alternatively this marking may be absent (subgenus *Cainodactylus* part), or:

2/ less than 39.5 mm SV length in adults; 7-10 chin scales; 5 circumnasal scales; 1-5 scales between supranasals; 9-12 supralabials; 8-11 infralabials; 16-18 dorsal scale rows; 8-10 ventral scale rows; lamellar formula on forefoot 4-4-4-4; lamellar formula on hindfoot 4-5-5-5; femoral pores absent in both sexes, 9 precloacal pores in males; 1 or 2 cloacal spurs on each side present in both sexes; dark postorbital stripe; no anteriorly projecting arms of postsacral mark, (subgenus *Cainodactylus* part), or:

3/ Chin scales bordering mental scale posteriorly slightly or not enlarged, their size nearly same as more medial chin scales; caecum and gonadal-duct peritoneum pigmentation usually black; adult females with no or fewer than five secreting precloacal pores; adult size seldom greater than 38 mm SVL; usually two U-shaped digital lamellae under the fourth digit of forefoot; dorsal trunk pattern is bold, transverse dark blotches, longitudinal series of white dorsolateral spots and postsacral mark of dark brown and orange, (subgenus *Maculacruscalotes subgen. nov.*).
Maculacruscalotes subgen. nov. is treated herein as monotypic for *M. aurantiacus* (Beddome, 1870). However there are number of unnamed species currently identified as the single taxon which await formal scientific description.

The genus *Cassandracampbellea gen. nov.* type species *Lepidodactylus harterti* Werner, 1900, is separated from the other three genera by the following suite of characters: Chin scales bordering mental scale posteriorly distinctly enlarged and appear as a pair of scales labelled postmentals in other geckos; caecum and gonadal peritoneum white; precloacal and femoral pore series continuous; females usually lack precloacal pores; forefoot digital lamellar formula 3-3-3-3 or 3-4-4-4, rarely higher; adults of moderate size, usually less than 42 mm SVL; postsacral mark without anterior arms; trunk usually with a distinct dark dorsolateral stripe; precloacal and femoral pore series continuous with 44-45 pores in males and a single cloacal spur.

The genus *Malayacolotes gen. nov.* type species *Gehyra larutensis* Boulenger, 1900 is separated from the other three genera by one or other of the following suites of characters, which diagnose each subgenus:
1/ Chin scales bordering mental scale posteriorly distinctly enlarged and appear as a pair of scales labelled postmentals in other geckos; caecum and gonadal peritoneum white; precloacal and femoral pore series continuous; females usually lack precloacal pores; forefoot digital lamellar formula 3-3-3-3 or 3-4-4-4, rarely higher; adults of moderate size, usually less than 42 mm SVL; postsacral mark without anterior arms; trunk usually with a distinct dark dorsolateral stripe; precloacal and femoral pore series continuous with 2-36 pores in males and two to three cloacal spurs (subgenus *Malayacolotes gen. nov.*), or:

2/ Adults large, usually more than 45 mm SVL; chin scales bordering mental scale posteriorly distinctly enlarged and appear as a pair of scales labelled postmentals in other geckos; caecum and gonadal peritoneum white; precloacal and femoral pore series continuous usually more than 22 (17-39) pores; females usually lack precloacal pores; forefoot digital lamellar formula 3-3-3-3 or 3-4-4-4, hindfoot digital lamellar formula is usually 4-4-5-5 or 4-5-5-5; postsacral mark with anterior arms (subgenus *Titiwangsacolotes subgen. nov.*), this being diagnostic for the subgenus *Titiwangsacolotes subgen. nov.*.

Etymology: *Titiwangsacolotes* in Latin means gecko from Titiwangsa.

Distribution: Peninsular Malaysia in the vicinity of Titiwangsa.

Content: *Malayacolotes* (*Titiwangsacolotes*) *titiwangsaensis* (Zug, 2010) (type species); *Malayacolotes* (*Titiwangsacolotes*) *cassandracampbellae sp. nov.*.

MALAYACOLOTES CASSANDRACAMPBELLAE SP. NOV.

LSID urn:lsid:zoobank.org:act:CF5D0651-B779-4171-9A2E-BFB8777FD55A

Holotype: A preserved specimen at the University of Texas at El Paso Biodiversity Collections, specimen number: UTEP Herps H-11708, erroneously identified as "Hemiphyllodactylus typus", collected at Bukit Fraser (= Fraser's Hill) at between 4000 to 4200 feet, Pahang Province, Malaysia, Latitude: 3.71 N., Longitude 101.7 E. The University of Texas at El Paso Biodiversity Collections allows access to its holdings.

Paratypes: Two preserved specimens at the University of Texas at El Paso Biodiversity Collections, specimen number: UTEP Herps H-11709 and UTEP Herps H-11707 of the same taxon collected at the same location as the holotype.

Diagnosis: The species *Malayacolotes cassandracampbellae sp. nov.* is morphologically similar to *M. titiwangsaensis* (Zug, 2010), as defined by Zug (2010) and both are separated from all other species formerly included within *Hemiphyllodactylus* Bleeker, 1860 on the basis of the diagnosis for "*Hemiphyllodactylus titiwangsaensis*" on pages 48-50 of Zug (2010).

Malayacolotes cassandracampbellae sp. nov. is most readily separated from the other species (*M. titiwangsaensis*) on the basis of markings on original tails.

M. cassandracampbellae sp. nov. have obvious black spots on the flanks of the tail, whereas these are not present in *M. titiwangsaensis.* Furthermore markings on the tail of *M. cassandracampbellae sp. nov.* are not tending towards cross bars as seen in *M. titiwangsaensis.*

Both species *M. cassandracampbellae sp. nov.* and *M. titiwangsaensis*, forming the entirety of the subgenus *Titiwangsacolotes subgen. nov.* are separated from all other species formerly included in the genus *Hemiphyllodactylus* (now within four genera) by the following unique character combination: Adults large, usually more than 45 mm SVL; chin scales bordering mental scale posteriorly distinctly enlarged and appear as a pair of scales labelled postmentals in other geckos; caecum and gonadal peritoneum white; precloacal and femoral pore series continuous usually more than 22 (17-39) pores; females usually lack precloacal pores; forefoot digital lamellar formula 3-3-3-3 or 3-4-4-4, hindfoot digital lamellar formula is usually 4-4-5-5 or 4-5-5-5; postsacral mark with anterior arms. Photos of *M. cassandracampbellae sp. nov.* in life, that conform to the preceding diagnosis, being depicted as *M. titiwangsaensis* can be found at:

https://www.ecologyasia.com/verts/lizards/titiwangsa-slender-gecko.htm (Baker, 2018).

Distribution: Restricted to the immediate vicinity of Fraser's Hill, Pahang Province, Pensular Malaysia.

Etymology: Named in honour of Cassandra Campbell, of Bexley, NSW, Australia, a lawyer working with Alex Tees (also a lawyer from Sydney, NSW), for services to wildlife conservation spanning some decades.

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CONFLICT OF INTEREST

There are no conflicts of interest in terms of this paper and author.

GENUS AND SPECIES LIST FOR CURRENTLY RECOGNIZED TAXA WITHIN *HEMIPHYLLODACTYLUS SENSU LATO.*

Note: This list underestimates actual species diversity.

GENUS *HEMIPHYLLODACTYLUS* BLEEKER, 1860

Subgenus *Hemiphyllodactylus* Bleeker, 1860

Hemiphyllodactylus (*Hemiphyllodactylus*) *typus* Bleeker, 1860 (type species)

Hemiphyllodactylus (*Hemiphyllodactylus*) *engganoensis* Grismer, Riyanto, Iskander and McGuire, 2014

Hemiphyllodactylus (*Hemiphyllodactylus*) *ganoklonis* Zug, 2010

Hemiphyllodactylus (*Hemiphyllodactylus*) *insularis* Taylor, 1918

Hemiphyllodactylus (*Hemiphyllodactylus*) *margarethae* Brongersma, 1931

Subgenus *Ferehemiphyllodactylus subgen. nov.*

Hemiphyllodactylus (*Ferehemiphyllodactylus*) *jinpingensis* (Zhou and Liu, 1981) (type species)

Hemiphyllodactylus (*Ferehemiphyllodactylus*) *changningensis* Guo, Zhou, Yan and Li, 2015

Hemiphyllodactylus (*Ferehemiphyllodactylus*) *chiangmaiensis* Grismer, Wood and Cota, 2014

Hemiphyllodactylus (*Ferehemiphyllodactylus*) *khlonglanensis* Sukprasert, Sutthiwises, Lauhachinda and Taksintum, 2018

Hemiphyllodactylus (*Ferehemiphyllodactylus*) *linnwayensis* Grismer, Wood, Thura, Zin, Quah, Murdoch, Grismer, Li, Kyaw and Lwin, 2017

Hemiphyllodactylus (*Ferehemiphyllodactylus*) *longlingensis* (Zhou and Liu, 1981)

Hemiphyllodactylus (*Ferehemiphyllodactylus*) *montawaensis* Grismer, Wood, Thura, Zin, Quah, Murdoch, Grismer, Li, Kyaw and Lwin, 2017

Hemiphyllodactylus (*Ferehemiphyllodactylus*) *tonywhitteni* Grismer, Wood, Thura, Zin, Quah, Murdoch, Grismer, Li, Kyaw and Lwin, 2017

GENUS *CAINODACTYLUS* BARBOUR, 1924

Subgenus *Cainodactylus* Barbour, 1924

Cainodactylus (*Cainodactylus*) *yunnanensis* (Boulenger, 1903) (type species)

Cainodactylus (*Cainodactylus*) *banaensis* (Tri, Grismer, Thai and Wood, 2014)

Cainodactylus (*Cainodactylus*) *dushanensis* (Zhou and Liu, 1981)

Cainodactylus (*Cainodactylus*) *flaviventris* (Sukprasert, Sutthiwises, Lauhachinda and Taksintum, 2018)

Cainodactylus (*Cainodactylus*) *hongkongensis* (Sung, Lee, Ng, Zhang and Yang, 2018)

Cainodactylus (*Cainodactylus*) *huishuiensis* (Yan, Lin, Guo, Li and Zhou, 2016)

Cainodactylus (*Cainodactylus*) *kiziriani* (Nguyen, Botov, Le Duc, Nophaseud, Bonkowski and Zeigler, 2014)

Cainodactylus (*Cainodactylus*) *zugi* (Nguyen, Lehmann, Le Duc, Duong, Bonkowski and Ziegler, 2013)

Subgenus *Maculacruscalotes subgen. nov.*

Cainodactylus (*Maculacruscalotes*) *aurantiacus* (Beddome, 1870) (type species) (species complex)

GENUS *CASSANDRACAMPBELLEA GEN. NOV.*

Cassandracampbellea harterti (Werner, 1900) (type species)

Cassandracampbellea bintik (Grismer, Wood, Anuar, Quah, Muin, Onn, Sumarli and Loredo, 2015)

Cassandracampbellea cicak (Cobos, Grismer, Wood, Quah, Anuar and Muin, 2016)

GENUS *MALAYACOLOTES GEN. NOV.*

Subgenus *Malayacolotes subgen. nov.*

Malayacolotes larutensis (Boulenger, 1900) (type species)

Malayacolotes tehtarik (Grismer, Wood Jnr., Anuar, Muin, Quah, McGuire, Brown, Tri and Thai, 2013)

Subgenus *Titiwangsacolotes subgen. nov.*

Malayacolotes (*Titiwangsacolotes*) *titiwangsaensis* (Zug, 2010) (type species)

Malayacolotes (*Titiwangsacolotes*) *cassandracampbellae sp. nov.* (this paper).

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A new species of Chameleon Dragon *Chelosania* Gray, 1845 from the Northern Territory, Australia.

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ABSTRACT

The Chameleon Dragon, genus *Chelosania* Gray, 1845 has until now been treated as a single species throughout its known range across the dry tropics of Northern Australia. As part of an audit of the taxonomy and nomenclature of Australian agamids, it emerged that those specimens from the eastern sector of the Northern Territory (NT) are significantly different to the type race of *Chelosania brunnea* Gray, 1845, from Western Australia (WA) and separated by a well defined distribution gap in the western side of the Northern Territory.

Other putative species also split across the same biogeographcal barrier, approximating the Daly River, have recently on the basis of morphological and molecular evidence been found to consist of multiple species.

These include *Odatria glauerti* (Mertens, 1957) from WA, and *O. hoserae* Hoser, 2013 from the NT, or *Cannia weigeli* Wells and Wellington, 1987 from WA and *Cannia burgessi* (Hoser, 2001) from the NT).

Therefore I have no hesitation at all in formally describing the eastern NT population of *Chelosania* as a new species, namely *Chelosania neilsonnemanni sp. nov.*.

Keywords: Taxonomy; nomenclature; lizards; agamids, Australia; Northern Territory; Western Australia; Arnhem Land; *Chelosania*; Chameleon Dragon; *Chelosania brunnea*; new species; *neilsonnemanni.*

INTRODUCTION

The Chameleon Dragon, genus *Chelosania* Gray, 1845 has until now been treated as a single species throughout its known range across the dry tropics of Northern Australia including the states of Western Australia (WA), the Northern Territory (NT) and Queensland (Qld).

Examples of this taxonomic judgement is seen in the original description of Gray (1845) as well as more recently Cogger *et al.* (1983), Wells and Wellington (1985) and Cogger (2014).

The latter three publications are all effectively taxonomic reviews of this genus and component species based on available knowledge, but do not in themselves represent a scientific assessment of relevant specimens from across the range of the putative species (Kimberley, West Australia to far north-west Queensland).

In fact at no point in time to date (end 2018) has any author even been known to have speculated that there may be more than one species in the genus.

As part of an audit of the taxonomy and nomenclature of Australian agamids, it emerged that those specimens from the eastern half of the Northern Territory are significantly different to the type race of *Chelosania brunnea* Gray, 1845 and separated by a well defined distribution gap in the western side of the Northern Territory.

These key facts emerged initially when a phylogeny of Pyron *et al.* (2013) of squamates globally showed a single sample of this putative species on a significantly long stem on its own and divergent from all other Australian agamids.

The phylogeny of Pyron *et al.* (2013) was not calibrated by date or time in any way.

However, because other Australian dragon species within the phylogeny had been tested for divergences and calibrated in the results of other papers, it was the only reasonable conclusion available to infer that the genus *Chelosania* and species *brunnea* had been divergent from all others for a long time (est. 18 MYA determined by Hugall *et al.* 2008) and therefore potential speciation within the putative species as recognized was possible.

That there may be more than one species within the genus as known was considered more likely on the basis that the distribution was wide, as in across most of the dry tropics of Australia and a straight line distance of over 1,500 km and including three Australian states.

Furthermore the species is habitat specific, preferring a certain type of savannah habitat and usually in proximity to rocky locations and water, meaning that even when found in a given region, distribution may not be continuous throughout.

Observational data of herpetologists including that reported by Trainor (2005) and sources cited therein, confirm that *Chelosania brunnea* as identified by them are a slow moving and generally sedentary species, two traits that do not aid in dispersal over any biogeographical barriers.

Trainor (2005) gives a detailed explanation of collection records for the species he identified as *Chelosania brunnea* and while he notes evident gaps in known distribution potentially arising due to a lack of collection effort in many northern Australian localities and the cryptic nature of the species, he made a point of stressing that the gap across most of the western Northern Territory in a north-south band or line bound by Darwin in the east and the Victoria

River Region in the west, was most likely due to actual absence rather than a lack of collection effort.

Other putative species also split across the same biogeographcal barrier (essentially the Daly River basin) have recently on the basis of morphological and calibrated molecular evidence been found to consist of multiple species. This includes *Odatria glauerti* (Mertens, 1957) from WA, split with *O. hoserae* Hoser, 2013 from the NT, recently formally named, or *Cannia weigeli* Wells and Wellington, 1987 from WA and *Cannia burgessi* (Hoser, 2001) being described from the NT.

Inspection of numerous specimens by myself of putative *Chelosania brunnea* from all known parts of the range show morphologically distinct specimens in the various parts of the known range. However the most obvious differences can be seen between specimens on either side of the west NT gap.

Therefore, based on the preceding, I have no hesitation at all in formally describing the eastern NT population of *Chelosania* as a new species, namely *C. neilsonnemanni sp. nov.*.

References of relevance which supports the taxonomic conclusion within this paper include the following: Boulenger (1885), Bush (1985), Cogger (2014), Gray (1845), Hoser (2001, 2013, 2014, 2018), Hugall *et al.* (2008), Husband (1979), Hutchinson and Hutchinson (2011), Macey *et al.* (2000), Maryan *et al.* (2014), McLean *et al.* (2013), Melville *et al.* (2007, 2014, 2018, 2019), Pengilley (1982), Rosauer *et al.* (2018), Scott and Scott Keogh (2000), Shoo *et al.* (2008), Smith *et al.* (1999), Storr, Smith and Johnstone (1983), Trainor (2005), Wilson and Knowles (1988), Wilson and Swan (2017) and sources cited therein.

The ICZN compliant nomenclature in this paper, pursuant to the *International code of Zoological Nomenclature* (Fourth edition) (Ride *et al.* 1999), logically follows the taxonomic conclusion herein.

While the taxonomy of this paper is a certainty, what is not certain is if there are other as yet unrecognized species within the genus *Chelosania*. Based on the preceding, this is highly likely and so that there is no doubt one way or other, genetic sampling across the entire range of the genus should be undertaken with urgency. This can be easily paid for by way of the Australian government diverting funds currently used for killing people in imperialist wars in third world countries and spending it on genetic sampling and analysis instead.

CHELOSANIA NEILSONNEMANNI SP. NOV.

LSID urn:lsid:zoobank.org:act:2812529D-ABFA-4058-B112-5B9D14DADDE0

Holotype: A preserved specimen at the Australian Museum, in Sydney, New South Wales, Australia, specimen number: R.88842 collected at Jabiluka, NT, Australia, Latitude 12.58 S., Longitude 132.95 E. The Australian Museum in Sydney is a government-owned facility that allows access to its holdings.

Paratype: A preserved specimen at the Northern Territory Museum in Darwin, Northern Territory, Australia, specimen number: R08700 collected at Jabiru, Northern Territory, Australia, Latitude 12.67 S., Longitude 132.88 E.

Diagnosis: *Chelosania neilsonnemanni sp. nov.* until now treated as the eastern population of *C. brunnea* Gray, 1845 (type locality of Western Australia) is readily differentiated from that species by the following suite of characters (in life in adults): Reddish-brown, olive-brown or yellow brown in general dorsal colouration, versus grey in *C. brunnea*; strong yellow colour under the chin and upper neck versus none or on rare occasions very little in *C. brunnea*; minimal dorsal markings or pattern in adults versus a distinctive arrangement of joined dark flecks or spots tending to form obviously discernible dorsal cross-bands in *C. brunnea*; few if any black flecks or spots on the limbs, versus prominent black flecks and spots on the limbs of *C. brunnea*; adult female *C. neilsonnemanni sp. nov.* have significant striations behind the ear and lower neck versus none or very few in *C. brunnea*; *C. neilsonnemanni sp. nov.* have few spots or markings on the head, or if present are indistinct, versus significant spots and markings on *C. brunnea.* The second band on the tail of *C. neilsonnemanni sp. nov.* is not strongly etched with black, versus strongly etched in *C. brunnea.*

Species within the genus *Chelosania* Gray, 1845 are separated from all other Australian agamids by the possession of an exposed tympanum, slender compressed body, absence of either a transverse gular fold, pre-anal or femoral pores, a short tail that is 1.25 to 1.5 times the length of the body and no large conical spines all over the body (derived from Cogger 2017).

Photos of *Chelosania neilsonnemanni sp. nov.* in life can be found in Cogger (2014) on page 699 at bottom, Wilson (2012) at page 149, top left, Storr, Smith and Johnstone (1983) at plate 1, image 3, Wilson and Knowles (1988) at page 205, bottom left and Wilson and Swan (2017) at page 409 top right.

Photos of *C. brunnea* in life can be found in Storr, Smith and Johnstone (1983) on plate 1, middle right, Wilson and Swan (2017) on page 409 at middle left.

Distribution: As defined here, besides being found in the type locality of Arnhem Land in the Northern Territory, Australia, *Chelosania neilsonnemanni sp. nov.*is found in a region bound by a line running south of Darwin and east of there to include the top end of the Northern Territory and east to the Gulf of Carpentaria to include nearby parts of far north-west Queensland, at least as far east as Doomadgee, Queensland, all within Australia.

Etymology: Named in honour of well-known Victorian snake breeder, Neil Sonnemann of Murmungee, Beechworth, Victoria, Australia, who besides making significant contributions to herpetology in Australia in his role as snake breeder and via relevant publications, has also worked with *Chelosania* in the Lake Argyle region of north-west Australia and made a significant contribution to our body of knowledge on the genus (Trainor 2005).

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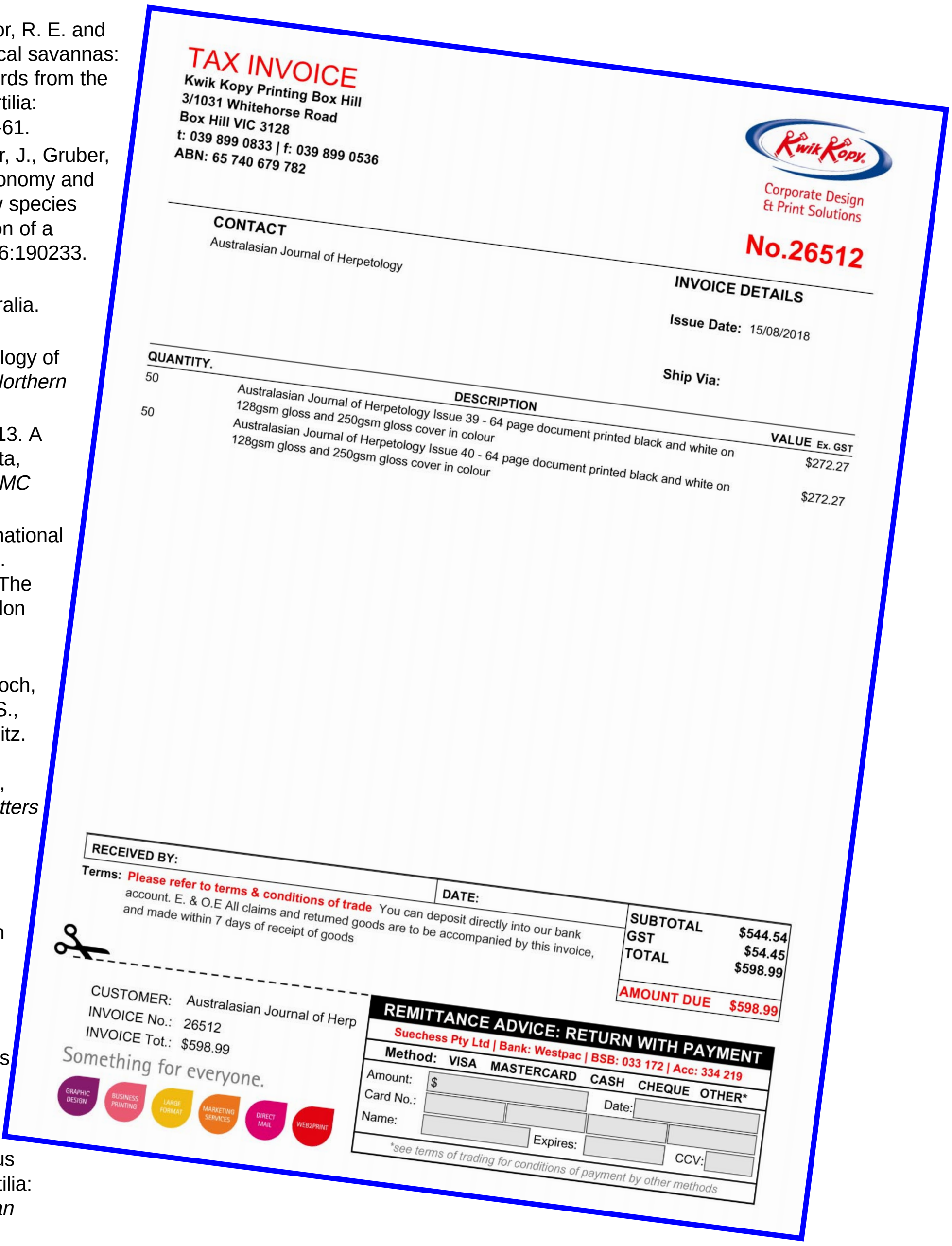

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11 new species, 4 new subspecies and a subgenus of Australian Dragon Lizard in the genus *Tympanocryptis* Peters, 1863, with a warning on the conservation status and long-term survival prospects of some newly named taxa.

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ABSTRACT

As a result of a long-term and ongoing study of the taxonomy of the Australian herpetofauna, this paper formally names eleven well defined species within the genus *Tympanocryptis* Peters, 1863, four subspecies and erects a new subgenus for three divergent species. As this paper was about to go to press and with knowledge of this author's working on the relevant species, Melville *et al*. (2019) scooped this author to formally name another (valid) species that would otherwise have been formally named herein. Significantly this recent paper by Melville *et al* (2019) and an earlier one, Melville *et al*. (2018) both engaged in serious acts of academic misconduct, potential violation of copyright law and the crime of taxonomic vandalism. Taxonomic vandalism is the deliberate illegal renaming of taxa previously named by another person and the associated act of improperly and in breach of the rules of the *International Code of Zoological Nomenclature* (Ride *et al*. 1999) unlawfully getting others to use the illegal junior synonym.

A separate paper deals with the ethically repugnant acts of Melville in more detail and the wider consequences of her improper actions.

In the context of the significant increase in known species within *Tympanocryptis*, this paper also highlights the fact that the biodiversity of Australia's herpetofauna has been significantly under-estimated. Furthermore extinctions are likely unless more work is done to both identify and name species-level taxa and engage in a plan to conserve them which in order to have any chance of success must include restricting and stopping the runaway growth of human population in Australia.

The ongoing threat to the survival of taxa caused by the unscientific and reckless Kaiser *et al*. (2013) manifesto is also assessed.

Keywords: Taxonomy; Nomenclature; Lizards; Dragons; Agamidae; Australia; *Tympanocryptis*; *Lophognathus*; *Melvillesaurea*; *lineata*; *telecom*; *mccartneyi*; *alexteesi*; Raymond Hoser; Richard Wells; Cliff Ross Wellington; 1985; 2015; 2018; 2019; ICZN, *International Code of Zoological Nomenclature*; New Subgenus; *Williamconnellysaurus*; New species; *snakebustersorum*; *optus*; *vodafone*; *lachlanheffermani*; *simonknolli*; *deniselivingstoneae*; *karimdaouesi*; *williamconnollyi*; *tonylovelinayi*; *reconnectorum*; *samsungorum*; New subspecies; *ianrentoni*; *marcusbrummeri*; *courtneyleitchae*; *clintonlogani*; Illegal names; *Tropicagama*; *horneri*; *osbornei*; taxonomic vandalism; Jane Melville; Wolfgang Wüster; Hinrich Kaiser; *osbornei*.

INTRODUCTION

Dragon lizards of the Australian genus *Tympanocryptis*, Peters, 1863 are endemic to continental Australia. They are one of several endemic genera of smallish (by dragon standards) mainly ground-dwelling species most readily recognized by a suite of characters including the absence of external ear openings. Other diagnostic traits include the ear region being covered by scaly skin, usually some dorsal scales enlarged and raised, keeled or spinose. The phalangeal formula of the hind foot is usually 2.3.4.5.3.

Cogger (2014) listed the genus as consisting of 8 species and defined it in a similar manner to the above.

While Cogger had treated a number of well-defined and previously named forms as synonymous with his listed species (including forms treated by some as subspecies and others as full species), the number given by Cogger was in effect the agreed position by most herpetologists in Australia at the time.

This position was (and still is) somewhat circular as Cogger's books are regarded as the conservative consensus position in Australia and generally used by most others, meaning Cogger's taxonomic judgements tend to become the default position of most Australian herpetologists post-dating the relevant publications, in turn being reflected in his later books.

By end 2018 the total of recognized species (by this author) was 21 (as listed below), with each being diagnosed sufficiently at the species level on the basis of one or other of morphological or molecular evidence, or alternatively as seen in most cases both.

Several had been formally named for the first time in the period between 2014 and 2018 and one or more others resurrected from synonymy.

I should note however that were Cogger to publish a later edition of his book "*Reptiles and Amphibians of Australia*" (Cogger 2014 veing edition 7) it most likely would not include all the species recognized herein, even though all are valid and shown as such using scientific methods.

The conservatism of Cogger's taxonomic judgements means his books often lag taxonomic research and nomenclature by some decades.

Of the species listed below, one, *Tympanocryptis macra*, Storr, 1982 (originally described as a subspecies of *Tympanocryptis lineata* Peters, 1863) has in recent years been treated by some authors as a junior synonym of *Tympanocryptis uniformis* Mitchell, 1948. But molecular and distributional evidence shows that all three are distinct at the species level and so all are recognized herein.

The species, *Tympanocryptis macra*, Storr, 1982 is one of those divided in this paper, with a new species being named herein, being the south-western form of the species as defined by Storr (1982).

As mentioned in the abstract, Melville *et al.* (2019) published a paper relevant to this genus.

They named a species in May 2019, namely *Tympanocryptis mccartneyi* Melville, Chaplin, Hutchinson, Sumner, Gruber, MacDonald and Sarre, 2019. This taxon is also recognized as valid and listed below, giving a total of 22 species. Another taxon they named *T. osbornei* is in fact a junior synonym of *T. lineata* Peters, 1863 and the authors engaged in an act of taxonomic vandalism in renaming this species and widely promulgating the illegally coined name as "new".

This paper further names 11 more well defined species, differentiable from congeners on any of a morphological, distributional or genetic basis as well as four very distinctive subspecies. Most have already been differentiated in the literature on all three levels and in every case at least one such basis, including molecular results showing species level divergence and this paper distinguishes each on a morphological basis.

In terms of many of the forms formally named herein as species and subspecies, the morphological differences between the newly named forms and their nearest congeners is provided for the first time.

The list of recognized species in the genus *Tympanocryptis* preceding the publication of this paper is therefore as follows:

Tympanocryptis alexteesi Hoser, 2015
Tympanocryptis bottomi Hoser, 2015
Tympanocryptis centralis Sternfeld, 1925
Tympanocryptis cephalus Günther, 1867
Tympanocryptis condaminensis Melville, Smith, Hobson, Hunjaw and Shoo, 2014
Tympanocryptis diabolicus Doughty, Kealley, Shoo and Melville, 2015
Tympanocryptis fortescuensis Doughty, Kealley, Shoo and Melville, 2015
Tympanocryptis gigas Mitchell, 1948
Tympanocryptis houstoni Storr, 1982
Tympanocryptis intima Mitchell, 1948
Tympanocryptis lineata Peters, 1863
Tympanocryptis karumba Wells and Wellington, 1985
Tympanocryptis macra Storr, 1982
Tympanocryptis markteesi Hoser, 2015
Tympanocryptis mccartneyi Melville, Chaplin, Hutchinson, Sumner, Gruber, MacDonald and Sarre, 2019
Tympanocryptis pentalineata Melville, Smith, Hobson, Hunjaw and Shoo, 2014
Tympanocryptis pinguicolla Mitchell, 1948
Tympanocryptis pseudopsephos Melville, Smith, Hobson, Hunjaw and Shoo, 2014
Tympanocryptis telecom Wells and Wellington, 1985
Tympanocryptis tetraporophora Lucas and Frost, 1895
Tympanocryptis uniformis Mitchell, 1948
Tympanocryptis wilsoni Melville, Smith, Hobson, Hunjaw and Shoo, 2014

In the case of each taxon, the published diagnostic information (cited in this paper) is more than adequate to separate each.

Exceptional to this (in the view of some who have not actually read the original description of Wells and Wellington, or otherwise of improper motive) may be *Tympanocryptis karumba* Wells and Wellington, 1985, whose descriptions of taxa are regularly lampooned and without basis synonymised.

However later authors working on the species group including in molecular studies have referred to the taxon as "*Tympanocryptis cf. lineata*" indicating a taxonomic judgement by those authors that it is a separate species from "*Tympanocryptis lineata* Peters, 1863".

This position is maintained in this paper.

Significantly and in rebuttal of often repeated claims against Wells and Wellington, Wells and Wellington (1985) also gave reference to a photo published by Hal Cogger in one of his books (by page reference) of their species from which it is self evident it was not *T. lineata*, as accepted at the time. Similarly the species *Tympanocryptis karumba* Wells and Wellington, 1985 is also clearly not the same species as *T. lineata*, as accepted by Melville *et al.* (2019) or the similar species recognized as *T. lineata* by myself in this paper.

T. Karumba is also readily separated from nominate *T. lineata* in the formal descriptions below, removing any doubt whatsoever that it is a separate species level taxon from *T. lineata.* The diagnosis for this taxon with respect to all currently recognized species in the genus *Tympanocryptis* is in effect a full redescription of the taxon and effective validation of the lesser and somewhat ambiguous formal description of Wells and Wellington (1985).

The eleven newly described species and four subspecies within the genus *Tympanocryptis* have all been previously regarded as forms or variants of already described species as listed above. However each are morphologically distinct and allopatric. For each of the species formally named, in each case, they are separated from one another (their nearest congeners) by well-defined and known biogeographic barriers, each with a divergence timeline in excess of 2 million years.

Therefore I have absolutely no hesitation in naming each of the eleven as full species, rather than taking the otherwise conservative position of identifying each as a subspecies.

The relevant taxa have in all cases already been sampled genetically and confirm the preceding statement.

The eleven species formally named for the first time in this paper fall within the following species groups.

Three had been until now treated as populations of *Tympanocryptis lineata* Peters, 1863; one had until now been treated as a population of *T. centralis* Sternfeld, 1925; three had until now been treated as populations of *Tympanocryptis tetraporophora* Lucas and Frost, 1895; one had been treated as a population of *T. macra* Storr, 1982; one had been treated as a population of *T. bottomi* Hoser, 2015; one had been treated as a population of *T. intima* Mitchell, 1948 and the last treated as the far western population of *T. houstoni* Storr, 1982.

With four new species being formally identified and given names within the single *T. tetraporophora* Lucas and Frost, 1895 (three being new), three further subspecies are also defined and named for the first time.

The molecular evidence is seen in earlier publications including Melville *et al.* (2014) and this paper also confirms that each formally identified group are also geographically separate and morphologically distinct by way of characters identified in this paper.

In terms of the species defined herein, all appear to have diverged from their closest congeners by more than 2 MYA, based on previously published molecular results across the same biogeographical barriers as cited by Hoser (2015h).

The four relevant subspecies appear to have diverged at about 1.5 MYA from their nearest species-level relatives, except for one which has a divergence estimated at about 1 MYA but is particularly distinctive morphologically, meaning all may ultimately be regarded as full species by later workers.

The three species *T. williamconnellyi sp. nov.*, *T. uniformis* and *T. macra* are also herein placed in a new subgenus *Williamconnellysaurus subgen. nov.* due to their divergence from nearest congeners, including members of the genus *Roundacryptus* Wells and Wellington (1985), herein treated as a valid subgenus within *Tympanocryptis* as opposed to its original description as a full genus.

Shoo *et al.* (2008) showed an 8.2 MYA divergence between this group and others in the *T. cephalus* complex, including eastern species formerly treated as *T. intima*.

Those species in turn have a greater divergence from others in *Tympanocryptis*, effectively vindicating a genus (or subgenus) level separation in terms of taxonomy and nomenclature as first formally proposed by Wells and Wellington (1985).

MATERIALS, METHODS AND OTHER RELEVANT CONSIDERATIONS

While it is not always necessary to cite earlier works when publishing descriptions of new taxa if it is not being referred to or used in any way and does not make taxonomic judgements of relevance, it is worthwhile mentioning some key texts relevant to the preparation of this paper and detail materials and methods at the same time.

All relevant taxa have been inspected by myself across a period spanning more than four decades both live, in specimen collections and via numerous photos of specimens with accurate locality data.

Besides the fact that the newly named species taxa are geographically isolated from one another (within their immediate species complexes, being the species they are most similar to), they are also morphologically distinct.

Until recently this alone would have been regarded as being sufficient grounds to grant each formal taxonomic recognition.

In the post 2010 period, most species are only recognized on the basis of molecular data or some kind of equivalent that establishes a preferably calibrated timeline of divergence. As already mentioned references and DNA samples previously detailed by relevant authors cited give timelines for all of the new taxa already, with all known to be separated by biogeographical barriers of known antiquity.

Most herpetologists and biologists in other disciplines of zoology recognize reproductive isolation and divergence of over 1.5 MYA as sufficient grounds to consider dividing a species as may have been previously recognized (e.g. Harvey *et al.* 2000).

Of course, it is here that I should explain the ridiculous, unscientific and childish attitude of many so-called "professional herpetologists" (including Melville as detailed later in this paper) with respect to the works of Wells and Wellington and a pig-headed refusal to use their works, cite their works or be seen to accept their (often blindingly obvious) taxonomy and nomenclature, unless vetoed by one of a select few individuals, usually by the names of Glenn Shea or Hal Cogger.

This ridiculous attitude manifested by anti Wells and Wellington crusaders (opposing the publications of Wells and Wellington 1984 and 1985) in recent years has been led by a group known as the Wüster gang or "Kaiser *et al.*.

The group includes Wolfgang Wüster, Hinrich Kaiser, Wulf Schleip, Mark O'Shea and several others, who also between them run many thousands of fake accounts online to present a false veneer that their perverted world view is that of a majority of herpetologists.

Their anti-science and anti-wildlife conservation actions are beyond a joke and is severely hampering the progress of the science of herpetology and conservation in Australia as seen in the examples manifesting in the resultant improper alterations seen in publications of Anonymous (1987), Anonymous (2001), Anstis (2002), Aplin (1999), Barker and Barker (1994), Cogger (1975, 1992, 1996), Kaiser *et al.* (2013), Mirtschin and Davis (1992), Sprackland *et al.* (1997), Turner and Valentic (1998), Tyler (1992) and Tyler *et al.* (1994) or relevant comments made out of necessity by these authors.

However countering these ridiculous actions caused by the Wolfgang Wüster gang are the publications of Cogger (2014), Dubois (2014), Dubois *et al.* (1988), Hoser (1989, 1998, 2000a, 2000b, 2001 and 2007), ICZN (1991, 2001), Shea (1995), Thomson (2003), Wells and Wellington (1999) and many others as cited by Hoser (2009, 2012a, 2012b, 2013a, 2015a-f).

Recent misconduct involving Melville and co-authors in Melville *et al.* (2018 and 2019) is discussed in more detail after the formal descriptions of the 11 new species and in more detail in a separate paper.

However, as reported by Hoser (2015h) some earlier examples relevant to Australian agamids follow.

The molecular results of a paper, Melville *et al.* (2011) upheld the Wells and Wellington action in 1984 of splitting the species *Rankinia diemensis* by naming the most divergent species in the complex as *Rankinia boylani* and yet Melville *et al.* effectively ignored their result and effectively said nothing, as did Ng *et al.* (2014).

This of course has meant that in the following years (post-dating 1984 to present), pretty much all other herpetologists have continued to recognize only *Rankinia diemensis* (Gray, 1841) and not the second species *Rankinia boylani* Wells and Wellington, 1984.

I need not mention that the latter taxon has a centre of distribution around Sydney, Australia, Australia's largest urban area in terms of population, already surpassing 5 million people in 2015 and clearly putting the taxon at potential extinction risk.

It would be scandalous if this and other even more vulnerable taxa within the *Rankinia diemensis* complex as named by Hoser (2015h) or other threatened taxa named by Wells and Wellington were exterminated simply as a result of so-called jealously by other Australian herpetologists.

The papers of Wells and Wellington (1984, 1985), subject of an illegal attempted suppression by the President of the Australian Society of Herpetologists, who at the time was none other than Richard Shine, now in 2019 a professor at the University of Sydney, are still regularly condemned and lampooned by so-called herpetologists within Australia.

While they contain many errors, as do almost all other herpetology papers of similar size and scope, one fact has emerged in the three decades since it was published.

The taxonomy and nomenclature within as an account of the systematics of Australian herpetofauna is considerably more accurate than any similar publications before or since, up to and including the present date. Most of the taxonomic decisions within the papers have been validated by molecular methods and phylogenies published since (e.g. Pyron *et al.* 2013), noting that these methods were not available to the original authors and all the nomenclature within the Wells and Wellington papers complied with the relevant edition/s of the *International Code of Zoological Nomenclature*.

While the most recent edition of Cogger (2014) has according to Cogger himself, been acting on behalf of the current views of the majority of Australian herpetologists, adopted numerous taxonomic and nomenclatural acts of Wells and Wellington (1984, 1985), many other obvious and sensible actions by them continue to be ignored by the herpetological community at large.

Examples are many and include the non-recognition of divergent taxa such as *Rankinia boylani* or the similarly vulnerable "*Pantherosaurus kurringai*" still ridiculously treated as a synonym for "*Varanus rosenbergi* Mertens, 1957" even though they are morphologically quite different, come from almost opposite sides of the continent and have even had their separate species status validated by molecular studies which showed a 6 per cent mitochondrial divergence (est. 3 MYA)!

Now of course, if there is anyone on the planet with a genuinely valid reason to take offense and to not want to recognize the Wells and Wellington name "*Rankinia boylani*" it is myself.

After all on 8 May 1981, Mr. Terry Boylan, the man whom the species was named after, was one of five men who illegally entered my home, tied me up in a chair and then proceeded to steal reptiles, files and whatever else took their fancy.

The NSW National Parks and Wildlife Service (NPWS) who led the raid later admitted they had acted illegally and were at fault and even returned some of the 14 stolen snakes, files taken and so on.

They were ordered to return all, but lied and claimed the others had died.

A decade later, Boylan to his credit made an apology and amends with me and as far as the rules of science go, none of this even matters!

However noting how rare it is to get an apology for wrongdoing from anyone, this does speak volumes for Boyland's character (in his favour).

The preceding account is only mentioned to show that no one on the planet would have a greater desire to see the name "*boylani*" junked than myself!

However rules are rules and in terms of the *International Code of Zoological Nomenclature* scientists and users of nomenclature must comply. This is particularly so as wildlife laws in all countries worldwide also are based on the same rules which therefore become legally enforceable.

The taxon *Rankinia boylani* Wells and Wellington, 1984 is valid; the name is valid according to the rules of the *International Code of Zoological Nomenclature*, and the sooner people get over the politics the better.

The name must be used and the species must be preserved as previously stated in Hoser (2015h) and even if the patronym name is horrible.

In terms of the Wells and Wellington (1984 and 1985) papers however, I must state that it remains a key document in Australian herpetology and the sooner the obviously correct taxonomic decisions within those papers are adopted, the better!

Nomenclature simply follows this as per the rules of the *International Code of Zoological Nomenclature.*

This includes those agamid taxa described by them and until now treated as synonyms of others, even though they are morphologically distinct and when coupled with other publicly available evidence, make a compelling case for their proper recognition, for which the Wells and Wellington nomenclature must inevitably follow, including in terms of taxa they named and are recognized in this paper in terms of the genus *Tympanocryptis*.

I also note the haste with which unethical herpetologists have literally stolen the works of Wells and Wellington (1984, 1985) and used their papers as a basis for their own alleged "discoveries", which they have then trumpeted far and wide and without even so much as a shred of decency to acknowledge the earlier works of these authors.

Hoser (2015h) cites examples of this and another as yet uncited example is the paper of Mclean *et al.* (2013), with the bold title: "Taxonomic assessment of the *Ctenophorus decresii* complex (Reptilia: Agamidae) reveals a new species of dragon lizard from western New South Wales."

It is a brazen attempt to claim the discovery of a new species as a result of their allegedly original scientific work.

A close reading of the paper makes such a very claim and scandalously nowhere in this document is there even a reference to the works of Wells and Wellington.

Now because some of the co-authors have been very critical of the Wells and Wellington papers, we know that they have read them, or at least would reasonably expect this to be the case.

In Wells and Wellington (1984) the two men wrote:

"*Ctenophorus decresii* (Duméril and Bibron, 1837): We believe the N.S.W. population to represent an undescribed species. *C decreasii* is confined to South Australia."

Or in case McLean *et al.* missed that, Wells and Wellington (1985) wrote:

"We have deferred describing a number of species in this complex a Mr. Magnus Peterson has formally informed us of his intentions to name some members".

So clearly we have Wells, Wellington and at least another well-known herpetologist at the time (1980's) well aware that the NSW animals assigned to *C. decreasii* were definitely of another species!

Now I am not going to deny that McLean *et al.* (2013) did a small amount of work on the relevant taxa and in naming this long known and undescribed species.

But they have engaged in the morally repugnant action of plagiarisation of the works of others in their process and it is this that I object to.

There is also a copyright issue to deal with and there is little doubt that Wells and Wellington would have a good case of copyright infringement against McLean *et al.* (2013) if they chose to pursue it.

Hoser (2015h) and sources cited therein, detail many other cases of similar attempts to steal the works of authors by a ratbag group known as the Wüster gang.

Not only are their actions ethically wrong and potentially illegal under intellectual property laws, they serve to hamper the progress of the science of herpetology and associated wildlife conservation efforts by acting to deter potential new entrants to the field, who may be in fear of many years work being stolen by pirates who have attempted to set themselves up as high priests or gatekeepers of herpetology in direct breach of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

The genus *Ctenophorus* Fitzinger, 1843 as recognized by Melville *et al.* (2008) and most authors since, was dissected by Hoser (2015h) along phylogenetic lines into four genera (three named for the first time) and subgenera, using available names and three new ones in a continuation of the dismemberment of the genus commenced by Wells and Wellington (1984, 1985).

The phylogeny produced in Melville *et al.* (2008) generally validated the taxonomic decisions of Wells and Wellington (1984, 1985) who dissected *Ctenophorus* as generally recognized at the time, this including species that had been shunted between various genera by various authors.

The genera *Licentia* Wells and Wellington, 1984; *Phthanodon* Wells and Wellington, 1985; *Tachyon* Wells and Wellington, 1985 and of course *Rankinia* Wells and Wellington, 1984 have been largely supported by research results since 1985, but due to the pig-headed inertia of a vocal minority of herpetologists in Australia and their improper tactics of bludgeoning others to submit to their warped perceptions, the adoption and use of Wells and Wellington genera or subgenera, including these has been at times scandalously limited.

However Hoser (2015h) broke this scientific censorship and recognized the relevant Wells and Wellington taxa as appropriate.

There are numerous relevant papers in terms of the taxonomy and nomenclature of the genus *Tympanocryptis sensu lato* and the conclusions made within this paper. However in summary, they are primarily based on direct observations of the newly named taxa and those species they have until now been confused with and with direct reference to the type material, either by way of inspection, relevant literature or whatever else is required to ascertain provenance and important diagnostic features.

Key references of relevance to the final taxonomic and nomenclatural judgements in this paper include the following: Ackermann (2006), Ackermann and Fritz (2006), Banks *et al.* (2013), Boulenger (1885), Brown (2014), Cogger (1975, 1983, 1992, 1996, 2014), Cogger *et al.* (1983), Coventry (1970), Doughty *et al.* (2015), Freynik and Drewes (2011), Fritz and Ackermann (2012), Greenbaum (2000), Greer and Smith (1999), Günther (1867), Jenkins and Bartell (1980), Harvey *et al.* (2000), Hoser (1989, 2015g), Houston (1978), Hugall *et al.* (2008), Kinghorn (1924), Kwet (2016), Loveridge (1934), Lucas and Frost (1895), Macey *et al.* (2000), Manthey and Mertens (1967), Schuster (1999), Melville (2018), Melville *et al.* (2007, 2014, 2018, 2019), Mitchell (1948), Müller (1998), Osborne *et al.* (1993), Patanant (2016), Peters (1863), Pianka and Vitt (2003), Ride *et al.* (1999), Scott and Scott Keogh (2000), Shea and Sadlier (1999), Shoo *et al.* (2008), Smith *et al.* (1999), Starr and Leung (2006), Sternfeld (1925), Storr (1964, 1982a, 1982b, 1986), Storr, Smith and Johnstone (1983), Swan *et al.* (2014), Wells and Wellington (1984, 1985), Wermuth (1967), Wilson and Knowles (1988), Wilson and Swan (2010, 2017), Worrell (1963) and sources cited therein.

In terms of the species formally named herein within the *T. tetraporophora* species group I note the following:

In 2015 Doughty et al. wrote: "Although the Hamersley and Fortescue populations were not supported as independent by the nuclear DNA indicating a relatively recent split within the *T. cephalus* species-group, subtle morphological differences and evidence of independent evolutionary trajectories

from the mitochondrial DNA led us to recognize both lineages as full species, rather than recognizing two subspecies (e.g. Zink 2004; Torstrom *et al*. 2014).”

This is a contrary position to that taken by Melville *et al.* (2018), when not formally labelling distinct mitochondrial lineages in another species complex within *Tympanocryptis.* I herein adopt the same position as Doughty *et al.* with respect to the species recognized herein within the *T. tetraporophora* species group not formally recognized as such by Melville *et al.* (2018) and these facts explain the discrepancy in taxonomy between this paper and that of Melville *et al.* (2018) in the face of the same available evidence.

It should also be noted that the species identified in Melville *et al.* (2019) as *T. lineata* is in fact *T. telecom* Wells and Wellington, 1985 and the relevant diagnostic information for these taxa has in effect been confused by Melville *et al.* (2019).

She did correctly separate the two southern highlands of NSW and ACT species on the basis of tail blotches and has diagnosed each properly in her paper, but unfortunately failed to properly inspect the lectotype for *T. lineata* and failed to realise that she erroneously labelled it as conspecific with *T. telecom* instead of the other species, which she then improperly renamed *T. osbornei* in the misguided belief it was an undescribed form.

This paper corrects that error and in the taxonomic treatments below, *T. telecom* as identified below, equates with the *T. lineata* of Melville *et al.* (2019) and *T. lineata* as identified below, equates with the *T. osbornei* of Melville *et al.* (2019) which she recklessly created and named in an act of taxonomic vandalism.

To make it abundantly clear to readers, this paper formally synonymises *T. osbornei* with *T. lineata* and therefore also resurrects from synonymy of the latter, *T. telecom.*

Readers of this paper should be aware of the discrepancies identified herein and the scientific basis for them.

I also note Melville *et al.* (2019) wrote in the synonymy list for *T. lineata* the following:

“*Tympanocryptis telecom* Wells, R. & Wellington, C.R. 1985. *Australian Journal of Herpetology*, Supplementary Series: 1–61 [20]. Type locality, Black Mountain, Australian Capital Territory. Type specimen not identified, *nomen nudum*.”

This statement is incorrect. The term *nomen nudum* is defined in the *International code of Zoological Nomenclature* (Ride *et al.* 1999) and the Wells and Wellington description from 1985 does not fit within that definition.

Therefore the name is available in terms of the code and Melville *et al.* (2019) assuming the *et al.* part actually had input into the writing of the paper as well as any alleged peer reviewers if they in fact existed, were reckless in publishing the misinformation stating that *Tympanocryptis telecom* was a *nomen nudem.*

All relevant parties should have engaged in the simple intellectual exercise of consulting the original publication of Wells and Wellington and the relevant section of the *International code of Zoological Nomenclature* (any of editions 2, 3 or 4) before creating taxonomic and nomenclatural confusion in terms of the relevant taxa.

The paper Melville *et al.* (2019) also provided evidence to validate at least one species named by Hoser (2015h) (*T. alexteesi*) including by way of DNA from the holotype. The paper Hoser (2015h) had been previously criticized online by Melville and yet she failed to refer to or even cite Hoser (2015h) in her 2019 paper. This is fraudulent and unscientific conduct on her part.

Melville et al. (2019) engaged in a more serious act of potential copyright breach, fraudulent behaviour and taxonomic vandalism by recklessly renaming the species *Tympanocryptis lineata* Peters, 1863 as *T. osbornei* and also improperly referred to *T. telecom* Wells and Wellington 1985 as a junior synonym of *T. lineata* Peters, 1863.

While Melville *et al.* (2019) was allegedly peer reviewed, both these reckless taxonomic and nomenclatural actions would have been averted had any credible peer review in fact been done.

Even a competent 10 year old school student could have easily cross checked the alleged facts to find the errors. A PhD would not have been necessary.

In an earlier paper that also evaded credible peer review, Melville *et al.* (2018), publishing a review of a different group of Australian agaimids engaged in acts of scientific fraud, potential copyright breach and taxonomic vandalism. In that paper their illegally coined name *Tropicagama* was a junior synonym of *Melvillesaurea* Hoser, 2015 and *Lophognathus horneri* was a junior synonym of *Lophognathus wellingtoni* Hoser, 2015.

These unlawful actions by Melville *et al.* (2018 and 2019) along with similar earlier actions by members of the so-called Wüster gang have had disastrous conservation outcomes for the relevant species, including potential extinction of one relevant species, namely *T. pinguicolla.*

THEFT OF MATERIALS TO IMPEDE SCIENCE AND WILDLIFE CONSERVATION

I also note the following: In 2006 an online petition sponsored by a group of animal-hating pseudo-scientists including Wolfgang Wüster, Mark O’Shea, David John Williams, Bryan Fry and others posted at: http://www.aussiereptileclassifieds.com/phpPETITION (Hunter *et al.* 2006) called for my successful wildlife education business (Snakebusters®) and all my other herpetological activity to be shut down by the government of Victoria, Australia.

These men were successful in that after a ruthless five-year campaign, on 17 August 2011, 11 heavily armed police and wildlife officers conducted a highly illegal and violent raid on our family home and research facility. The raid was also a reprisal for several publications I had made that were highly critical of corruption involving the relevant people (e.g. Hoser 1993, 1996, 2010).

Myself, my wife and two vulnerable young daughters were arrested at gunpoint and held captive in the kitchen of the house for nine hours while the facility was ransacked. Besides the unspeakable acts of killing captive snakes and criminal damage to cages and household goods, the raiding officers illegally shut down our business and effectively placed myself under house arrest at gunpoint for some months after the raid (March to June in 2012).

An application by myself to the Supreme Court of Victoria led to the re-opening of our unlawfully shut down wildlife education business (June 2012), although much of the damage to the business and our reputation built up over more than 4 decades was irreparable.

Later proceedings resolved in 2014 and 2015, cleared me of dozens of fabricated criminal charges spanning some decades (Magistrates Court Victoria 2014), and a judicial finding that I was legally a cleanskin in that I had never acted illegally (VCAT 2015).

The government was ordered to pay me costs, restitution, compensation and damages (Court of Appeal, 2014), which as of mid 2019 remain unpaid.

Of greater relevance here is that at the time of the raid, research files spanning more than 40 years were taken and never returned, including materials and records relevant to this paper.

Material taken included all the computers, disks, hard drives, backups, cameras, scientific literature and other forms of information and information storage at the facility. All were loaded into the back of a truck and trailer and carted off.

Faced with the dilemma of deciding whether to spend another forty years gathering data, by which time I may be dead from old age, being aged 57 as of May 2019, or publishing the relevant paper/s with significantly less data, I have opted to publish.

Underlying this motivation has been an increasing concern that a delay to formally identify and name undescribed biodiversity may lead to its extinction before another scientist gets around to the matter.

Engstrom *et al.* (2002) wrote: “The documentation of this diversity must be seen as an activity that is done not just for posterity but for immediate action and protection.”

A number of authors including Kaiser (2012a, 2012b, 2013, 2014a and 2014b), Kaiser *et al.* (2013), Naish (2013) and Wüster *et al.* (2014), all part of the group of people effectively controlled by Wolfgang Wüster of Wales, UK, have been highly critical of the fact that I have assigned names to unnamed clades of snakes and more recently for other reptiles. Their unscientific and childish attacks, continued incessantly on social media such as Facebook and Twitter are rejected herein as destabilizing the nomenclature, impeding the progress of science and in some cases putting people’s lives at risk.

Their ridiculous comments and false and defamatory statements are systematically rebutted by Hoser (2012a, 2012b, 2013a, 2015a-

f) and sources cited therein, as well as Cogger (2013, 2014), Dubois (2014), Eipper (2013), Mutton (2014a, 2014b), Shea (2013a-d), Thorpe (2013, 2014a-c), Wellington (2013, 2014a, 2014b), Wells (2013, 2014a, 2014b), and many others, so this history is not reviewed here.

I also note that many taxa formally named by myself for the first time in earlier publications (e.g. Hoser 2000a, 2000b) are in fact threatened species.

Therefore I note the sensible remarks of Engstrom *et al.* (2002) as a perfectly reasonable explanation for the publishing of taxon descriptions for such unnamed groups. This remains the case even if a sizeable amount of my original research, files, photos and data have been stolen (more than once) and therefore cannot be relied upon and incorporated into these contemporary publications.

I also note that I welcome redescriptions of the relevant taxa by later authors unfettered by illegal break ins and thefts by corrupt government officers and if fortunate, even funded by these people, and who will hopefully have time and money to be able to do a more thorough redescription of the same and other taxa.

One does however expect these and all other herpetologists to abide by the letter and spirit of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

IMPORTANT NOTES ON THE FORMAL DESCRIPTIONS THAT FOLLOW

In terms of the formal species descriptions below, the following eight important points should be noted.

1/ Unless mandated by rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999), or later equivalent publications, the spellings of each new scientific name should not be altered in any way, including to change gender or in any other way. The names in their entirety and spelling is completely intentional. In other words by way of example, both "*optus*" and "*snakebustersorum*" as used in the descriptions is intentional and should be maintained, even though it could be argued that the correct formation of the former should be "*optusorum*".

2/ There are no conflicts of interest in terms of this paper and any material within it.

3/ In the unlikely event any later author seeks to treat two named taxa as one and the same, then the order of priority for use of names should be that of page priority, which is also the order the names are first listed in the keywords of the abstract.

4/ Material and words in each formal description may be repeated to ensure that each formal description fully complies with all relevant articles in the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

5/ No money, sponsorship or gratuity of any kind has been received or sought, in terms of the commercial entities whom various taxa have been named in honour of herein or from anyone else.

6/ All descriptions in terms of colour and morphology apply to reasonably healthy typical, wild (as opposed to living in captivity) living adult specimens and not specimens that may have faded in preservative. For this reason detailed descriptions of holotype material is not given in this paper, but can be obtained by direct viewing of the said specimens.

7/ Urls (internet addresses) (including www.zoobank.org references) given in the text below and/or for material cited within the paper may not be formally cited in the references section at the end of this paper. Other published material referred to is cited in the usual way.

8/ All names within this paper and all others by this author in other publications (to date) are always listed with Zoobank.org (the ICZN repository) within 30 days of first publication in hard copy in the period post-dating 2012 (or prior to publication) and all earlier names of taxa created by this author were also formally listed with Zoobank in 2012 or earlier.

IMAGES OF RECOGNIZED SPECIES WITHIN THE GENUS *TYMPANOCRYPTIS*, INCLUDING RECENTLY DESCRIBED FORMS AND THOSE SPECIES FORMALLY IDENTIFIED FOR THE FIRST TIME IN THIS PAPER

There have been published quality colour images of all species and subspecies formally named within this paper as well as other relevant named taxa as also redefined in this paper, with reference to the newly named taxa. This has either been in books and scientific papers or on the internet on photo sharing websites including for example www dot flickr dot com or www dot facebook dot com.

Many are misidentified on the basis of old taxonomy and/or nomenclature and some are just plain misidentified.

Some examples of the relevant species identified using the taxonomy and nomenclature of this paper (but ignoring subgenus designations, such as that of Wells and Wellington, 1985, only on the basis of convenience herein and not as a taxonomic decision) include the following:

T. snakebustersorum sp. nov. is seen in Houston 1978 at page 47 at top left image (B/W line drawing), and in life in Robertson and Coventry (2019), on page 217 (three images) as well as online at: https://www.flickr.com/photos/126237772@N07/27755777729 and https://www.flickr.com/photos/58349528@N02/25663353748/in/album-72157667480315693/ (downloaded on 21 May 2019).

T. optus sp. nov. in life is seen in an image online at: https://www.flickr.com/photos/ken_griffiths_photography/31757898385/in/photolist-QokwLa (downloaded on 21 May 2019).

T. vodafone sp. nov. is depicted on page 47, bottom right in Houston (1978) (B/W line drawing).

T. lachlanheffermani sp. nov. is seen in Wilson and Knowles (1988) at page 221, bottom right.

T, tetraporophora ianrentoni subsp. nov. is seen in Houston (1978) on page 44, bottom right as a B/W line drawing and in life online at: https://www.flickr.com/photos/58349528@N02/39553792711/in/album-72157667480315693/ (downloaded on 21 May 2019).

T. simonknolli sp. nov. (of the nominate form) (of the nominate subspecies) in life from the Barkly Tableland was found online on the domain www dot instgram dot com but the exact url for the photo could not be ascertained.

T. simonknolli marcusbrummeri subsp. nov. is seen in Cogger (2014) on page 760 at bottom and Wilson (2012) at page 79, bottom right and online at: https://www.flickr.com/photos/mark_green/10107995975/ (downloaded on 21 May 2019).

T. deniselivingstoneae sp. nov. images are not in any recently published books.

T. karimdaouesi sp. nov. (of the nominate subspecies) is seen in life and online at: https://www.flickr.com/photos/ryanfrancis/15051532074/in/album-72157630944032536/ and https://www.flickr.com/photos/ryanfrancis/15669578501/in/album-72157630944032536/ and https://www.flickr.com/photos/ryanfrancis/15486692170/in/album-72157630944032536/ (downloaded on 21 May 2019).

T.; karimdaouesi courtneyleitchae subsp. nov. is seen in life online at: https://www.flickr.com/photos/euprepiosaur/5245450404/in/photolist-8ZwiE5-ivBVmn-8Zwi9o/ and https://www.flickr.com/photos/euprepiosaur/5245448682/in/photolist-8ZwiE5-ivBVmn-8Zwi9o/ and https://www.flickr.com/photos/gazs_pics/11493251833/in/photolist-8ZwiE5-ivBVmn-8Zwi9o (downloaded on 21 May 2019).

T. williamconnellyi sp.nov. is seen in life in Wilson and Knowles (1988) at page 222, middle left photo and Storr, Smith and Johnstone (1983), plate 12, image 6, being second photo from bottom on right.

T. tonylovelinayi sp. nov. images have not been published in any recent books.

T. reconnectorum sp. nov. images of the nominate subspecies is seen in life in Wilson and Swan (2017) on page 453 middle.

T. reconnectorum clintonlogani subsp. nov. in life is seen online at: https://www.flickr.com/photos/euprepiosaur/37373631602/in/photostream/ and https://www.flickr.com/photos/euprepiosaur/23552179358/ and https://www.flickr.com/photos/euprepiosaur/37373630892/in/photostream/ (downloaded on 21 May 2019).

T. samsungorum sp. nov. is seen in an image online at: http://www.arod.com.au/arod/reptilia/Squamata/Agamidae/Tympanocryptis/houstoni (downloaded on 21 May 2019).

T. alexteesi Hoser, 2015 is seen online in an image at: https://www.flickr.com/photos/124184373@N02/23300787025 (downloaded on 21 May 2019) and at http://www.arod.com.au/arod/reptilia/Squamata/Agamidae/Tympanocryptis/lineata (Downloaded on 21 May 2019).

T. bottomi Hoser, 2015 is seen in life online at: http://www.arod.com.au/arod/reptilia/Squamata/Agamidae/Tympanocryptis/intima (downloaded on 21 May 2019) and at https://www.flickr.com/photos/smacdonald/albums/72157603712531195 (downloaded on 21 May 2019).

T. cephalus Günther, 1867 is seen in Wilson and Swan (2017) at page 449, bottom image.

T. centralis Sternfeld, 1925 is seen in Wilson and Swan (2017) at page 449, middle image and online at http://www.arod.com.au/arod/reptilia/Squamata/Agamidae/Tympanocryptis/centralis (downloaded on 21 May 2019).

T. condaminensis Melville, Smith, Hobson, Hunjaw and Shoo, 2014 is seen in Wilson and Swan (2017) at page 451 two top images, Melville *et al.* (2014), page 8 and online at: http://www.arod.com.au/arod/reptilia/Squamata/Agamidae/Tympanocryptis/condaminensis (downloaded on 21 May 2019).

T. diabolicus Doughty, Kealley, Shoo and Melville, 2015 is seen in Wilson and Swan (2017) at page 451 second image up from bottom and online at: http://www.arod.com.au/arod/reptilia/Squamata/Agamidae/Tympanocryptis/diabolicus (downloaded on 21 May 2019).

T. fortescuensis Doughty, Kealley, Shoo and Melville, 2015 is seen in Wilson and Swan (2017) at page 451 in the bottom image.

T. gigas Mitchell, 1948 is seen in Doughty *et al.* (2015) figure 5, photo b and online at https://www.flickr.com/photos/124699310@N06/33179708754 (downloaded 21 May 2019).

T. houstoni Storr, 1982 is seen in Wilson and Swan (2017) at page 453 at top right, Wilson and Knowles (1988) at top left, Storr, Smith and Johnstone (1983), plate 12, image 5, being second photo from bottom on left and Cogger (2014) on page 757 top.

Tympanocryptis intima Mitchell, 1948 is seen in life online at: https://www.flickr.com/photos/whitworthimages/5283908914/ (downloaded on 21 May 2019).

T. karumba Wells and Wellington, 1985, is seen in Cogger (1983) at plate 538.

T. lineata Peters, 1863 is seen in Melville *et al.* (2019) at figure 10b being incorrectly labelled as "*Tympanocryptis osbornei sp. nov.*" and similarly mislabled (different image) online at: http://www.arod.com.au/arod/reptilia/Squamata/Agamidae/Tympanocryptis/osbornei (downloaded on 21 May 2019).

T. markteesi Hoser, 2015 is not depicted in life in any recent books.

T. mccartneyi Melville, Chaplin, Hutchinson, Sumner, Gruber, MacDonald and Sarre, 2019 is seen in Melville *et al.* (2019) at fig 11, in image at top right of page.

T. pentalineata is seen in Wilson and Swan (2017) on page 455 second image down from top.

T. pinguicolla Mitchell, 1948 is seen in Robertson and Coventry (2019) on page 220 in 2 images and Jenkins and Bartell (1980) on page 97.

T. pseudopsephos Melville, Smith, Hobson, Hunjaw and Shoo, 2014 is seen in Wilson and Swan (2017) at page 455 in two bottom images and online at: http://www.arod.com.au/arod/reptilia/Squamata/Agamidae/Tympanocryptis/pseudopsephos (downloaded on 21 May 2019).

T. telecom Wells and Wellington (1985) is seen in Wilson and Swan (2017) at page 455 second image down from top, Swan, Shea and Sadlier (2004), on page 82 at top, Robertson and Coventry (2019) on page 219 at bottom (2 images), Melville *et al.* (2019) at figure 8b and Cogger (2014) on page 759 (top).

T. tetraporophora Lucas and Frost, 1895 (of the type subspecies) is seen in Melville *et al.* (2014), page 12 and also seen in Houston (1978) on page 44 bottom left as a B/W Line drawing as well as online at: https://www.flickr.com/photos/reptileshots/15401846859/in/album-72157632658429282/ (downloaded on 21 May 2019) and https://www.flickr.com/photos/reptileshots/15402349548/in/album-72157632658429282/ (downloaded on 21 May 2019).

The subspecies *T. tetraporophora ianrentoni subsp. nov.* is seen in Houston (1978) on page 44 bottom right as a B/W Line drawing and online at: https://www.flickr.com/photos/58349528@N02/39553792711/in/album-72157667480315693/ (downloaded on 21 May 2019).

T. uniformis Mitchell, 1948 is seen in Wilson and Swan (2017) at page 457 second image down from top on left. Numerous photos published on websites such as www dot flickr dot com of so called *T. macra* appear to be of the species *T. uniformis.*

T. wilsoni Melville, Smith, Hobson, Hunjaw and Shoo, 2014 is seen in Wilson and Swan (2017) at page 457 image at bottom right and Melville *et al.* (2014), page 11.

TYMPANOCRYPTIS SNAKEBUSTERSORUM SP. NOV.

LSID urn:lsid:zoobank.org:act:55A5F9EC-CF09-44ED-9F73-D402FDC88557

Holotype: A preserved specimen at the South Australian Museum Herpetology Collection, specimen number: R42648, collected from Ngautngaut Conservation Park, South Australia, Australia, Latitude 34.42 S. Longitude 139.37 E. The South Australian Museum allows access to its holdings.

Paratype: A preserved specimen at the South Australian Museum Herpetology Collection, specimen number: R41188, collected from 3.5 KM South-west of Mackys Dam, South Australia, Australia, Latitude 33.03 S., Longitude 139.17 E.

Diagnosis: Until 2019 this taxon has been regarded as typical and type form of *Tympanocryptis lineata* Peters, 1863 as defined by Houston 1978 at page 47 at top left image. However Melville *et al.* (2019) provided data that showed that the type specimen of *Tympanocryptis lineata* Peters, 1863 was in fact from the Australian Alps in New South Wales and provided a photo of the relevant lectotype ZMB 740 that confirmed the fact. A better quality image of the same animal can be found online via a Google search of images for "*Tympanocryptis lineata*", where diagnostic tail blotches can be easily counted.

Based on the molecular data and morphological data of Melville *et al.* (2019) this means that the south east South Australian animals previously treated as *Tympanocryptis lineata* Peters, 1863 are until now an undescribed species.

For this reason the relevant taxon is herein named *Tympanocryptis snakebustersorum sp. nov.*.

T. snakebustersorum sp. nov. is readily separated from all other species formerly treated as *T. lineata* in South Australia by the possession of the following suite of characters: distinct markings on upper and lower limbs, no obvious circles running down the midline (this is seen in *T. vodafone sp. nov.* to the exclusion of all other similar species), a U-shaped blotch on the dorsal tail behind the hind limbs and on a whiteish background, versus not-U-shaped in all other species; a whitish line running along the top rear of each of the hind limbs (versus none in all other species, except occasionally in some *T. centralis*) and wider light areas than dark areas on the upper body, versus the reverse in all other species. The darker cross bands, broken by the dorsolateral lines are wide at the mid body line, narrowing to the first dorsolateral line on the sides of the dorsal surface, occasionally forming a very slight widening or etching on the meeting point at these lines, versus an obvious widening in *T. houstoni* Storr, 1982, *T. samsungorum sp. nov.* (a species previously treated as a population of *T. houstoni*), *T. alexteesi* Hoser, 2015, *T. centralis* Sternfeld, 1925 and *T. lachlanheffermani* sp. nov..

Tympanocryptis markteesi Hoser, 2015 was in the past treated as a variant of so called *T. lineata* Peters, 1863 now known as *T. snakebustersorum sp. nov.*. However *T. markteesi sp. nov.* can be separated from *T. snakebustersorum sp. nov.* by its generally greyish colour versus orangeish in *T. snakebustersorum sp. nov.*. Furthermore *T. snakebustersorum sp. nov.* is characterised by two more-or-less vertical thick creamy bars on the upper labials beneath the eye, whereas *T. markteesi sp. nov.* is characterised by one only (the rear one) and the equivalent front bar being reduced to a largeish spot. In *T. snakebustersorum sp. nov.* the light barring of the forelimbs is distinct, versus indistinct or non-existent in *T. markteesi sp. nov.* and the similar species *T. karumba* Wells and Wellington, 1985, treated (improperly) by most authors as merely *T. lineata.*

T. karumba is characterised by semi-circular blotches on the dorsolateral surface, versus squareish in *T. markteesi sp. nov.*. Like *T. snakebustersorum sp. nov.*, *T. Karumba* is characterised by two more-or-less vertical thick creamy bars on the upper labials beneath the eye, whereas *T. markteesi sp. nov.* is characterised by one only (the rear one) and the equivalent front bar being reduced to a largeish spot.

Tympanocryptis alexteesi sp. nov. described by Hoser (2015h), is readily separated from *Tympanocryptis markteesi sp. nov.*, *T. karumba* Wells and Wellington, 1985, and *T. snakebustersorum sp. nov.* by the fact that the dark dorsal blotches are orange-brown as opposed to greyish as well as the deep reddish orange lighter background colour of the dorsal surfaces. *Tympanocryptis alexteesi sp. nov.* is also readily separated from the other three taxa by the considerable whitish yellow peppering on the lower neck region as well as a relative lack of white bars or spots on the upper labials, this being no more than two obvious ones.

T. snakebustersorum sp. nov., *T. vodafone sp. nov*, *T. alexteesi* Hoser, 2015, *T. houstoni* Storr, 1982, *T. optus sp. nov.*, *T. centralis* Sternfeld, 1925 and *T. lachlanheffermani sp. nov.* can all be readily separated from all of *Tympanocryptis pinguicolla* Mitchell, 1848, *T. lineata* Peters, 1863 and *T. telecom* Wells and Wellington, 1985 by having 4-5 transverse dark dorsal bands or markings, versus 6-7 in the latter three species and the absence, versus presence of a lateral skin fold.

Tympanocryptis houstoni Storr, 1982 from the Nullarbor Plain region of South Australia and Western Australia as well as the species *T. samsungorum sp. nov.* described in this paper are readily separated from all other similar species by the presence of extremely wide darker dorsal bands on the body (usually four), the widest of which includes two joined white spots radiating on either side of the mid-dorsal stripe. The fore and hind limbs are heavily banded with dark cross-bands, a trait is shares only with *T. vodafone sp. nov.* and *T. snakebustersorum sp. nov.*.

T. houstoni and *T. samsungorum sp. nov.* are unique in the species complex by having a significantly thickened mid-dorsal stripe, versus thin line in all others. *T. samsungorum sp. nov.* until now regarded as a far western population of *T. houstoni* is readily separated from *T. houstoni* by having upper hind legs with alternating orange brown and yellow white cross bands, versus dark brown and orange, or brownish-black and yellow-grey in *T. houstoni.*

The white line on the lower part of the rear side of the rear leg of *T. samsungorum sp. nov.* is distinct versus semi-distinct in *T. houstoni.*

Both *T. houstoni* and *T. samsungorum sp. nov.* have a dorsal patterning of three alternating (mainly) dark and light patches on the body. In *T. houstoni* the lighter patches are all of similar size, whereas in *T. samsungorum sp. nov.* the anterior light patches (first pair from the mid-dorsal line) are noticeably larger than those that follow.

T. vodafone sp. nov. from north of the Eyre Peninsula in South Australia is separated from all other similar species of *Tympanocryptis* in South Australia by having a unique pattern consisting of four large dark circles running down the mid dorsal line (the circles alone being unique in this species complex) and with the line being broken on at least some of these circles, these breaks in this configuration being unique in the species complex. On the tail, there is usually an unbroken dark patch across the foretail upper surface.

T. vodafone sp. nov. is also unique among species of *Tympanocryptis* from South Australia in having heavily spinose rear legs on the dorsal anterior surfaces, the spines being small and narrow, versus raised scales forming low blunt spines, which is a unique diagnostic trait of *T. optus sp. nov.* from north-west South Australia and nearby parts of Western Queensland as well as *T. centralis* Sternfeld, 1925.

Until now *T. optus sp. nov.* has been regarded as a form of *Tympanocryptis lineata* Peters, 1863. *T. optus sp. nov.* is different among species in the complex and separated from all of them in having relatively indistinct dorsal markings in adults including on the limbs, which are basically one colour (whitish-orange) and the dorsal colouration is usually a greyish-brown or reddish colour.The dorsolateral lines are often broken, but if so, over light parts of the upper body and not the darker regions, where they remain distinct.

Tympanocryptis pinguicolla Mitchell, 1948 is readily separated from all other *Tympanocryptis* species by having almost vertically oriented dorsal tubercles that either lack a terminal spine or have only a small projection. They can be separated from *T. lineata* Peters, 1863 and *T. telecom* Wells and Wellington, 1985 by having enlarged tubercular scales scattered on the thighs, compared to the absence of this scalation.

T. lachlanheffermani sp. nov. and *T. centralis* Sternfeld, 1925 are readily separated from all other species in the complex by having a pale mid-dorsal stripe that is not or scarcely wider than the mid-dorsal stripe, and an extremely conspicuous and usually continuous white mid lateral stripe on each side.

T. centralis Sternfeld, 1925 from central Australia is separated from *T. lachlanheffermani sp. nov.* known only from near Tenant Creek in the Northern Territory and areas immediately east of there, by its strongly spinose hind legs (blunt spines formed from raised scales) and a strong deep reddish-brown colouration versus a washed out yellowish-reddish colouration in *T. lachlanheffermani sp. nov.*. In *T. lachlanheffermani sp. nov.* and *T. centralis* the hind limbs are slightly rugose. However in *T. lachlanheffermani sp. nov.* the ridge of white ruguse, spined scales running down the anterior side of the lower hind limb is prominent, versus relatively indistinct in *T. centralis.*

At a glance, the easiest way to tell *T. centralis* and *T. lachlanheffermani sp. nov.* apart, is by viewing the dorsal surface and looking at the stripes running down the sides of the dorsal surface (not the vertebral stripe). These are broken in both species across the lighter patches and unbroken across the darker patches. In *T. centralis*, these lines are thick, whereas in *T. lachlanheffermani sp. nov.* the lines are extremely thin (like a hairline). *T. lachlanheffermani sp. nov.* has 11 or less light coloured tail rings, versus 12 or more in *T. centralis.* Scattered raised red scales on the dorsal surface are prominent in *T. centralis* versus relatively indistinct in *T. lachlanheffermani sp. nov.*.

T. vodafone sp. nov. is depicted on page 47, bottom right in Houston (1978). Similar species depicted on the same page of Houston (1978), showing comparative differences in dorsal patterning are, *T. snakebustersorum sp. nov.*, top left, *T. centralis*, top right and *T. houstoni* at bottom left.

T. snakebustersorum sp. nov. is seen in Houston 1978 at page 47 at top left image (B/W line drawing), and in life in Robertson and Coventry (2019), on page 217 (three images) as well as online at: https://www.flickr.com/photos/126237772@N07/27755777729 and https://www.flickr.com/photos/58349528@N02/25663353748/in/album-72157667480315693/ (downloaded on 21 May 2019).

Distribution: *T. snakebustersorum sp. nov.* is restricted to agricultural regions of south-eastern South Australia and nearby parts of southern New South Wales and western Victoria including immediately adjacent semi-arid areas.

Etymology: Named in honour of the hard working team at Snakebusters ®: Australia's best reptiles ® reptile shows, for more than a decades work including the core activity of wildlife displays and education in schools, events and for the iconic Reptile Parties ® a concept first pioneered by myself and associates more than 30 years ago and now being copied globally. The staff at Snakebusters®: Australia's best reptiles® also assisted in fieldwork in various places, accessing museum specimens on my behalf when travelling to relevant cities, and other logistical assistance in the research and conservation of various species. Included among those people honoured by the patronym "snakebustersorum" are the following: Jen Anderson, Ateaka Campbell, Tom Cotton, Scott Eipper, Judy Fergusson, Adelyn Hoser, Jacky Hoser, Shireen Hoser, Michael Laidlaw, Andrew Lamont, Louise McGoldrick, Simon McGoldrick, Dylan Mullins, Dara Nin, Andrew Paget, Demi Perkins, Christopher Pillot, James Proudly, Fred Rossignolli, Callum Sharples; Madeline Shaw, Michael Smyth, Christopher Trioano, Peter Whybrow, Andrew Wilson, all of Victoria, Australia and at the relevant times they have been with the Snakebusters team engaged in core activities.

Numerous other individuals who have worked with Snakebusters ® to a lesser extent or provided invaluable assistance's to the team are not named herein.

TYMPANOCRYPTIS OPTUS SP. NOV.

LSID urn:lsid:zoobank.org:act:ED41757B-8E0B-44E3-B815-835159D22272

Holotype: A preserved specimen at the South Australian Museum, Adelaide, South Australia, Australia, specimen number: R49360, collected from the east side of the Lake Hope Channel, 12 km, SSW of Red Lake Yard, South Australia, Australia, Latitude 28.19 S., Longitude 139.13 E. The South Australian Museum, Adelaide, South Australia, Australia is a government owned facility that allows access to its holdings.

Paratype: A preserved specimen in the Museum of Victoria, Melbourne, Victoria, Australia, specimen number: D1124 collected from Kalamurina (East of Lake Eyre), South Australia, Australia, Latitude 27.9 S., Longitude 137.98 E.

Diagnosis: Until now *T. optus sp. nov.* has been regarded as a form of *Tympanocryptis lineata* Peters, 1863. *T. optus sp. nov.* is different among species in the complex and separated from all of them in having relatively indistinct dorsal markings in adults including on the limbs, which are basically one colour (whitish-orange) and the dorsal colouration is usually a greyish-brown or reddish colour.The dorsolateral lines are often broken, but if so, over light parts of the upper body and not the darker regions, where they remain distinct.

Until now *T. snakebustersorum sp. nov.* has been regarded as typical and type form of *Tympanocryptis lineata* Peters, 1863 as defined by Houston 1978 at page 47 at top left image. However Melville *et al.* (2019) provided data that showed that the type specimen of *Tympanocryptis lineata* Peters, 1863 was in fact from the Australian Alps in New South Wales and provided a photo of the relevant lectotype ZMB 740 that confirmed the fact. A better quality image of the same animal can be found online via a Google search of images for "*Tympanocryptis lineata*", where diagnostic tail blotches can be easily counted.

Based on the molecular data and morphological data of Melville *et al.* (2019) this means that the south east South Australian animals previously treated as *Tympanocryptis lineata* Peters, 1863 are until now an undescribed species.

For this reason the relevant taxon is herein named *Tympanocryptis snakebustersorum sp. nov.*.

T. snakebustersorum sp. nov. is readily separated from all other species formerly treated as *T. lineata* in South Australia by the possession of the following suite of characters: distinct markings on upper and lower limbs, no obvious circles running down the midline (this is seen in *T. vodafone sp. nov.* to the exclusion of all other similar species), a U-shaped blotch on the dorsal tail behind the hind limbs and on a whitish background, versus not-U-shaped in all other species, a whitish line running along the top rear of each of the hind limbs (versus none in all other species, except occasionally in some *T. centralis*) and wider light areas than dark areas on the upper body, versus the reverse in all other species. The darker cross bands, broken by the dorsolateral lines are wide at the mid body line, narrowing to the first dorsolateral line on the sides of the dorsal surface, occasionally forming a very slight widening or etching on the meeting point at these lines, versus an obvious widening in *T. houstoni* Storr, 1982, *T. samsungorum sp. nov.* (a species previously treated as a population of *T. houstoni*), *T. alexteesi* Hoser, 2015, *T. centralis* Sternfeld, 1925 and *T. lachlanheffermani* sp. nov..

Tympanocryptis markteesi Hoser, 2015 was in the past treated as a variant of so called *T. lineata* Peters, 1863 now known as *T. snakebustersorum sp. nov.*. However *T. markteesi sp. nov.* can be separated from *T. snakebustersorum sp. nov.* by its generally greyish colour versus orangeish in *T. snakebustersorum sp. nov.*. Furthermore *T. snakebustersorum sp. nov.* is characterised by two more-or-less vertical thick creamy bars on the upper labials beneath the eye, whereas *T. markteesi sp. nov.* is characterised by one only (the rear one) and the equivalent front bar being reduced to a largeish spot. In *T. snakebustersorum sp. nov.* the light barring of the forelimbs is distinct, versus indistinct or non-existent in *T. markteesi sp. nov.* and the similar species *T. karumba* Wells and Wellington, 1985, treated (improperly) by most authors as merely *T. lineata*.

T. karumba is characterised by semi-circular blotches on the dorsolateral surface, versus squareish in *T. markteesi sp. nov.*. Like *T. snakebustersorum sp. nov.*, *T. Karumba* is characterised by two more-or-less vertical thick creamy bars on the upper labials beneath the eye, whereas *T. markteesi sp. nov.* is characterised by one only (the rear one) and the equivalent front bar being reduced to a largeish spot.

Tympanocryptis alexteesi sp. nov. described by Hoser (2015h), is readily separated from *Tympanocryptis markteesi sp. nov.*, *T. karumba* Wells and Wellington, 1985, and *T. snakebustersorum sp. nov.* by the fact that the dark dorsal blotches are orange-brown as opposed to greyish as well as the deep reddish orange lighter background colour of the dorsal surfaces. *Tympanocryptis alexteesi sp. nov.* is also readily separated from the other three taxa by the considerable whitish yellow peppering on the lower neck region as well as a relative lack of white bars or spots on the upper labials, this being no more than two obvious ones.

T. snakebustersorum sp. nov., *T. vodafone sp. nov*, *T. alexteesi* Hoser, 2015, *T. houstoni* Storr, 1982, *T. optus sp. nov.*, *T. centralis* Sternfeld, 1925 and *T. lachlanheffermani sp. nov.* can all be readily separated from all of *Tympanocryptis pinguicolla* Mitchell, 1848, *T. lineata* Peters, 1863 and *T. telecom* Wells and Wellington, 1985 by having 4-5 transverse dark dorsal bands or markings, versus 6-7 in the latter three species and the absence, versus presence of a lateral skin fold.

Tympanocryptis houstoni Storr, 1982 from the Nullarbor Plain region of South Australia and Western Australia as well as the species *T. samsungorum sp. nov.* described in this paper are readily separated from all other similar species by the presence of extremely wide darker dorsal bands on the body (usually four), the widest of which includes two joined white spots radiating on either side of the mid-dorsal stripe. The fore and hind limbs are heavily banded with dark cross-bands, a trait is shares only with *T. vodafone sp. nov.* and *T. snakebustersorum sp. nov.*.

T. houstoni and *T. samsungorum sp. nov.* are unique in the species complex by having a significantly thickened mid-dorsal stripe, versus thin line in all others. *T. samsungorum sp. nov.* until now regarded as a far western population of *T. houstoni* is readily separated from *T. houstoni* by having upper hind legs with alternating orange brown and yellow white cross bands, versus dark brown and orange, or brownish-black and yellow-grey in *T. houstoni.*

The white line on the lower part of the rear side of the rear leg of *T. samsungorum sp. nov.* is distinct versus semi-distinct in *T. houstoni.*

Both *T. houstoni* and *T. samsungorum sp. nov.* have a dorsal patterning of three alternating (mainly) dark and light patches on the body. In *T. houstoni* the lighter patches are all of similar size, whereas in *T. samsungorum sp. nov.* the anterior light patches (first pair from the mid-dorsal line) are noticeably larger than those that follow.

T. vodafone sp. nov. from north of the Eyre Peninsula in South Australia is separated from all other similar species of *Tympanocryptis* in South Australia by having a unique pattern consisting of four large dark circles running down the mid dorsal line (the circles alone being unique in this species complex) and with the line being broken on at least some of these circles, these breaks in this configuration being unique in the species complex. On the tail, there is usually an unbroken dark patch across the fore-tail upper surface.

T. vodafone sp. nov. is also unique among species of *Tympanocryptis* from South Australia in having heavily spinose rear legs on the dorsal anterior surfaces, the spines being small and narrow, versus raised scales forming low blunt spines, which is a unique diagnostic trait of *T. optus sp. nov.* from north-west South Australia and nearby parts of Western Queensland as well as *T. centralis* Sternfeld, 1925.

Tympanocryptis pinguicolla Mitchell, 1948 is readily separated from all other *Tympanocryptis* species by having almost vertically oriented dorsal tubercles that either lack a terminal spine or have only a small projection. They can be separated from *T. lineata* Peters, 1863 and *T. telecom* Wells and Wellington, 1985 by having enlarged tubercular scales scattered on the thighs, compared to the absence of this scalation.

T. lachlanheffermani sp. nov. and *T. centralis* Sternfeld, 1925 are readily separated from all other species in the complex by having a pale mid-dorsal stripe that is not or scarcely wider than the mid-dorsal stripe, and an extremely conspicuous and usually continuous white mid lateral stripe on each side.

T. centralis Sternfeld, 1925 from central Australia is separated from *T. lachlanheffermani sp. nov.* known only from near Tenant Creek in the Northern Territory and areas immediately east of there, by its strongly spinose hind legs (blunt spines formed from raised scales) and a strong deep reddish-brown colouration versus a washed out yellowish-reddish colouration in *T. lachlanheffermani sp. nov.*. In *T. lachlanheffermani sp. nov.* and *T. centralis* the hind limbs are slightly rugose. However in *T. lachlanheffermani sp. nov.* the ridge of white ruguse, spined scales running down the anterior side of the lower hind limb is prominent, versus relatively indistinct in *T. centralis.*

At a glance, the easiest way to tell *T. centralis* and *T. lachlanheffermani sp. nov.* apart, is by viewing the dorsal surface and looking at the stripes running down the sides of the dorsal surface (not the vertebral stripe). These are broken in both species across the lighter patches and unbroken across the darker patches. In *T. centralis*, these lines are thick, whereas in *T. lachlanheffermani sp. nov.* the lines are extremely thin (like a hairline). *T. lachlanheffermani sp. nov.* has 11 or less light coloured tail rings, versus 12 or more in *T. centralis.* Scattered raised red scales on the dorsal surface are prominent in *T. centralis* versus relatively indistinct in *T. lachlanheffermani sp. nov.*.

T. vodafone sp. nov. is depicted on page 47, bottom right in Houston (1978). Similar species depicted on the same page of Houston (1978), showing comparative differences in dorsal patterning are, *T. snakebustersorum sp. nov.*, top left, *T. centralis*, top right and *T. houstoni* at bottom left.

T. optus sp. nov. in life is seen in an image online at: https://www.flickr.com/photos/ken_griffiths_photography/31757898385/in/photolist-QokwLa

Distribution: *Tympanocryptis optus sp. nov.* is found in the region east of Lake Eyre in South Australia and nearby parts of far south-west Queensland and north-west New South Wales.

Etymology: Named in recognition of the excellent work done by Singapore Telecom and their offshoot company Optus in terms of telecommunications, internet and other activities that have facilitated scientific research in Australia. The spelling "*optus*" is intentional and should not be changed unless mandated by rules of the ICZN.

TYMPANOCRYPTIS VODAFONE SP. NOV.

LSID urn:lsid:zoobank.org:act:0F9B1FBE-7CB5-4B61-B810-3362AE0A0387

Holotype: A preserved specimen at the South Australian Museum, Adelaide, South Australia, Australia, specimen number: R65644, collected from 8.4 km north east of the Bon Bon Homestead, South Australia, Australia, Latitude 30.22 S., Longitude 135.32 E. The South Australian Museum, Adelaide, South Australia, Australia is a government owned facility that allows access to its holdings.

Paratype: A preserved specimen at the South Australian Museum, Adelaide, South Australia, Australia, specimen number: R67456, collected at 2.2 km East of Hiltaba Homestead, South Australia, Australia, Latitude 30.22 S., Longitude 135.32 E.

Diagnosis: Until now, *T. vodafone sp. nov.* has been regarded as a variant of *T. lineata* Peters, 1863. *T. vodafone sp. nov.* from north of the Eyre Peninsula in South Australia is separated from all other similar species of *Tympanocryptis* in South Australia by having a unique pattern consisting of four large dark circles running down the mid dorsal line (the circles alone being unique in this species complex) and with the line being broken on at least some of these circles, these breaks in this configuration being unique in the species complex. On the tail, there is usually an unbroken dark patch across the foretail upper surface.

T. vodafone sp. nov. is also unique among species of *Tympanocryptis* from South Australia in having heavily spinose rear legs on the dorsal anterior surfaces, the spines being small and narrow, versus raised scales forming low blunt spines, which is a unique diagnostic trait of *T. optus sp. nov.* from north-west South Australia and nearby parts of Western Queensland as well as *T. centralis* Sternfeld, 1925.

Until now *T. optus sp. nov.* has been regarded as a form of *Tympanocryptis lineata* Peters, 1863. *T. optus sp. nov.* is different among species in the complex and separated from all of them in having relatively indistinct dorsal markings in adults including on the limbs, which are basically one colour (whitish-orange) and the dorsal colouration is usually a greyish-brown or reddish colour.The dorsolateral lines are often broken, but if so, over light parts of the upper body and not the darker regions, where they remain distinct.

Until now *T. snakebustersorum sp. nov.* has been regarded as typical and type form of *Tympanocryptis lineata* Peters, 1863 as defined by Houston 1978 at page 47 at top left image. However Melville *et al*. (2019) provided data that showed that the type specimen of *Tympanocryptis lineata* Peters, 1863 was in fact from the Australian Alps in New South Wales and provided a photo of the relevant lectotype ZMB 740 that confirmed the fact. A better quality image of the same animal can be found online via a Google search of images for "*Tympanocryptis lineata*", where diagnostic tail blotches can be easily counted.

Based on the molecular data and morphological data of Melville *et al.* (2019) this means that the south east South Australian animals previously treated as *Tympanocryptis lineata* Peters, 1863 are until now an undescribed species.

For this reason the relevant taxon is herein named *Tympanocryptis snakebustersorum sp. nov.*.

T. snakebustersorum sp. nov. is readily separated from all other species formerly treated as *T. lineata* in South Australia by the possession of the following suite of characters: distinct markings on upper and lower limbs, no obvious circles running down the midline (this is seen in *T. vodafone sp. nov.* to the exclusion of all other similar species), a U-shaped blotch on the dorsal tail behind the hind limbs and on a whiteish background, versus not-U-shaped in all other species; a whitish line running along the top rear of each of the hind limbs (versus none in all other species, except occasionally in some *T. centralis*) and wider light areas than dark areas on the upper body, versus the reverse in all other species. The darker cross bands, broken by the dorsolateral lines are wide at the mid body line, narrowing to the first dorsolateral line on the sides of the dorsal surface, occasionally forming a very slight widening or etching on the meeting point at these lines, versus an obvious widening in *T. houstoni* Storr, 1982, *T. samsungorum sp. nov.* (a species previously treated as a population of *T. houstoni*), *T. alexteesi* Hoser, 2015, *T. centralis* Sternfeld, 1925 and *T. lachlanheffermani* sp. nov..

Tympanocryptis markteesi Hoser, 2015 was in the past treated as a variant of so called *T. lineata* Peters, 1863 now known as *T. snakebustersorum sp. nov.*. However *T. markteesi sp. nov.* can be separated from *T. snakebustersorum sp. nov.* by its generally greyish colour versus orangeish in *T. snakebustersorum sp. nov.*. Furthermore *T. snakebustersorum sp. nov.* is characterised by two more-or-less vertical thick creamy bars on the upper labials beneath the eye, whereas *T. markteesi sp. nov.* is characterised by one only (the rear one) and the equivalent front bar being reduced to a largeish spot. In *T. snakebustersorum sp. nov.* the light barring of the forelimbs is distinct, versus indistinct or non-existent in *T. markteesi sp. nov.* and the similar species *T. karumba* Wells and Wellington, 1985, treated (improperly) by most authors as merely *T. lineata.*

T. karumba is characterised by semi-circular blotches on the dorsolateral surface, versus squareish in *T. markteesi sp. nov.*. Like *T. snakebustersorum sp. nov.*, *T. Karumba* is characterised by two more-or-less vertical thick creamy bars on the upper labials beneath the eye, whereas *T. markteesi sp. nov.* is characterised by one only (the rear one) and the equivalent front bar being reduced to a largeish spot.

Tympanocryptis alexteesi sp. nov. described by Hoser (2015h), is readily separated from *Tympanocryptis markteesi sp. nov.*, *T. karumba* Wells and Wellington, 1985, and *T. snakebustersorum sp. nov.* by the fact that the dark dorsal blotches are orange-brown as opposed to greyish as well as the deep reddish orange lighter background colour of the dorsal surfaces. *Tympanocryptis alexteesi sp. nov.* is also readily separated from the other three taxa by the considerable whitish yellow peppering on the lower neck region as well as a relative lack of white bars or spots on the upper labials, this being no more than two obvious ones.

T. snakebustersorum sp. nov., *T. vodafone sp. nov*, *T. alexteesi* Hoser, 2015, *T. houstoni* Storr, 1982, *T. optus sp. nov.*, *T. centralis* Sternfeld, 1925 and *T. lachlanheffermani sp. nov.* can all be readily separated from all of *Tympanocryptis pinguicolla* Mitchell, 1848, *T. lineata* Peters, 1863 and *T. telecom* Wells and Wellington, 1985 by having 4-5 transverse dark dorsal bands or markings, versus 6-7 in the latter three species and the absence, versus presence of a lateral skin fold.

Tympanocryptis houstoni Storr, 1982 from the Nullarbor Plain region of South Australia and Western Australia as well as the species *T. samsungorum sp. nov.* described in this paper are readily separated from all other similar species by the presence of extremely wide darker dorsal bands on the body (usually four), the widest of which includes two joined white spots radiating on either side of the mid-dorsal stripe. The fore and hind limbs are heavily banded with dark cross-bands, a trait is shares only with *T. vodafone sp. nov.* and *T. snakebustersorum sp. nov.*.

T. houstoni and *T. samsungorum sp. nov.* are unique in the species complex by having a significantly thickened mid-dorsal stripe, versus thin line in all others. *T. samsungorum sp. nov.* until now regarded as a far western population of *T. houstoni* is readily separated from *T. houstoni* by having upper hind legs with alternating orange brown and yellow white cross bands, versus dark brown and orange, or brownish-black and yellow-grey in *T. houstoni.*

The white line on the lower part of the rear side of the rear leg of *T. samsungorum sp. nov.* is distinct versus semi-distinct in *T. houstoni.*

Both *T. houstoni* and *T. samsungorum sp. nov.* have a dorsal patterning of three alternating (mainly) dark and light patches on the body. In *T. houstoni* the lighter patches are all of similar size, whereas in *T. samsungorum sp. nov.* the anterior light patches (first pair from the mid-dorsal line) are noticeably larger than those that follow.

Tympanocryptis pinguicolla Mitchell, 1948 is readily separated from all other *Tympanocryptis* species by having almost vertically oriented dorsal tubercles that either lack a terminal spine or have only a small projection. They can be separated from *T. lineata* Peters, 1863 and *T. telecom* Wells and Wellington, 1985 by having enlarged tubercular scales scattered on the thighs, compared to the absence of this scalation.

T. lachlanheffermani sp. nov. and *T. centralis* Sternfeld, 1925 are readily separated from all other species in the complex by having a pale mid-dorsal stripe that is not or scarcely wider than the mid-dorsal stripe, and an extremely conspicuous and usually continuous white mid lateral stripe on each side.

T. centralis Sternfeld, 1925 from central Australia is separated from *T. lachlanheffermani sp. nov.* known only from near Tenant Creek in the Northern Territory and areas immediately east of there, by its strongly spinose hind legs (blunt spines formed from raised scales) and a strong deep reddish-brown colouration versus a washed out yellowish-reddish colouration in *T. lachlanheffermani sp. nov.*. In *T. lachlanheffermani sp. nov.* and *T. centralis* the hind limbs are slightly rugose. However in *T. lachlanheffermani sp. nov.* the ridge of white ruguse, spined scales running down the anterior side of the lower hind limb is prominent, versus relatively indistinct in *T. centralis.*

At a glance, the easiest way to tell *T. centralis* and *T. lachlanheffermani sp. nov.* apart, is by viewing the dorsal surface and looking at the stripes running down the sides of the dorsal surface (not the vertebral stripe). These are broken in both species across the lighter patches and unbroken across the darker patches. In *T. centralis*, these lines are thick, whereas in *T. lachlanheffermani sp. nov.* the lines are extremely thin (like a hairline). *T. lachlanheffermani sp. nov.* has 11 or less light coloured tail rings, versus 12 or more in *T. centralis.* Scattered raised red scales on the dorsal surface are prominent in *T. centralis* versus relatively indistinct in *T. lachlanheffermani sp. nov.*.

T. vodafone sp. nov. is depicted on page 47, bottom right in Houston (1978). Similar species depicted on the same page of Houston (1978), showing comparative differences in dorsal patterning are, *T. snakebustersorum sp. nov.*, top left, *T. centralis*, top right and *T. houstoni* at bottom left.

Distribution: *T. vodafone sp. nov.* is known from the region generally encompassing the northern part of the Eyre Peninsula in South Australia, generally north of about Whyalla and extending about 400 km in a band half that width generally through the area of Lake Gairdner.

Etymology: Named in honour of the Vodafone Group plc, a British based multinational telecommunications conglomerate with headquarters in London and Newbury, Berkshire. It predominantly operates services in the regions of Asia, Africa, Europe, and Oceania with their phone services aiding herpetologists in the field and to share knowledge globally. The spelling "*vodafone*" is intentional and should not be changed unless mandated by rules of the ICZN.

TYMPANOCRYPTIS LACHLANHEFFERMANI SP. NOV.

LSID urn:lsid:zoobank.org:act:0FC720CB-51E7-4AC5-A0D8-A7EBDB96C7E9

Holotype: A preserved specimen at the South Australian Museum, Adelaide, South Australia, Australia, specimen number: R53992, collected from the Tennant Creek Rubbish Tip, Tennant Creek, Northern Territory, Australia, Latitude 19.40 S., Longitude 134.10 E. The South Australian Museum, Adelaide, South Australia, Australia is a government owned facility that allows access to its holdings.

Paratype: A preserved specimen at the South Australian Museum, Adelaide, South Australia, Australia, specimen number: R53991, collected from the Tennant Creek Rubbish Tip, Tennant Creek, Northern Territory, Australia, Latitude 19.40 S, Longitude 134.10 E.

Diagnosis: Until now, *T. lachlanheffermani sp. nov.* known only from the Tennant Creek area of the Northern Territory and nearby areas to the immediate east, has been regarded as a northern outlier population of *T. centralis* Sternfeld, 1925, or alternatively a wider *T. lineata* Peters, 1839.

T. lachlanheffermani sp. nov. and *T. centralis* Sternfeld, 1925 are similar in most respects and until now, both would have been identified *T. centralis* Sternfeld, 1925 on the basis of other diagnostic material in this paper.

T. lachlanheffermani sp. nov. and *T. centralis* Sternfeld, 1925 are readily separated from all other species in the complex by having a pale mid-dorsal stripe that is not or scarcely wider than the mid-dorsal stripe, and an extremely conspicuous and usually continuous white mid lateral stripe on each side.

T. centralis Sternfeld, 1925 from central Australia is separated from *T. lachlanheffermani sp. nov.* known only from near Tenant Creek in the Northern Territory and areas immediately east of there, by its strongly spinose hind legs (blunt spines formed from raised scales) and a strong deep reddish-brown colouration versus a washed out yellowish-reddish colouration in *T. lachlanheffermani sp. nov.*. In *T. lachlanheffermani sp. nov.* and *T. centralis* the hind limbs are slightly rugose. However in *T. lachlanheffermani sp. nov.* the ridge of white ruguse, spined scales running down the anterior side of the lower hind limb is prominent, versus relatively indistinct in *T. centralis.*

At a glance, the easiest way to tell *T. centralis* and *T. lachlanheffermani sp. nov.* apart, is by viewing the dorsal surface and looking at the stripes running down the sides of the dorsal surface (not the vertebral stripe). These are broken in both species across the lighter patches and unbroken across the darker patches. In *T. centralis*, these lines are thick, whereas in *T. lachlanheffermani sp. nov.* the lines are extremely thin (like a hairline). *T. lachlanheffermani sp. nov.* has 11 or less light coloured tail rings, versus 12 or more in *T. centralis.* Scattered raised red scales on the dorsal surface are prominent in *T. centralis* versus relatively indistinct in *T. lachlanheffermani sp. nov.*.

Until now, *T. vodafone sp. nov.* has been regarded as a variant of *T. lineata* Peters, 1863. *T. vodafone sp. nov.* from north of the Eyre Peninsula in South Australia is separated from all other similar species of *Tympanocryptis* in South Australia by having a unique pattern consisting of four large dark circles running down the mid dorsal line (the circles alone being unique in this species complex) and with the line being broken on at least some of these circles, these breaks in this configuration being unique in the species complex. On the tail, there is usually an unbroken dark patch across the foretail upper surface.

T. vodafone sp. nov. is also unique among species of *Tympanocryptis* from South Australia in having heavily spinose rear legs on the dorsal anterior surfaces, the spines being small and narrow, versus raised scales forming low blunt spines, which is a unique diagnostic trait of *T. optus sp. nov.* from north-west South Australia and nearby parts of Western Queensland as well as *T. centralis* Sternfeld, 1925.

Until now *T. optus sp. nov.* has been regarded as a form of *Tympanocryptis lineata* Peters, 1863. *T. optus sp. nov.* is different among species in the complex and separated from all of them in having relatively indistinct dorsal markings in adults and is usually a greyish-brown or reddish colour.The dorsolateral lines are often broken, but if so, over light parts of the upper body and not the darker regions, where they remain distinct.

Until now *T. snakebustersorum sp. nov.* has been regarded as typical and type form of *Tympanocryptis lineata* Peters, 1863 as defined by Houston 1978 at page 47 at top left image. However Melville *et al*. (2019) provided data that showed that the type specimen of *Tympanocryptis lineata* Peters, 1863 was in fact from the Australian Alps in New South Wales and provided a photo of the relevant lectotype ZMB 740 that confirmed the fact. A better quality image of the same animal can be found online via a Google search of images for "*Tympanocryptis lineata*", where diagnostic tail blotches can be easily counted.

Based on the molecular data and morphological data of Melville *et al*. (2019) this means that the south east South Australian animals previously treated as *Tympanocryptis lineata* Peters, 1863 are until now an undescribed species.

For this reason the relevant taxon is herein named *Tympanocryptis snakebustersorum sp. nov.*.

T. snakebustersorum sp. nov. is readily separated from all other species formerly treated as *T. lineata* in South Australia by the possession of the following suite of characters: distinct markings on upper and lower limbs, no obvious circles running down the midline (this is seen in *T. vodafone sp. nov.* to the exclusion of all other similar species), a U-shaped blotch on the dorsal tail behind the hind limbs and on a whiteish background, versus not-U-shaped in all other species; a whitish line running along the top rear of each of the hind limbs (versus none in all other species, except occasionally in some *T. centralis*) and wider light areas than dark areas on the upper body, versus the reverse in all other species. The darker cross bands, broken by the dorsolateral lines are wide at the mid body line, narrowing to the first dorsolateral line on the sides of the dorsal surface, occasionally forming a very slight widening or etching on the meeting point at these lines, versus an obvious widening in *T. houstoni* Storr, 1982, *T. samsungorum sp. nov.* (a species previously treated as a population of *T. houstoni*), *T. alexteesi* Hoser, 2015, *T. centralis* Sternfeld, 1925 and *T. lachlanheffermani* sp. nov..

Tympanocryptis markteesi Hoser, 2015 was in the past treated as a variant of so called *T. lineata* Peters, 1863 now known as *T. snakebustersorum sp. nov.*. However *T. markteesi sp. nov.* can be separated from *T. snakebustersorum sp. nov.* by its generally greyish colour versus orangeish in *T. snakebustersorum sp. nov.*.

Furthermore *T. snakebustersorum sp. nov.* is characterised by two more-or-less vertical thick creamy bars on the upper labials beneath the eye, whereas *T. markteesi sp. nov.* is characterised by one only (the rear one) and the equivalent front bar being reduced to a largeish spot. In *T. snakebustersorum sp. nov.* the light barring of the forelimbs is distinct, versus indistinct or non-existent in *T. markteesi sp. nov.* and the similar species *T. karumba* Wells and Wellington, 1985, treated (improperly) by most authors as merely *T. lineata.*

T. karumba is characterised by semi-circular blotches on the dorsolateral surface, versus squareish in *T. markteesi sp. nov.*. Like *T. snakebustersorum sp. nov.*, *T. Karumba* is characterised by two more-or-less vertical thick creamy bars on the upper labials beneath the eye, whereas *T. markteesi sp. nov.* is characterised by one only (the rear one) and the equivalent front bar being reduced to a largeish spot.

Tympanocryptis alexteesi sp. nov. described by Hoser (2015h), is readily separated from *Tympanocryptis markteesi sp. nov.*, *T. karumba* Wells and Wellington, 1985, and *T. snakebustersorum sp. nov.* by the fact that the dark dorsal blotches are orange-brown as opposed to greyish as well as the deep reddish orange lighter background colour of the dorsal surfaces. *Tympanocryptis alexteesi sp. nov.* is also readily separated from the other three taxa by the considerable whitish yellow peppering on the lower neck region as well as a relative lack of white bars or spots on the upper labials, this being no more than two obvious ones.

T. snakebustersorum sp. nov., *T. vodafone sp. nov*, *T. alexteesi* Hoser, 2015, *T. houstoni* Storr, 1982, *T. optus sp. nov.*, *T. centralis* Sternfeld, 1925 and *T. lachlanheffermani sp. nov.* can all be readily separated from all of *Tympanocryptis pinguicolla* Mitchell, 1848, *T. lineata* Peters, 1863 and *T. telecom* Wells and Wellington, 1985 by having 4-5 transverse dark dorsal bands or markings, versus 6-7 in the latter three species and the absence, versus presence of a lateral skin fold.

Tympanocryptis houstoni Storr, 1982 from the Nullarbor Plain region of South Australia and Western Australia as well as the species *T. samsungorum sp. nov.* described in this paper are readily separated from all other similar species by the presence of extremely wide darker dorsal bands on the body (usually four), the widest of which includes two joined white spots radiating on either side of the mid-dorsal stripe. The fore and hind limbs are heavily banded with dark cross-bands, a trait is shares only with *T. vodafone sp. nov.* and *T. snakebustersorum sp. nov.*.

T. houstoni and *T. samsungorum sp. nov.* are unique in the species complex by having a significantly thickened mid-dorsal stripe, versus thin line in all others. *T. samsungorum sp. nov.* until now regarded as a far western population of *T. houstoni* is readily separated from *T. houstoni* by having upper hind legs with alternating orange brown and yellow white cross bands, versus dark brown and orange, or brownish-black and yellow-grey in *T. houstoni.*

The white line on the lower part of the rear side of the rear leg of *T. samsungorum sp. nov.* is distinct versus semi-distinct in *T. houstoni.*

Both *T. houstoni* and *T. samsungorum sp. nov.* have a dorsal patterning of three alternating (mainly) dark and light patches on the body. In *T. houstoni* the lighter patches are all of similar size, whereas in *T. samsungorum sp. nov.* the anterior light patches (first pair from the mid-dorsal line) are noticeably larger than those that follow.

Tympanocryptis pinguicolla Mitchell, 1948 is readily separated from all other *Tympanocryptis* species by having almost vertically oriented dorsal tubercles that either lack a terminal spine or have only a small projection. They can be separated from *T. lineata* Peters, 1863 and *T. telecom* Wells and Wellington, 1985 by having enlarged tubercular scales scattered on the thighs, compared to the absence of this scalation.

T. vodafone sp. nov. is depicted on page 47, bottom right in Houston (1978). Similar species depicted on the same page of Houston (1978), showing comparative differences in dorsal patterning are, *T. snakebustersorum sp. nov.*, top left, *T. centralis*, top right and *T. houstoni* at bottom left.

T. lachlanheffermani sp. nov. in life is seen in Wilson and Knowles (1988) at page 221, bottom right.

Distribution: Only known from the vicinity of Tennant Creek in the Northern Territory south-east to about the Davenport Range area also in the Northern Territory, Australia.

Etymology: Named in honour of Victorian Police Officer, Lachlan Hefferman for services to wildlife conservation.

On 9 December 2018 a gang of criminals working with the Wüster gang of thieves attacked a Snakebusters hands on reptile show at the Melbourne Exhibition and Convention Centre, being part of an "Autocult" motor show. Matthew Christopher Gatt was filmed stealing a rare python from the display, which was part of a well planned and executed heist.

The theft and photos of Gatt were provided to a helpful female Victoria Police officer named Courtney Leitch, who passed the investigation on to Lachlan Hefferman.

Hefferman investigated the matter, got a search warrant and with other police did a raid on Gatt's home at 12 Domain Drive, Hillside, on 31 December 2018, being some 22 days after the snake was first stolen.

The now mite infested snake was seized and returned to Snakebusters. Gatt was charged with theft and breaching the wildlife act as he had no permit for the said snake.

Reptiles are heavily regulated in Australia.

On 21 March 2019 he fronted Melbourne Magistrates Court and pled guilty to the theft.

Magistrate Denise Livingstone described Gatt's carefully planned theft as an "outrageous offence" and when imposing an $8,000.00 fine with recorded conviction said the penalty has "to deter you and others" from trying such despicable acts again.

The case was reported in news media across Australia in order to aid deterrence of like-minded thieves including by the AAP news wire service (Goodman 2019).

This conviction and fine, through the efforts of Hefferman and the other police involved, including prosecutor Simon Knoll represented a significant victory for wildlife conservation in Australia.

The intention of the theft action by Gatt, as seen by his actions following the theft and others in the cohort, was to attempt to blame myself (Raymond Hoser) for the theft and to allege it had occurred due to my failure to properly control or regulate our animals in our hands on wildlife displays.

The aim was to have our business shut down at gunpoint on the basis that we had allegedly breached our wildlife display license by failing to minimize risk of theft.

While the short term aim would be to divert our clients to less professional business rivals associated with the Wüster gang, the long term effects would have been even more devastating. By depriving members of the public from being able to hold reptiles at wildlife displays (Snakebusters are the only hands on reptile shows in Australia that let people hold the animals), public education about these animals would decline as would any desire to actively conserve those species at threat of decline or extinction.

Gatt's detection by the diligent Snakebusters team at the time of the attack, including getting photos and video of the theft from numerous angles and by use of hidden cameras was a significant effort and one that is recognized in naming a species of *Tympanocryptis* in in this paper in honour of the Snakebusters team.

The retrieval of the relevant snake, subject of a peer reviewed paper likely to be published in 2019 or early 2020, followed by Gatt's conviction and fine, meant that an immediate threat to the Snakebusters licenses was removed and furthermore like minded individuals would also be deterred from attempting similar acts in the future.

Significantly on 25 November 2010 another snake thief was busted.

At the Mansfield Agricultural Show, diligence by Snakebusters staff Tom Cotton and Callum Sharples paid off. It resulted in the police arrest of local drug dealer Dane Bender at his home after he stole a Diamond Python *Morelia spilota* (Lacépède, 1804) from the Snakebusters hands on reptile show display.

After arrest, Bender said he was working for an imitator of Snakebusters, Sean McCarthy (a claim later denied by McCarthy) and he said that he'd also stolen the snake to allow his (alleged) friend McCarthy to claim Snakebusters were being reckless in "allowing" their reptiles to be stolen in breach of license conditions. Police at the time stated they would hit Bender with a theft charge as well as assault, as to get the snake in the first place a group of ten men had attacked the two Snakebusters staff. The recovered snake appeared reasonably well after the incident, save for its collection of a few snake mites and a spinal injury above the vent, but did die later.

The relevant officer Senior Constable David Eric Farrell then decided not to charge Bender for the theft and assault on advice from Glenn Sharp, senior enforcement officer of the wildlife department (known at the time as Department of Sustainability and Environment). At the time, Sharp was working to assist the department's own wildlife display business "Zoos Victoria" to shut down Snakebusters on the basis that they were too successful and their own business was losing money.

Shortly after improperly dropping the charges the corrupted Farrell was inadvertently filmed unlawfully bashing a member of the public at Mansfield and was forced to leave the police force (Beck 2011a, 2011b, 2012, Buttler and Dowsley 2011).

Had Bender been properly charged and sentenced in 2010/2011, the deterrent effect of this may well have meant Matthew Gatt would not have been tempted to be a part of a criminal cohort who would seek to attack Snakebusters and steal a snake in 2018.

The efforts of Lachlan Hefferman and Simon Knoll as police officers in Victoria doing no more than their job is recognized as a significant contribution, not just because it was, but also because policing is not an easy job at the best of times and it is appropriate that their diligence is recognized, especially by a person often accused of improperly "hating all police" (being myself), which is not and has never been the case.

The case of Dane Bender and his theft of a Diamond Python in 2010, for which he never faced charges is related herein so that people should not be under an illusion that all police in Victoria are doing their job properly at all times (see also Hoser 1994, 1999a and 1999b) and that deliberate inaction by police has at times encouraged an increase in criminal attacks on law-abiding people and as of 2019 this form of police corruption remains a serious problem in Victoria.

TYMPANOCRYPTIS TETRAPOROPHORA IANRENTONI SUBSP. NOV.

LSID urn:lsid:zoobank.org:act:0032A30B-B516-4A49-A1AA-D463DFE0A026

Holotype: A preserved specimen in the South Australian Museum, Adelaide, South Australia, Australia, specimen number: R41504, collected at half a kilometre north east of Manunda Creek, South Australia, Australia, Latitude: 32.77 S., Longitude 139.65 E. The South Australian Museum, Adelaide, South Australia, Australia, is a government-owned facility that allows access to its holdings.

Paratype: A preserved specimen in the South Australian Museum, Adelaide, South Australia, Australia, specimen number: R41301, collected at 1.5 km east from Aldermans Catch, South Australia, Australia, Latitude 32.55 S., Longitude 140.64 E.

Diagnosis: The species group formerly regarded as being *Tympanocryptis tetraporophora* Lucas and Frost, 1895 (a single species) as defined by Cogger (2014) are separated from all other members of the genus by the following suite of characters: the dorsal tubercles are scattered irregularly and not aligned longitudinally; the pale dorso-lateral lines or stripes are obscure or absent and the tail tapers rapidly from the base and is only 1.5 times as long as the head and body.

Within this group of species are the recently described species *Tympanocryptis condaminensis* Melville, Smith, Hobson, Hunjaw and Shoo, 2014, *Tympanocryptis pentalineata* Melville, Smith, Hobson, Hunjaw and Shoo, 2014 and *Tympanocryptis wilsoni* Melville, Smith, Hobson, Hunjaw and Shoo, 2014 as defined by the authors in Melville *et al.* (2014).

The newly described *T. wilsoni* and *T. condaminensis* can easily be distinguished from all others in the species complex by the absence of femoral pores.

T. condaminensis can be distinguished from the newly described *T. wilsoni* Melville *et al.*, 2014 by the presence of a narrow white lateral stripe from axilla to groin and well-developed lateral and ventral body patterning, consisting of strongly contrasting brown-black and white irregular banding and speckling with more white that brown-black colouration. *T. wilsoni* also has strong ventral and lateral patterning but it doesn't form irregular contrasting bands, there is more black-brown than white colouration, and the lateral stripe is absent. It is also known that some individuals of *T. condaminensis* have red-pink colouration on their throats.

The species *T. pentalineata* is separated from all others in the species complex by the following suite of characters: having rough prominently keeled scales on the head, two preanal and two femoral pores; five prominent pale stripes running down the body; enlarged spinose scales scattered over the body; dorsal colouration being brownish black with a weak narrow grey vertebral stripe, narrow white dorsolaterals and laterals separated on the flanks by several broad, dark vertical bars. The lateral stripes comprise a row of enlarged, sharp pale scales. The ventral patterning is concentrated on the head, throat and upper chest, extending posteriorly toward the lateral portions of the belly.

T. tetraporophora is herein confined to South Australia, nearby parts of the southern Northern Territory and adjacent parts of southern western New South Wales. The species *Tympanocryptis tetraporophora* Lucas and Frost, 1895 is diagnosed as having rough and distinctly keeled head scales and a neck significantly narrower than the head. There is a preanal and femoral pore on either side making a total of 4. The type form and nominate subspecies is from far northern central South Australia, near the Northern Territory border. Its distribution extends into the southern Northern Territory and central parts of South Australia generally west of Lake Eyre.

Colouration is diagnostic for this subspecies and an image of the type form is depicted in Houston (1978) on page 44 bottom left.

The subspecies *Tympanocryptis tetraporophora tetraporophora* Lucas and Frost, 1895 is separated from all other species and subspecies in the species complex by having a dorsal pattern consisting of dark patches between the three mid dorsal lines being noticeably smaller in area than the intervening light patches, a narrow dark patch or band across the anterior end of the top of the tail behind the pelvic girdle, hind legs with a pattern of indistinct bands, a consistent light patch across the back of the head that is not broken in any way by darker pigment or markings and about a dozen evenly spaced small spines scattered across the back of the head and upper neck.

The subspecies *Tympanocryptis tetraporophora ianrentoni subsp. nov.* with a distribution centred on the Flinders Ranges in South Australia and immediately adjacent areas to the east in South Australia and nearby south-western New South Wales is separated from all other species and subspecies in the species complex by having a dorsal pattern consisting of dark patches between the three mid dorsal lines being of about the same area as the intervening light patches and including obvious white spines on the areas of darker pigment; a large dark crown-shaped patch at the anterior end of the dorsal surface of the tail, well-defined dark and light markings on both fore and hind limbs, these not necessarily being in the form of cross-bands; the back of the head and neck are marked with two irregular-shaped bars running anterior to posterior and effectively cutting off the lighter areas of the upper neck; significant and semi-distinct markings on the top of the head and an absence of obvious small spines on the back of the head and upper neck, or if present only about two on each side of the back of the head and/or any of these or others are small and indistinct.

The species *T. deniselivingstonae sp. nov.* known from northern New South Wales in a region bounded by 20 km north-west of Tilpa in the west and Coonamble in the east is similar in appearance to *T. tetraporophora ianrentoni subsp. nov.* but is readily separated from that taxon and all others in the species complex by the presence of thick and broken lateral stripes on each side of the mid vertebral stripe on the upper body, (those on the lower flanks are usually, but not always broken, whereas those between the top and bottom stripes are); light brown and white barring on all legs and distinct orange raised scales on the upper body, which are most noticeable over the areas of lighter pigment. There is a greater area of dark brown markings, versus creamish on the upper body between the top three dorsal stripes.

The species *T. simonknolli sp. nov.* is best defined by giving a diagnosis of each of the two subspecies noting molecular evidence implies a 2 million year divergence between each.

The nominate subspecies *T. simonknolli simonknolli subsp. nov.* is separated from all other taxa in the species complex by the following suite of characters: A distinct dorsal body pattern consisting of a greyish background with the upper surface including three relatively distinct stripes, one vertebral and two on either side of the back, the middle line being white in colour and the outer two being vivid yellow, but becoming white immediately posterior to the back legs on the tail, which while banded, the bands are indistinct and totally absent from about band number 13. Dorsally there are large irregularly shaped brown patches bound by areas of light greyish brown occupying about double the area of the darker patches. The darker patches do cut across the vertebral line and break it at irregular points. The head has no obvious markings save for irregular and alternating patches of scales that are slightly lighter or darker than one another. All limbs have extremely indistinct banding, being mainly light brownish in colour. The back limbs have distinctive black speckling or tips on scales and there is usually, but not always a strong yellow flush under the throat. There are two well-defined rows of about 6-8 small spines, each consisting a single scale, at the back of each side of the head.

The subspecies *T. simonknolli marcusbrummeri subsp. nov.* from far north-west New South Wales and nearby far south-west Queensland is separated from all other taxa in the species complex by the following suite of characters: numerous prominent raised conical spines on the back, these being largest down the mid body and reducing on the flanks; a rich orange-red dorsal colouration, consisting of thick broken creamish dorsolateral stripes; mainly orange-red on the back with semi-distinct darker patches being purplish-brownish-black in colour; the head has irregular white and cream markings; limbs are generally orange-red with obscure blackish markings or flecks, sometimes arranged as indistinct cross-bands; the tail is moderately distinctly banded (although not all bands entire or regular in shape) with alternating darker and lighter bands, usually numbering 18 and with the darker sections an average of twice the width of the lighter sections.

The species *T. karimdaouesi sp. nov.* is best defined by way of diagnosing each subspecies individually. The subspecies *T. karimdaouesi karimdaouesi subsp. nov.* from north Queensland in a region generally bound by Mount Isa / Riversleigh in the west and Townsville in the east of Queensland is separated from all other taxa in the species complex by the following suite of characters: the lizard is generally a mud-brown or grey dorsal colour with indistinct dorsal markings and the darker sections between the three dorsal lines are both-3-4 times smaller than the intervening lighter areas and also indistinct. Tail banding is indistinct along the entirety of the tail, but usually numbers 20. Front and back legs appear unmarked, but on close inspection either may have very indistinct bands. In some specimens either front, back or both sets of limbs may have white or black peppering. On the side of the back of the head are raised yellow spines and the thrat has a strong yellow flush. Dorsal lines, while generally indistinct, are either white or cream with those on the upper flanks always broken on the body. Other than an indistinct post-ocular streak running to the rear of the mouth and a similarly indistinct streak running under the eye to the labials the head is unmarked save for small black flecks. Both upper and lower limbs (all four) have small spines of uniform size, these being sometimes absent from the front limbs in some specimens. There are also obvious large spines on the flanks of the anterior tail.

The subspecies *T. karimdaouesi courtneyleitchae subsp. nov.* is separated from all other taxa in the species complex by the following suite of characters: mostly the same as for *T. karimdaouesi karimdaouesi subsp. nov.*, but differs from that taxon by the following traits: a strongly banded tail; dorsolateral lines are indistinct or even absent; abundant grey to black peppering across the entire body which is reddish-grey in colour as opposed to a mud-grey colouration and the yellow under the throat does not extend to the side of the head.

T. tetraporophora ianrentoni subsp. nov. is seen in Houston (1978) on page 44 bottom right as a B/W Line drawing. The nominate form *T. tetraporophora tetraporophora* is similarly depicted to the left of this image on the same page.

T, tetraporophora ianrentoni subsp. nov. is seen in life online at: https://www.flickr.com/photos/58349528@N02/39553792711/in/album-72157667480315693/ (downloaded on 21 May 2019).

T. tetraporophora Lucas and Frost, 1895 (of the type subspecies) is seen in Melville *et al.* (2014), page 12 as well as online at: https://www.flickr.com/photos/reptileshots/15401846859/in/album-72157632658429282/ (downloaded on 21 May 2019) and https://www.flickr.com/photos/reptileshots/15402349548/in/album-72157632658429282/ (downloaded on 21 May 2019)

Distribution: The subspecies *Tympanocryptis tetraporophora ianrentoni subsp. nov.* has a distribution centred on the Flinders Ranges in South Australia and immediately adjacent areas to the east in South Australia and nearby south-western New South Wales.

Etymology: Named in honour of Ian Renton of Paradise, (Adelaide) South Australia, who for many years ran the wildlife conservation and rescue group “Snake Away” in recognition of his services to the conservation of reptiles in Australia and to the science of herpetology.

TYMPANOCRYPTIS SIMONKNOLLI SP. NOV.

LSID urn:lsid:zoobank.org:act:DF421563-77AE-46CA-BE27-7EEB5A8A7CC4

Holotype: A preserved specimen at the Australian Museum in Sydney, New South Wales, Australia, specimen number: R147233, collected at 52 km north of the Barkly Roadhouse on Cape Crawford Road, Northern Territory, Australia, Latitude 19.31 S., Longitude 136.05 E. The Australian Museum in Sydney, New South Wales, Australia is a government-owned facility that allows access to its holdings.

Paratype: A preserved specimen at the Australian Museum in Sydney, New South Wales, Australia, specimen number: R.147225.001, collected at 104.8 km west of Camooweal (Queensland) (= 3.6 km east of Soudan in the Northern Territory), Northern Territory, Australia, Latitude 20.04 S., Longitude 137.05 E.

Diagnosis: The species group formerly regarded as being *Tympanocryptis tetraporophora* Lucas and Frost, 1895 (a single species) as defined by Cogger (2014) are separated from all other members of the genus by the following suite of characters: the dorsal tubercles are scattered irregularly and not aligned longitudinally; the pale dorso-lateral lines or stripes are obscure or absent and the tail tapers rapidly from the base and is only 1.5 times as long as the head and body.

Within this group of species are the recently described species *Tympanocryptis condaminensis* Melville, Smith, Hobson, Hunjaw and Shoo, 2014, *Tympanocryptis pentalineata* Melville, Smith, Hobson, Hunjaw and Shoo, 2014 and *Tympanocryptis wilsoni* Melville, Smith, Hobson, Hunjaw and Shoo, 2014 as defined by the authors in Melville *et al.* (2014).

The species *T. simonknolli sp. nov.* is best defined by giving a diagnosis of each of the two subspecies noting molecular evidence implies a 2 million year divergence between each.

The nominate subspecies *T. simonknolli simonknolli subsp. nov.* is separated from all other taxa in the species complex by the following suite of characters: A distinct dorsal body pattern consisting of a greyish background with the upper surface including three relatively distinct stripes, one vertebral and two on either side of the back, the middle line being white in colour and the outer two being vivid yellow, but becoming white immediately posterior to the back legs on the tail, which while banded, the bands are indistinct and totally absent from about band number 13. Dorsally there are large irregularly shaped brown patches bound by areas of light greyish brown occupying about double the area of the darker patches. The darker patches do cut across the vertebral line and break it at irregular points. The head has no obvious markings save for irregular and alternating patches of scales that are slightly lighter or darker than one another. All limbs have extremely indistinct banding, being mainly light brownish in colour. The back limbs have distinctive black speckling or tips on scales and there is usually, but not always a strong yellow flush under the throat. There are two well-defined rows of about 6-8 small spines, each consisting a single scale, at the back of each side of the head.

The subspecies *T. simonknolli marcusbrummeri subsp. nov.* from far north-west New South Wales and nearby far south-west Queensland is separated from all other taxa in the species complex by the following suite of characters: numerous prominent raised conical spines on the back, these being largest down the mid body and reducing on the flanks; a rich orange-red dorsal colouration, consisting of thick broken creamish dorsolateral stripes; mainly orange-red on the back with semi-distinct darker patches being purplish-brownish-black in colour; the head has irregular white and cream markings; limbs are generally orange-red with obscure blackish markings or flecks, sometimes arranged as indistinct cross-bands; the tail is moderately distinctly banded (although not all bands entire or regular in shape) with alternating darker and lighter bands, usually numbering 18 and with the darker sections an average of twice the width of the lighter sections.

The newly described *T. wilsoni* and *T. condaminensis* can easily be distinguished from all others in the species complex by the absence of femoral pores.

T. condaminensis can be distinguished from the newly described *T. wilsoni* Melville *et al.*, 2014 by the presence of a narrow white lateral stripe from axilla to groin and well-developed lateral and ventral body patterning, consisting of strongly contrasting brown-black and white irregular banding and speckling with more white that brown-black colouration. *T. wilsoni* also has strong ventral and lateral patterning but it doesn't form irregular contrasting bands, there is more black-brown than white colouration, and the lateral stripe is absent. It is also known that some individuals of *T. condaminensis* have red-pink colouration on their throats.

The species *T. pentalineata* is separated from all others in the species complex by the following suite of characters: having rough prominently keeled scales on the head, two preanal and two femoral pores; five prominent pale stripes running down the body; enlarged spinose scales scattered over the body; dorsal colouration being brownish black with a weak narrow grey vertebral stripe, narrow white dorsolaterals and laterals separated on the flanks by several broad, dark vertical bars. The lateral stripes comprise a row of enlarged, sharp pale scales. The ventral patterning is concentrated on the head, throat and upper chest, extending posteriorly toward the lateral portions of the belly.

T. tetraporophora is herein confined to South Australia, nearby parts of the southern Northern Territory and adjacent parts of southern western New South Wales. The species *Tympanocryptis tetraporophora* Lucas and Frost, 1895 is diagnosed as having rough and distinctly keeled head scales and a neck significantly narrower than the head. There is a preanal and femoral pore on either side making a total of 4. The type form and nominate subspecies is from far northern central South Australia, near the Northern Territory border. Its distribution extends into the southern Northern Territory and central parts of South Australia generally west of Lake Eyre.

Colouration is diagnostic for this subspecies and an image of the type form is depicted in Houston (1978) on page 44 bottom left.

The subspecies *Tympanocryptis tetraporophora tetraporophora* Lucas and Frost, 1895 is separated from all other species and subspecies in the species complex by having a dorsal pattern consisting of dark patches between the three mid dorsal lines being noticeably smaller in area than the intervening light patches, a narrow dark patch or band across the anterior end of the top of the tail behind the pelvic girdle, hind legs with a pattern of indistinct bands, a consistent light patch across the back of the head that is not broken in any way by darker pigment or markings and about a dozen evenly spaced small spines scattered across the back of the head and upper neck.

The subspecies *Tympanocryptis tetraporophora ianrentoni subsp. nov.* with a distribution centred on the Flinders Ranges in South Australia and immediately adjacent areas to the east in South Australia and nearby south-western New South Wales is separated from all other species and subspecies in the species complex by having a dorsal pattern consisting of dark patches between the three mid dorsal lines being of about the same area as the intervening light patches and including obvious white spines on the areas of darker pigment; a large dark crown-shaped patch at the anterior end of the dorsal surface of the tail, well-defined dark and light markings on both fore and hind limbs, these not necessarily being in the form of cross-bands; the back of the head and neck are marked with two irregular-shaped bars running anterior to posterior and effectively cutting off the lighter areas of the upper neck; significant and semi-distinct markings on the top of the head and an absence of obvious small spines on the back of the head and upper neck, or if present only about two on each side of the back of the head and/or any of these or others are small and indistinct.

The species *T. deniselivingstonae sp. nov.* known from northern New South Wales in a region bounded by 20 km north-west of Tilpa in the west and Coonamble in the east is similar in appearance to *T. tetraporophora ianrentoni subsp. nov.* but is readily separated from that taxon and all others in the species complex by the presence of thick and broken lateral stripes on each side of the mid vertebral stripe on the upper body, (those on the lower flanks are usually, but not always broken, whereas those between the top and bottom stripes are); light brown and white barring on all legs and distinct orange raised scales on the upper body, which are most noticeable over the areas of lighter pigment. There is a greater area of dark brown markings, versus creamish on the upper body between the top three dorsal stripes.

The species *T. karimdaouesi sp. nov.* is best defined by way of diagnosing each subspecies individually. The subspecies *T. karimdaouesi karimdaouesi subsp. nov.* from north Queensland in a region generally bound by Mount Isa / Riversleigh in the west and Townsville in the east of Queensland is separated from all other taxa in the species complex by the following suite of characters: the lizard is generally a mud-brown or grey dorsal colour with indistinct dorsal markings and the darker sections between the three dorsal lines are both-3-4 times smaller than the intervening lighter areas and also indistinct. Tail banding is indistinct along the entirety of the tail, but usually numbers 20. Front and back legs appear unmarked, but on close inspection either may have very indistinct bands. In some specimens either front, back or both sets of limbs may have white or black peppering. On the side of the back of the head are raised yellow spines and the thrat has a strong yellow flush. Dorsal lines, while generally indistinct, are either white or cream with those on the upper flanks always broken on the body. Other than an indistinct post-ocular streak running to the rear of the mouth and a similarly indistinct streak running under the eye to the labials the head is unmarked save for small black flecks. Both upper and lower limbs (all four) have small spines of uniform size, these being sometimes absent from the front limbs in some specimens. There are also obvious large spines on the flanks of the anterior tail.

The subspecies *T. karimdaouesi courtneyleitchae subsp. nov.* is separated from all other taxa in the species complex by the following suite of characters: mostly the same as for *T. karimdaouesi karimdaouesi subsp. nov.*, but differs from that taxon by the following traits: a strongly banded tail; dorsolateral lines are indistinct or even absent; abundant grey to black peppering across the entire body which is reddish-grey in colour as opposed to a mud-grey colouration and the yellow under the throat does not extend to the side of the head.

T. tetraporophora ianrentoni subsp. nov. is seen in Houston (1978) on page 44 bottom right as a B/W Line drawing. The nominate form *T. tetraporophora tetraporophora* is similarly depicted to the left of this image on the same page.

T. simonknolli sp. nov. (of the nominate form) (of the nominate subspecies) in life from the Barkly Tableland was found online on the domain www dot instgram dot com but the exact url for the photo could not be ascertained.

T. simonknolli marcusbrummeri subsp. nov. is seen in Cogger (2014) on page 760 (bottom) and Wilson (2012) at page 79 bottom right and online at: https://www.flickr.com/photos/mark_green/10107995975/ (downloaded on 21 May 2019).

Distribution: *T. simonknolli sp. nov.* as a species appears to have a range extending from the Barkly Tableland in the Northern Territory in the north, extending south-east to northwest New South Wales and south-west Queensland and nearby South Australia. The nominate subspecies *T. simonknolli sp. nov.* appears to be restricted to the Barkly Tablelands in the NT and nearby parts of far western Queensland. The subspecies *T. simonknolli marcusbrummeri subsp. nov.* is found in far northwest New South Wales and immediately adjacent parts of South Australia and Queensland. There appears to be a significant distance of several hundred kms between populations of either subspecies, but due to the remoteness of the area, there may be specimens of the species (one or other subspecies, or perhaps one or more others).

Etymology: Named in honour of serving Victorian Police Officer, Simon Knoll for his work as a police prosecutor in the Melbourne Magistrates Court. See etymology for *T. lachlanheffermani sp. nov.* (earlier in this paper).

TYMPANOCRYPTIS SIMONKNOLLI MARCUSBRUMMERI SUBSP. NOV.

LSID urn:lsid:zoobank.org:act:EF9B5721-8613-4F22-930E-51A0761C67B6

Holotype: A preserved specimen at the Australian Museum in Sydney, New South Wales, Australia, specimen number: R.151144, collected at Binerah Downs, Sturt National Park, New South Wales, Australia, Latitude 29.03 S., Longitude 141.56 E.

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

Paratype: A preserved specimen at the Australian Museum in Sydney, New South Wales, Australia, specimen number: R.152948.001 collected at Sturt National Park, 0.18km south of the Olive Downs turn off on The Silver City Highway, New South Wales, Australia, Latitude 29.07 S., Longitude 141.92 E.

Diagnosis: The species group formerly regarded as being *Tympanocryptis tetraporophora* Lucas and Frost, 1895 (a single species) as defined by Cogger (2014) are separated from all other members of the genus by the following suite of characters: the dorsal tubercles are scattered irregularly and not aligned longitudinally; the pale dorso-lateral lines or stripes are obscure or absent and the tail tapers rapidly from the base and is only 1.5 times as long as the head and body.

Within this group of species are the recently described species *Tympanocryptis condaminensis* Melville, Smith, Hobson, Hunjaw and Shoo, 2014, *Tympanocryptis pentalineata* Melville, Smith, Hobson, Hunjaw and Shoo, 2014 and *Tympanocryptis wilsoni* Melville, Smith, Hobson, Hunjaw and Shoo, 2014 as defined by the authors in Melville *et al.* (2014).

The species *T. simonknolli sp. nov.* is best defined by giving a diagnosis of each of the two subspecies noting molecular evidence implies a 2 million year divergence between each.

The nominate subspecies *T. simonknolli simonknolli subsp. nov.* is separated from all other taxa in the species complex by the following suite of characters: A distinct dorsal body pattern consisting of a greyish background with the upper surface including three relatively distinct stripes, one vertebral and two on either side of the back, the middle line being white in colour and the outer two being vivid yellow, but becoming white immediately posterior to the back legs on the tail, which while banded, the bands are indistinct and totally absent from about band number 13. Dorsally there are large irregularly shaped brown patches bound by areas of light greyish brown occupying about double the area of the darker patches. The darker patches do cut across the vertebral line and break it at irregular points. The head has no obvious markings save for irregular and alternating patches of scales that are slightly lighter or darker than one another. All limbs have extremely indistinct banding, being mainly light brownish in colour. The back limbs have distinctive black speckling or tips on scales and there is usually, but not always a strong yellow flush under the throat. There are two well-defined rows of about 6-8 small spines, each consisting a single scale, at the back of each side of the head.

The subspecies *T. simonknolli marcusbrummeri subsp. nov.* from far north-west New South Wales and nearby far south-west Queensland is separated from all other taxa in the species complex, including nominate *T. simonknolli simonknolli subsp. nov.* by the following suite of characters: numerous prominent raised conical spines on the back, these being largest down the mid body and reducing on the flanks; a rich orange-red dorsal colouration, consisting of thick broken creamish dorsolateral stripes; mainly orange-red on the back with semi-distinct darker patches being purplish-brownish-black in colour; the head has irregular white and cream markings; limbs are generally orange-red with obscure blackish markings or flecks, sometimes arranged as indistinct cross-bands; the tail is moderately distinctly banded (although not all bands entire or regular in shape) with alternating darker and lighter bands, usually numbering 18 and with the darker sections an average of twice the width of the lighter sections.

The newly described *T. wilsoni* and *T. condaminensis* can easily be distinguished from all others in the species complex by the absence of femoral pores.

T. condaminensis can be distinguished from the newly described *T. wilsoni* Melville *et al.*, 2014 by the presence of a narrow white lateral stripe from axilla to groin and well-developed lateral and ventral body patterning, consisting of strongly contrasting brown-black and white irregular banding and speckling with more white that brown-black colouration. *T. wilsoni* also has strong ventral and lateral patterning but it doesn't form irregular contrasting bands, there is more black-brown than white colouration, and the lateral stripe is absent. It is also known that some individuals of *T. condaminensis* have red-pink colouration on their throats.

The species *T. pentalineata* is separated from all others in the species complex by the following suite of characters: having rough prominently keeled scales on the head, two preanal and two femoral pores; five prominent pale stripes running down the body; enlarged spinose scales scattered over the body; dorsal colouration being brownish black with a weak narrow grey vertebral stripe, narrow white dorsolaterals and laterals separated on the flanks by several broad, dark vertical bars. The lateral stripes comprise a row of enlarged, sharp pale scales. The ventral patterning is concentrated on the head, throat and upper chest, extending posteriorly toward the lateral portions of the belly.

T. tetraporophora is herein confined to South Australia, nearby parts of the southern Northern Territory and adjacent parts of southern western New South Wales. The species *Tympanocryptis tetraporophora* Lucas and Frost, 1895 is diagnosed as having rough and distinctly keeled head scales and a neck significantly narrower than the head. There is a preanal and femoral pore on either side making a total of 4. The type form and nominate subspecies is from far northern central South Australia, near the Northern Territory border. Its distribution extends into the southern Northern Territory and central parts of South Australia generally west of Lake Eyre.

Colouration is diagnostic for this subspecies and an image of the type form is depicted in Houston (1978) on page 44 bottom left.

The subspecies *Tympanocryptis tetraporophora tetraporophora* Lucas and Frost, 1895 is separated from all other species and subspecies in the species complex by having a dorsal pattern consisting of dark patches between the three mid dorsal lines being noticeably smaller in area than the intervening light patches, a narrow dark patch or band across the anterior end of the top of the tail behind the pelvic girdle, hind legs with a pattern of indistinct bands, a consistent light patch across the back of the head that is not broken in any way by darker pigment or markings and about a dozen evenly spaced small spines scattered across the back of the head and upper neck.

The subspecies *Tympanocryptis tetraporophora ianrentoni subsp. nov.* with a distribution centred on the Flinders Ranges in South Australia and immediately adjacent areas to the east in South Australia and nearby south-western New South Wales is separated from all other species and subspecies in the species complex by having a dorsal pattern consisting of dark patches between the three mid dorsal lines being of about the same area as the intervening light patches and including obvious white spines on the areas of darker pigment; a large dark crown-shaped patch at the anterior end of the dorsal surface of the tail, well-defined dark and light markings on both fore and hind limbs, these not necessarily being in the form of cross-bands; the back of the head and neck are marked with two irregular-shaped bars running anterior to posterior and effectively cutting off the lighter areas of the upper neck; significant and semi-distinct markings on the top of the head and an absence of obvious small spines on the back of the head and upper neck, or if present only about two on each side of the back of the head and/or any of these or others are small and indistinct.

The species *T. deniselivingstonae sp. nov.* known from northern New South Wales in a region bounded by 20 km north-west of Tilpa in the west and Coonamble in the east is similar in appearance to *T. tetraporophora ianrentoni subsp. nov.* but is readily separated from that taxon and all others in the species complex by the presence of thick and broken lateral stripes on each side of the mid vertebral stripe on the upper body, (those on the lower flanks are usually, but not always broken, whereas those between the top and bottom stripes are); light brown and white barring on all legs and distinct orange raised scales on the upper body, which are most noticeable over the areas of lighter pigment. There is a greater area of dark brown markings, versus creamish on the upper body between the top three dorsal stripes.

The species *T. karimdaouesi sp. nov.* is best defined by way of diagnosing each subspecies individually. The subspecies *T. karimdaouesi karimdaouesi subsp. nov.* from north Queensland in a region generally bound by Mount Isa / Riversleigh in the west and Townsville in the east of Queensland is separated from all other taxa in the species complex by the following suite of characters: the lizard is generally a mud-brown or grey dorsal colour with indistinct dorsal markings and the darker sections between the three dorsal lines are both-3-4 times smaller than the intervening lighter areas and also indistinct. Tail banding is indistinct along the entirety of the tail, but usually numbers 20. Front and back legs appear unmarked, but on close inspection either may have very indistinct bands. In some specimens either front, back or both sets of limbs may have white or black peppering. On the side of the back of the head are raised yellow spines and the thrat has a strong yellow flush. Dorsal lines, while generally indistinct, are either white or cream with those on the upper flanks always broken on the body. Other than an indistinct post-ocular streak running to the rear of the mouth and a similarly indistinct streak running under the eye to the labials the head is unmarked save for small black flecks. Both upper and lower limbs (all four) have small spines of uniform size, these being sometimes absent from the front limbs in some specimens. There are also obvious large spines on the flanks of the anterior tail.

The subspecies *T. karimdaouesi courtneyleitchae subsp. nov.* is separated from all other taxa in the species complex by the following suite of characters: mostly the same as for *T. karimdaouesi karimdaouesi subsp. nov.*, but differs from that taxon by the following traits: a strongly banded tail; dorsolateral lines are indistinct or even absent; abundant grey to black peppering across the entire body which is reddish-grey in colour as opposed to a mud-grey colouration and the yellow under the throat does not extend to the side of the head.

T. tetraporophora ianrentoni subsp. nov. is seen in Houston (1978) on page 44 bottom right as a B/W Line drawing. The nominate form *T. tetraporophora tetraporophora* is similarly depicted to the left of this image on the same page.

T. simonknolli marcusbrummeri subsp. nov. in life is seen in Cogger (2014) on page 760 (bottom) and Wilson (2012) at page 79 bottom right and online at: https://www.flickr.com/photos/mark_green/10107995975/ (downloaded on 21 May 2019).

T. simonknolli sp. nov. (of the nominate form) (of the nominate subspecies) in life from the Barkly Tableland was found online on the domain www dot instgram dot com but the exact url for the photo could not be ascertained.

Distribution: *T. simonknolli sp. nov.* as a species appears to have a range extending from the Barkly Tableland in the Northern Territory in the north south-east to northwest New South Wales and south-west Queensland and nearby South Australia. The nominate subspecies *T. simonknolli sp. nov.* appears to be restricted to the Barkly Tablelands in the NT and nearby parts of far western Queensland. The subspecies *T. simonknolli marcusbrummeri subsp. nov.* is found in far northwest New South Wales and immediately adjacent parts of South Australia and Queensland. There appears to be a significant distance of several hundred kms between populations of either subspecies, but due to the remoteness of the area, there may be specimens of the species (one or other subspecies, or perhaps one or more others).

Etymology: Named in honour of civil rights campaigner, Marcus Brummer, of Upwey (Melbourne) Victoria, Australia in recognition of his commitment to human rights including by way of drawing public attention to police brutality against civilians under instructions from a corrupt State Labor Party Government in Victoria, Australia. See the etymology for *Liopeltis tricolor brummeri* in Hoser (2013) for further details.

TYMPANOCRYPTIS DENISELIVINGSTONEAE SP. NOV.

LSID urn:lsid:zoobank.org:act:34BB93E2-3CC1-44B8-9699-C8A6C512FD3A

Holotype: A preserved specimen at the South Australian Museum in Adelaide, South Australia, Australia, specimen number: R45265, collected at 20 km north-west of Tilpa, New South Wales, Australia, Latitude 30.80 S., Longitude 144.28 E.

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

Diagnosis: The species group formerly regarded as being *Tympanocryptis tetraporophora* Lucas and Frost, 1895 (a single species) as defined by Cogger (2014) are separated from all other members of the genus by the following suite of characters: the dorsal tubercles are scattered irregularly and not aligned longitudinally; the pale dorso-lateral lines or stripes are obscure or absent and the tail tapers rapidly from the base and is only 1.5

times as long as the head and body.

Within this group of species are the recently described species *Tympanocryptis condaminensis* Melville, Smith, Hobson, Hunjaw and Shoo, 2014, *Tympanocryptis pentalineata* Melville, Smith, Hobson, Hunjaw and Shoo, 2014 and *Tympanocryptis wilsoni* Melville, Smith, Hobson, Hunjaw and Shoo, 2014 as defined by the authors in Melville *et al.* (2014).

The species *T. deniselivingstonae sp. nov.* known from northern New South Wales in a region bounded by 20 km north-west of Tilpa in the west and Coonamble in the east is similar in appearance to *T. tetraporophora ianrentoni subsp. nov.* but is readily separated from that taxon and all others in the species complex by the following suite of characters: the presence of thick and broken lateral stripes on each side of the mid vertebral stripe on the upper body(those on the lower flanks are usually, but not always broken, whereas those between the top and bottom stripes are); light brown and white barring on all legs and distinct orange raised scales on the upper body, which are most noticeable over the areas of lighter pigment. There is a greater area of dark brown markings, versus creamish on the upper body between the top three dorsal stripes.

The newly described *T. wilsoni* and *T. condaminensis* can easily be distinguished from all others in the species complex by the absence of femoral pores.

T. condaminensis can be distinguished from the newly described *T. wilsoni* Melville *et al.*, 2014 by the presence of a narrow white lateral stripe from axilla to groin and well-developed lateral and ventral body patterning, consisting of strongly contrasting brown-black and white irregular banding and speckling with more white that brown-black colouration. *T. wilsoni* also has strong ventral and lateral patterning but it doesn't form irregular contrasting bands, there is more black-brown than white colouration, and the lateral stripe is absent. It is also known that some individuals of *T. condaminensis* have red-pink colouration on their throats.

The species *T. pentalineata* is separated from all others in the species complex by the following suite of characters: having rough prominently keeled scales on the head, two preanal and two femoral pores; five prominent pale stripes running down the body; enlarged spinose scales scattered over the body; dorsal colouration being brownish black with a weak narrow grey vertebral stripe, narrow white dorsolaterals and laterals separated on the flanks by several broad, dark vertical bars. The lateral stripes comprise a row of enlarged, sharp pale scales. The ventral patterning is concentrated on the head, throat and upper chest, extending posteriorly toward the lateral portions of the belly.

T. tetraporophora is herein confined to South Australia, nearby parts of the southern Northern Territory and adjacent parts of southern western New South Wales. The species *Tympanocryptis tetraporophora* Lucas and Frost, 1895 is diagnosed as having rough and distinctly keeled head scales and a neck significantly narrower than the head. There is a preanal and femoral pore on either side making a total of 4. The type form and nominate subspecies is from far northern central South Australia, near the Northern Territory border. Its distribution extends into the southern Northern Territory and central parts of South Australia generally west of Lake Eyre.

Colouration is diagnostic for this subspecies and an image of the type form is depicted in Houston (1978) on page 44 bottom left.

The subspecies *Tympanocryptis tetraporophora tetraporophora* Lucas and Frost, 1895 is separated from all other species and subspecies in the species complex by having a dorsal pattern consisting of dark patches between the three mid dorsal lines being noticeably smaller in area than the intervening light patches, a narrow dark patch or band across the anterior end of the top of the tail behind the pelvic girdle, hind legs with a pattern of indistinct bands, a consistent light patch across the back of the head that is not broken in any way by darker pigment or markings and about a dozen evenly spaced small spines scattered across the back of the head and upper neck.

The subspecies *Tympanocryptis tetraporophora ianrentoni subsp. nov.* with a distribution centred on the Flinders Ranges in South Australia and immediately adjacent areas to the east in South Australia and nearby south-western New South Wales is separated from all other species and subspecies in the species complex by having a dorsal pattern consisting of dark patches between the three mid dorsal lines being of about the same area as the intervening light patches and including obvious white spines on the areas of darker pigment; a large dark crown-shaped patch at the anterior end of the dorsal surface of the tail, well-defined dark and light markings on both fore and hind limbs, these not necessarily being in the form of cross-bands; the back of the head and neck are marked with two irregular-shaped bars running anterior to posterior and effectively cutting off the lighter areas of the upper neck; significant and semi-distinct markings on the top of the head and an absence of obvious small spines on the back of the head and upper neck, or if present only about two on each side of the back of the head and/or any of these or others are small and indistinct.

The species *T. simonknolli sp. nov.* is best defined by giving a diagnosis of each of the two subspecies noting molecular evidence implies a 2 million year divergence between each.

The nominate subspecies *T. simonknolli simonknolli subsp. nov.* is separated from all other taxa in the species complex by the following suite of characters: A distinct dorsal body pattern consisting of a greyish background with the upper surface including three relatively distinct stripes, one vertebral and two on either side of the back, the middle line being white in colour and the outer two being vivid yellow, but becoming white immediately posterior to the back legs on the tail, which while banded, the bands are indistinct and totally absent from about band number 13. Dorsally there are large irregularly shaped brown patches bound by areas of light greyish brown occupying about double the area of the darker patches. The darker patches do cut across the vertebral line and break it at irregular points. The head has no obvious markings save for irregular and alternating patches of scales that are slightly lighter or darker than one another. All limbs have extremely indistinct banding, being mainly light brownish in colour. The back limbs have distinctive black speckling or tips on scales and there is usually, but not always a strong yellow flush under the throat. There are two well-defined rows of about 6-8 small spines, each consisting a single scale, at the back of each side of the head.

The subspecies *T. simonknolli marcusbrummeri subsp. nov.* from far north-west New South Wales and nearby far south-west Queensland is separated from all other taxa in the species complex by the following suite of characters: numerous prominent raised conical spines on the back, these being largest down the mid body and reducing on the flanks; a rich orange-red dorsal colouration, consisting of thick broken creamish dorsolateral stripes; mainly orange-red on the back with semi-distinct darker patches being purplish-brownish-black in colour; the head has irregular white and cream markings; limbs are generally orange-red with obscure blackish markings or flecks, sometimes arranged as indistinct cross-bands; the tail is moderately distinctly banded (although not all bands entire or regular in shape) with alternating darker and lighter bands, usually numbering 18 and with the darker sections an average of twice the width of the lighter sections.

The species *T. karimdaouesi sp. nov.* is best defined by way of diagnosing each subspecies individually. The subspecies *T. karimdaouesi karimdaouesi subsp. nov.* from north Queensland in a region generally bound by Mount Isa / Riversleigh in the west and Townsville in the east of Queensland is separated from all other taxa in the species complex by the following suite of characters: the lizard is generally a mud-brown or grey dorsal colour with indistinct dorsal markings and the darker sections between the three dorsal lines are both-3-4 times smaller than the intervening lighter areas and also indistinct. Tail banding is indistinct along the entirety of the tail, but usually numbers 20. Front and back legs appear unmarked, but on close inspection either may have very indistinct bands. In some specimens either front, back or both sets of limbs may have white or black peppering. On the side of the back of the head are raised yellow spines and the thrat has a strong yellow flush. Dorsal lines, while generally indistinct, are either white or cream with those on the upper flanks always broken on the body. Other than an indistinct post-ocular streak running to the rear of the mouth and a similarly indistinct streak running under the eye to the labials the head is unmarked save for small black flecks. Both upper and lower limbs (all four) have small spines of uniform size, these being sometimes absent from the front limbs in some specimens. There are also obvious large spines on the flanks of the anterior tail.

The subspecies *T. karimdaouesi courtneyleitchae subsp. nov.* is separated from all other taxa in the species complex by the following suite of characters: mostly the same as for *T. karimdaouesi karimdaouesi subsp. nov.*, but differs from that taxon by the following traits: a strongly banded tail; dorsolateral lines are indistinct or even absent; abundant grey to black peppering across the entire body which is reddish-grey in colour as opposed to a mud-grey colouration and the yellow under the throat does not extend to the side of the head.

T. tetraporophora ianrentoni subsp. nov. is seen in Houston (1978) on page 44 bottom right as a B/W Line drawing. The nominate form *T. tetraporophora tetraporophora* is similarly depicted to the left of this image on the same page.

Distribution: *T. deniselivingstoni sp. nov.* is known only from northern New South Wales, Australia in a region bounded by 20 km north-west of Tilpa in the west and Coonamble in the east and not more than 200 km north or south of that line. Specimens reported from north-east of here (near Inverell) may be referrable to this species.

Etymology: Named in honour of Melbourne (Australia) Magistrate Denise Livingstone. For further detail see the etymology for *T. lachlanheffermani sp. nov.* (earlier in this paper).

TYMPANOCRYPTIS KARIMDAOUESI SP. NOV.

LSID urn:lsid:zoobank.org:act:A967CA8D-3C62-4123-8DFE-3691047BE788

Holotype: A preserved specimen at the Queensland Museum, Brisbane, Queensland, Australia, specimen number: J83854 collected at Woolston, south east of Richmond, Queensland, Australia, Latitude 21.12 S., Longitude 147.75 E.

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

Paratype: A preserved specimen at the Queensland Museum, Brisbane, Queensland, Australia, specimen number: J83530 collected at Whitehill Station, Queensland, Australia, Latitude 23.67 S., Longitude 144.03 E.

Diagnosis: The species group formerly regarded as being *Tympanocryptis tetraporophora* Lucas and Frost, 1895 (a single species) as defined by Cogger (2014) are separated from all other members of the genus by the following suite of characters: the dorsal tubercles are scattered irregularly and not aligned longitudinally; the pale dorso-lateral lines or stripes are obscure or absent and the tail tapers rapidly from the base and is only 1.5 times as long as the head and body.

Within this group of species are the recently described species *Tympanocryptis condaminensis* Melville, Smith, Hobson, Hunjaw and Shoo, 2014, *Tympanocryptis pentalineata* Melville, Smith, Hobson, Hunjaw and Shoo, 2014 and *Tympanocryptis wilsoni* Melville, Smith, Hobson, Hunjaw and Shoo, 2014 as defined by the authors in Melville *et al.* (2014).

The species *T. karimdaouesi sp. nov.* is best defined by way of diagnosing each subspecies individually. The subspecies *T. karimdaouesi karimdaouesi subsp. nov.* from north Queensland in a region generally bound by Mount Isa / Riversleigh in the west and Townsville in the east of Queensland is separated from all other taxa in the species complex by the following suite of characters: the lizard is generally a mud-brown or grey dorsal colour with indistinct dorsal markings and the darker sections between the three dorsal lines are both-3-4 times smaller than the intervening lighter areas and also indistinct. Tail banding is indistinct along the entirety of the tail, but usually numbers 20. Front and back legs appear unmarked, but on close inspection either may have very indistinct bands. In some specimens either front, back or both sets of limbs may have white or black peppering. On the side of the back of the head are raised yellow spines and the thrat has a strong yellow flush. Dorsal lines, while generally indistinct, are either white or cream with those on the upper flanks always broken on the body. Other than an indistinct post-ocular streak running to the rear of the mouth and a similarly indistinct streak running under the eye to the labials the head is unmarked save for small black flecks. Both upper and lower limbs (all four) have small spines of uniform size, these being sometimes absent from the front limbs in some specimens. There are also obvious large spines on the flanks of the anterior tail.

The subspecies *T. karimdaouesi courtneyleitchae subsp. nov.* from south-west Queensland, excluding the very far west or the coast in a region generally centred on Tambo and slightly west of there, is separated from all other taxa in the species complex by the following suite of characters: mostly the same as for *T. karimdaouesi karimdaouesi subsp. nov.*, but differs from that taxon by the following traits: a strongly banded tail; dorsolateral lines are indistinct or even absent; abundant grey to black peppering across the entire body which is reddish-grey in colour as opposed to a mud-grey colouration and the yellow under the throat does not extend to the side of the head.

The newly described *T. wilsoni* and *T. condaminensis* can easily be distinguished from all others in the species complex by the absence of femoral pores.

T. condaminensis can be distinguished from the newly described *T. wilsoni* Melville *et al.*, 2014 by the presence of a narrow white lateral stripe from axilla to groin and well-developed lateral and ventral body patterning, consisting of strongly contrasting brown-black and white irregular banding and speckling with more white that brown-black colouration. *T. wilsoni* also has strong ventral and lateral patterning but it doesn't form irregular contrasting bands, there is more black-brown than white colouration, and the lateral stripe is absent. It is also known that some individuals of *T. condaminensis* have red-pink colouration on their throats.

The species *T. pentalineata* is separated from all others in the species complex by the following suite of characters: having rough prominently keeled scales on the head, two preanal and two femoral pores; five prominent pale stripes running down the body; enlarged spinose scales scattered over the body; dorsal colouration being brownish black with a weak narrow grey vertebral stripe, narrow white dorsolaterals and laterals separated on the flanks by several broad, dark vertical bars. The lateral stripes comprise a row of enlarged, sharp pale scales. The ventral patterning is concentrated on the head, throat and upper chest, extending posteriorly toward the lateral portions of the belly.

T. tetraporophora is herein confined to South Australia, nearby parts of the southern Northern Territory and adjacent parts of southern western New South Wales. The species *Tympanocryptis tetraporophora* Lucas and Frost, 1895 is diagnosed as having rough and distinctly keeled head scales and a neck significantly narrower than the head. There is a preanal and femoral pore on either side making a total of 4. The type form and nominate subspecies is from far northern central South Australia, near the Northern Territory border. Its distribution extends into the southern Northern Territory and central parts of South Australia generally west of Lake Eyre.

Colouration is diagnostic for this subspecies and an image of the type form is depicted in Houston (1978) on page 44 bottom left.

The subspecies *Tympanocryptis tetraporophora tetraporophora* Lucas and Frost, 1895 is separated from all other species and subspecies in the species complex by having a dorsal pattern consisting of dark patches between the three mid dorsal lines being noticeably smaller in area than the intervening light patches, a narrow dark patch or band across the anterior end of the top of the tail behind the pelvic girdle, hind legs with a pattern of indistinct bands, a consistent light patch across the back of the head that is not broken in any way by darker pigment or markings and about a dozen evenly spaced small spines scattered across the back of the head and upper neck.

The subspecies *Tympanocryptis tetraporophora ianrentoni subsp. nov.* with a distribution centred on the Flinders Ranges in South Australia and immediately adjacent areas to the east in South Australia and nearby south-western New South Wales is separated from all other species and subspecies in the species complex by having a dorsal pattern consisting of dark patches between the three mid dorsal lines being of about the same area as the intervening light patches and including obvious white spines on the areas of darker pigment; a large dark crown-shaped patch at the anterior end of the dorsal surface of the tail, well-defined dark and light markings on both fore and hind limbs, these not necessarily being in the form of cross-bands; the back of the head and neck are marked with two irregular-shaped bars running anterior to posterior and effectively cutting off the lighter areas of the upper neck; significant and semi-distinct markings on the top of the head and an absence of obvious small spines on the back of the head and upper neck, or if present only about two on each side of the back of the head and/or any of these or others are small and indistinct.

The species *T. deniselivingstonae sp. nov.* known from northern New South Wales in a region bounded by 20 km north-west of Tilpa in the west and Coonamble in the east is similar in appearance to *T. tetraporophora ianrentoni subsp. nov.* but is readily separated from that taxon and all others in the species complex by the presence of thick and broken lateral stripes on each side of the mid vertebral stripe on the upper body, (those on the lower flanks are usually, but not always broken, whereas those between the top and bottom stripes are); light brown and white barring on all legs and distinct orange raised scales on the upper body, which are most noticeable over the areas of lighter pigment. There is a greater area of dark brown markings, versus creamish on the upper body between the top three dorsal stripes.

The species *T. simonknolli sp. nov.* is best defined by giving a diagnosis of each of the two subspecies noting molecular evidence implies a 2 million year divergence between each.

The nominate subspecies *T. simonknolli simonknolli subsp. nov.* is separated from all other taxa in the species complex by the following suite of characters: A distinct dorsal body pattern consisting of a greyish background with the upper surface including three relatively distinct stripes, one vertebral and two on either side of the back, the middle line being white in colour and the outer two being vivid yellow, but becoming white immediately posterior to the back legs on the tail, which while banded, the bands are indistinct and totally absent from about band number 13. Dorsally there are large irregularly shaped brown patches bound by areas of light greyish brown occupying about double the area of the darker patches. The darker patches do cut across the vertebral line and break it at irregular points. The head has no obvious markings save for irregular and alternating patches of scales that are slightly lighter or darker than one another. All limbs have extremely indistinct banding, being mainly light brownish in colour. The back limbs have distinctive black speckling or tips on scales and there is usually, but not always a strong yellow flush under the throat. There are two well-defined rows of about 6-8 small spines, each consisting a single scale, at the back of each side of the head.

The subspecies *T. simonknolli marcusbrummeri subsp. nov.* from far north-west New South Wales and nearby far south-west Queensland is separated from all other taxa in the species complex by the following suite of characters: numerous prominent raised conical spines on the back, these being largest down the mid body and reducing on the flanks; a rich orange-red dorsal colouration, consisting of thick broken creamish dorsolateral stripes; mainly orange-red on the back with semi-distinct darker patches being purplish-brownish-black in colour; the head has irregular white and cream markings; limbs are generally orange-red with obscure blackish markings or flecks, sometimes arranged as indistinct cross-bands; the tail is moderately distinctly banded (although not all bands entire or regular in shape) with alternating darker and lighter bands, usually numbering 18 and with the darker sections an average of twice the width of the lighter sections.

T. karimdaouesi sp. nov. (of the nominate subspecies) is seen in life and online at: https://www.flickr.com/photos/ryanfrancis/15051532074/in/album-72157630944032536/ and https://www.flickr.com/photos/ryanfrancis/15669578501/in/album-72157630944032536/ and https://www.flickr.com/photos/ryanfrancis/15486692170/in/album-72157630944032536/ (downloaded on 21 May 2019).

T.; *karimdaouesi courtneyleitchae subsp. nov.* is seen in life online at: https://www.flickr.com/photos/euprepiosaur/5245450404/in/photolist-8ZwiE5-ivBVmn-8Zwi9o/ and https://www.flickr.com/photos/euprepiosaur/5245448682/in/photolist-8ZwiE5-ivBVmn-8Zwi9o/ and https://www.flickr.com/photos/gazs_pics/11493251833/in/photolist-8ZwiE5-ivBVmn-8Zwi9o (downloaded on 21 May 2019).

Distribution: The nominate form, the subspecies *T. karimdaouesi karimdaouesi subsp. nov.* is found in north Queensland in a region generally bound by Mount Isa / Riversleigh in the west and Townsville in the east of Queensland and not more than 300 km either side north or south. The only other subspecies, being *T. karimdaouesi courtneyleitchae subsp. nov.* occurs in south-west Queensland, excluding the very far west or the coast in a region generally centred on Tambo and slightly west of there.

Etymology: Named in honour of French herpetologist and reptile breeder and dealer, Karim Daoues of Paris, France, in recognition of a lifetime's work for reptile conservation.

TYMPANOCRYPTIS KARIMDAOUESI COURTNEYLEITCHAE SUBSP. NOV.

LSID urn:lsid:zoobank.org:act:B1FA973B-3C01-4074-BBC4-29BED4DD2FBA

Holotype: A preserved specimen at the Queensland Museum, Brisbane, Queensland, Australia, specimen number: J84185 collected at 30 km South south-west of Tambo, Queensland, Australia, Latitude 25.09 S., Longitude 146.08 E.

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

Paratypes: Two preserved specimens at the Queensland Museum, Brisbane, Queensland, Australia, specimen numbers: J84186 and J84187 collected at 30 km South south-west of Tambo, Queensland, Australia, Latitude 25.09 S., Longitude 146.08 E.

Diagnosis: The species group formerly regarded as being *Tympanocryptis tetraporophora* Lucas and Frost, 1895 (a single species) as defined by Cogger (2014) are separated from all other members of the genus by the following suite of characters: the dorsal tubercles are scattered irregularly and not aligned longitudinally; the pale dorso-lateral lines or stripes are obscure or absent and the tail tapers rapidly from the base and is only 1.5 times as long as the head and body.

Within this group of species are the recently described species *Tympanocryptis condaminensis* Melville, Smith, Hobson, Hunjaw and Shoo, 2014, *Tympanocryptis pentalineata* Melville, Smith, Hobson, Hunjaw and Shoo, 2014 and *Tympanocryptis wilsoni* Melville, Smith, Hobson, Hunjaw and Shoo, 2014 as defined by the authors in Melville *et al.* (2014).

The species *T. karimdaouesi sp. nov.* is best defined by way of diagnosing each subspecies individually. The subspecies *T. karimdaouesi karimdaouesi subsp. nov.* from north Queensland in a region generally bound by Mount Isa / Riversleigh in the west and Townsville in the east of Queensland is separated from all other taxa in the species complex by the following suite of characters: the lizard is generally a mud-brown or grey dorsal colour with indistinct dorsal markings and the darker sections between the three dorsal lines are both-3-4 times smaller than the intervening lighter areas and also indistinct. Tail banding is indistinct along the entirety of the tail, but usually numbers 20. Front and back legs appear unmarked, but on close inspection either may have very indistinct bands. In some specimens either front, back or both sets of limbs may have white or black peppering. On the side of the back of the head are raised yellow spines and the thrat has a strong yellow flush. Dorsal lines, while generally indistinct, are either white or cream with those on the upper flanks always broken on the body. Other than an indistinct post-ocular streak running to the rear of the mouth and a similarly indistinct streak running under the eye to the labials the head is unmarked save for small black flecks. Both upper and lower limbs (all four) have small spines of uniform size, these being sometimes absent from the front limbs in some specimens. There are also obvious large spines on the flanks of the anterior tail.

The subspecies *T. karimdaouesi courtneyleitchae subsp. nov.* from south-west Queensland, excluding the very far west or the coast in a region generally centred on Tambo and slightly west of there, is separated from all other taxa in the species complex by the following suite of characters: mostly the same as for *T. karimdaouesi karimdaouesi subsp. nov.*, but differs from that taxon by the following traits: a strongly banded tail; dorsolateral lines are indistinct or even absent; abundant grey to black peppering across the entire body which is reddish-grey in colour as opposed to a mud-grey colouration and the yellow under the throat does not extend to the side of the head.

The newly described *T. wilsoni* and *T. condaminensis* can easily be distinguished from all others in the species complex by the absence of femoral pores.

T. condaminensis can be distinguished from the newly described *T. wilsoni* Melville *et al*., 2014 by the presence of a narrow white lateral stripe from axilla to groin and well-developed lateral and ventral body patterning, consisting of strongly contrasting brown-black and white irregular banding and speckling with more white that brown-black colouration. *T. wilsoni* also has strong ventral and lateral patterning but it doesn't form irregular contrasting bands, there is more black-brown than white colouration, and the lateral stripe is absent. It is also known that some individuals of *T. condaminensis* have red-pink colouration on their throats.

The species *T. pentalineata* is separated from all others in the species complex by the following suite of characters: having rough prominently keeled scales on the head, two preanal and two femoral pores; five prominent pale stripes running down the body; enlarged spinose scales scattered over the body; dorsal colouration being brownish black with a weak narrow grey vertebral stripe, narrow white dorsolaterals and laterals separated on the flanks by several broad, dark vertical bars. The lateral stripes comprise a row of enlarged, sharp pale scales. The ventral patterning is concentrated on the head, throat and upper chest, extending posteriorly toward the lateral portions of the belly.

T. tetraporophora is herein confined to South Australia, nearby parts of the southern Northern Territory and adjacent parts of southern western New South Wales. The species *Tympanocryptis tetraporophora* Lucas and Frost, 1895 is diagnosed as having rough and distinctly keeled head scales and a neck significantly narrower than the head. There is a preanal and femoral pore on either side making a total of 4. The type form and nominate subspecies is from far northern central South Australia, near the Northern Territory border. Its distribution extends into the southern Northern Territory and central parts of South Australia generally west of Lake Eyre.

Colouration is diagnostic for this subspecies and an image of the type form is depicted in Houston (1978) on page 44 bottom left.

The subspecies *Tympanocryptis tetraporophora tetraporophora* Lucas and Frost, 1895 is separated from all other species and subspecies in the species complex by having a dorsal pattern consisting of dark patches between the three mid dorsal lines being noticeably smaller in area than the intervening light patches, a narrow dark patch or band across the anterior end of the top of the tail behind the pelvic girdle, hind legs with a pattern of indistinct bands, a consistent light patch across the back of the head that is not broken in any way by darker pigment or markings and about a dozen evenly spaced small spines scattered across the back of the head and upper neck.

The subspecies *Tympanocryptis tetraporophora ianrentoni subsp. nov.* with a distribution centred on the Flinders Ranges in South Australia and immediately adjacent areas to the east in South Australia and nearby south-western New South Wales is separated from all other species and subspecies in the species complex by having a dorsal pattern consisting of dark patches between the three mid dorsal lines being of about the same area as the intervening light patches and including obvious white spines on the areas of darker pigment; a large dark crown-shaped patch at the anterior end of the dorsal surface of the tail, well-defined dark and light markings on both fore and hind limbs, these not necessarily being in the form of cross-bands; the back of the head and neck are marked with two irregular-shaped bars running anterior to posterior and effectively cutting off the lighter areas of the upper neck; significant and semi-distinct markings on the top of the head and an absence of obvious small spines on the back of the head and upper neck, or if present only about two on each side of the back of the head and/or any of these or others are small and indistinct.

The species *T. deniselivingstonae sp. nov.* known from northern New South Wales in a region bounded by 20 km north-west of Tilpa in the west and Coonamble in the east is similar in appearance to *T. tetraporophora ianrentoni subsp. nov.* but is readily separated from that taxon and all others in the species complex by the presence of thick and broken lateral stripes on each side of the mid vertebral stripe on the upper body, (those on the lower flanks are usually, but not always broken, whereas those between the top and bottom stripes are); light brown and white barring on all legs and distinct orange raised scales on the upper body, which are most noticeable over the areas of lighter pigment. There is a greater area of dark brown markings, versus creamish on the upper body between the top three dorsal stripes.

The species *T. simonknolli sp. nov.* is best defined by giving a diagnosis of each of the two subspecies noting molecular evidence implies a 2 million year divergence between each.

The nominate subspecies *T. simonknolli simonknolli subsp. nov.* is separated from all other taxa in the species complex by the following suite of characters: A distinct dorsal body pattern consisting of a greyish background with the upper surface including three relatively distinct stripes, one vertebral and two on either side of the back, the middle line being white in colour and the outer two being vivid yellow, but becoming white immediately posterior to the back legs on the tail, which while banded, the bands are indistinct and totally absent from about band number 13. Dorsally there are large irregularly shaped brown patches bound by areas of light greyish brown occupying about double the area of the darker patches. The darker patches do cut across the vertebral line and break it at irregular points. The head has no obvious markings save for irregular and alternating patches of scales that are slightly lighter or darker than one another. All limbs have extremely indistinct banding, being mainly light brownish in colour. The back limbs have distinctive black speckling or tips on scales and there is usually, but not always a strong yellow flush under the throat. There are two well-defined rows of about 6-8 small spines, each consisting a single scale, at the back of each side of the head.

The subspecies *T. simonknolli marcusbrummeri subsp. nov.* from far north-west New South Wales and nearby far south-west Queensland is separated from all other taxa in the species complex by the following suite of characters: numerous prominent raised conical spines on the back, these being largest down the mid body and reducing on the flanks; a rich orange-red dorsal colouration, consisting of thick broken creamish dorsolateral stripes; mainly orange-red on the back with semi-distinct darker patches being purplish-brownish-black in colour; the head has irregular white and cream markings; limbs are generally orange-red with obscure blackish markings or flecks, sometimes arranged as indistinct cross-bands; the tail is moderately distinctly banded (although not all bands entire or regular in shape) with alternating darker and lighter bands, usually numbering 18 and with the darker sections an average of twice the width of the lighter sections.

T. karimdaouesi sp. nov. (of the nominate subspecies) is seen in life and online at: https://www.flickr.com/photos/ryanfrancis/15051532074/in/album-72157630944032536/ and https://www.flickr.com/photos/ryanfrancis/15669578501/in/album-72157630944032536/ and https://www.flickr.com/photos/ryanfrancis/15486692170/in/album-72157630944032536/ (downloaded on 21 May 2019).

T.; karimdaouesi courtneyleitchae subsp. nov. is seen in life online at: https://www.flickr.com/photos/euprepiosaur/5245450404/in/photolist-8ZwiE5-ivBVmn-8Zwi9o/ and https://www.flickr.com/photos/euprepiosaur/5245448682/in/photolist-8ZwiE5-ivBVmn-8Zwi9o/ and

https://www.flickr.com/photos/gazs_pics/11493251833/in/photolist-8ZwiE5-ivBVmn-8Zwi9o (downloaded on 21 May 2019).

Distribution: The subspecies *T. karimdaouesi courtneyleitchae subsp. nov.* occurs in south-west Queensland, excluding the very far west or the coast in a region generally centred on Tambo and slightly west of there and within 150 km of Tambo.

The nominate form, the subspecies *T. karimdaouesi karimdaouesi subsp. nov.* is found in north Queensland in a region generally bound by Mount Isa / Riversleigh in the west and Townsville in the east of Queensland and not more than 300 km either side north or south.

Etymology: Named in honour of Melbourne (Australia) Victoria Police Officer, Courtney Leitche in recognition of her beneficial work as a police officer.

For further detail see the etymology for *T. lachlanheffermani sp. nov.* (earlier in this paper).

TYMPANOCRYPTIS WILLIAMCONNELLYI SP. NOV.

LSID urn:lsid:zoobank.org:act:16E8B6CB-E2EF-4014-9317-927C5F001999

Holotype: A preserved specimen at the National Museum of Victoria, Melbourne, Victoria, Australia, specimen number: D73876, collected at Gibb River Rd, West of Lennard River, Kimberley district, Western Australia, Australia, Latitude 17.26 S., Longitude 124.30 E. The National Museum of Victoria, Melbourne, Victoria, Australia is a government-owned facility that allows access to its holdings.

Paratype: A preserved specimen at the Western Australian Museum, Perth, Western Australia, Australia, specimen number: R36164 collected at 50 km south-east of Fitzroy Crossing, Western Australia, Australia, Latitude 18.55 S., Longitude 125.75 E.

Diagnosis: This taxon, *T. williamconnellyi sp.nov.* has been variously confused with others in the genus, most notably *T. lineata* and *T. macra*, the latter of which has been treated as a subspecies of *T. lineata* since originally described by Storr as *T. lineata macra* in 1982.

Molecular evidence in numerous papers, including that of Shoo *et al.* (2008) confirm that the specimens attributed to *T. lineata macra* from the south-west Kimberley division of Western Australia are a different species to those from the north-east Kimberley and nearby areas. The north-east Kimberley animals are of the nominate *T. macra* form and also clearly a different species to both *T. uniformis* and *T.lineata*.

T. williamconnellyi sp.nov. is readily separated from *T. macra* by the fact that while both taxa are strongly keeled above and below, in *T. macra* the head scales, especially those on the occiput, are rugose as well as sharply keeled, which is not the case in *T. williamconnellyi sp.nov.*.

The two taxa, *T. williamconnellyi sp.nov.* and *T. macra* are in turn only likely to be confused with *T. centralis* and *T. lachlanheffermani* and can be readily separated from both on the following basis: In *T. centralis* and *T. lachlanheffermani* the dorsal ground colour is reddish and the colour pattern is in parts, strongly developed, including a white vertebral stripe which is twice as wide as a dorsolateral stripe, although this is slightly faded in *T. lachlanheffermani.* In *T. macra* and *T. williamconnellyi sp.nov.* the dorsum is greyish, the pattern weakly developed and the vertebral stripe no wider than a dosolateral stripe. These differences in ground colour reflect differences in habitat: *T. centralis* and *T. lachlanheffermani* prefers red soils in the vicinity of rocks and stony hills: *T. williamconnellyi sp.nov.* and *T. macra* prefers black-soil or dark soil plains in proximity to rocky hills.

The similar species *T. uniformis* from the north-west Northern Territory is separated from *T. macra* by head shields less rugose than in *T. macra* and is separated from *T. williamconnellyi sp.nov.* by being a yellowish brown colour as opposed to greyish brown (in adults). *T. macra* is differentiated from the other two taxa (*T. uniformis* and *T. williamconnellyi sp.nov.*) by being generally a reddish brown lizard.

Otherwise the diagnosis and description for *Tympanocryptis lineata macra subsp. nov.* at pages 51 and 62 of Storr (1982) also applies to the species *T. williamconnellyi sp.nov.*.

T. williamconnellyi sp.nov. is seen in life in Wilson and Knowles (1988) at page 222, middle left photo and Storr, Smith and Johnstone (1983), plate 12, image 6, being second photo from bottom on right.

The three species *T. williamconnellyi sp.nov.*, *T. uniformis* and *T. macra* are also herein placed in a new subgenus *Williamconnellysaurus subgen. nov.* due to their divergence from nearest congeners, including members of the genus *Roundacryptus* Wells and Wellington (1985), herein treated as a valid subgenus within *Tympanocryptis.*

Distribution: *T. williamconnellyi sp.nov.* is a west Kimberley (of Western Australia) endemic. Its known distribution sits within a triangular area bounded by the following locations: 50 km East of Derby on the Gibb River Road, Latitude 17.42 S., Longitude 124.10 E. in the west; 167 km East of Fitzroy Crossing, Latitude 18.80 S., Longitude 126.53 E. in the south east and Mornington Station, Latitude 17.32 S., Longitude 126.25 E. in the north east.

Etymology: Named in honour of William Connelly of Melbourne, Victoria, Australia, better known as “egg boy”, in recognition of his courageous stunt of cracking an egg on the head of far right wing Australian politician Fraser Anning.

Australian teenager William (Will) Connolly made headlines in early 2019 around the world after cracking a raw egg over controversial Australian politician Fraser Anning’s head.

The egging came after Anning made victim-blaming comments in the wake of Christchurch mosque shootings on 15 March 2019, where a white supremacist killed 51 worshippers at two mosques and live-streamed the massacre on Facebook, where it apparently complied with the Facebook “community standards” and so was allowed to be broadcast to a global audience.

Connolly was arrested following the incident which also saw Anning and his supporters retaliate, with one crowd member holding him on the ground in a chokehold.

This prompted the creation of an online GoFundMe page to raise funds for his legal fees. However, Connolly promised to donate spare money to the victims.

After some deliberations by police and various behind the scenes manoeuvres, the leftist Victorian Labor Government tacitly supported Connelly and his egging a far right extremist and ensured that the police did not charge Connelly with assault, although one of Anning’s minders who apprehended Connelly after the egging was because he was from the political right and a target of retribution by the leftist government and their police.

On Instagram on 28 May 2019 Connelly posted on Instagram “Finally!!! After a huge amount of red tape,$99,922.36 has today been transferred to the Christchurch Foundation and Victims Support,”

He said: “For those of you who don’t know, there were two GoFundMe pages set up to help cover the cost of my legal fees and to ‘buy more eggs” … “Gratefully, Gordon Legal acted pro-bono for me so I don’t have any legal fees.” … “I decided to donate all monies to help provide some relief to the victims of the massacre... it wasn’t mine to keep.” (Cox 2019, Voloder 2019).

While the action by Connelly should (based on law and precedent) have warranted him being charged and jailed for a month for an unlawful assault, as happened to another political agitator Marcus Brummer (See etymology for *Liopeltis tricolor brummeri* in Hoser 2013), a decision was made not to charge Connelly.

However based on the well publicized precedent, it can be assumed that Connolly was aware of the risk he took with his unusual form of protest (likely jail) and for this risk taken to publicly draw attention to bizarre comments by a far right wing, Muslim hating politician, Connelly deserves recognition.

The decision to name a species in his honour occurred before it emerged on 28 May 2019, that “egg boy” had raised nearly $100,000 in donations to support victims of a gun massacre in Christchurch and this again is an act worthy of positive recognition.

TYMPANOCRYPTIS TONYLOVELINAYI SP. NOV.

LSID urn:lsid:zoobank.org:act:68E966E2-5FCD-4FA7-9EFA-81BD0775E14D

Holotype: A preserved specimen at the Australian Museum in Sydney, New South Wales, Australia, specimen number: R166731 collected at Nocoleche Nature Reserve, 11 km West of Wanaaring – Wilcannia Rd in New South Wales, Australia, Latitude 29.52 S., Longitude 144.00 E. The Australian Museum in Sydney, New South Wales, Australia is a government-owned facility that allows access to its holdings.

Paratype: A preserved specimen at the Australian Museum in Sydney, New South Wales, Australia, specimen number: R166771 collected at Nocoleche Nature Reserve, 11 km West of Wanaaring – Wilcannia Rd in New South Wales, Australia, Latitude 29.52 S., Longitude 144.00 E.

Diagnosis: *Tympanocryptis tonylovelinayi sp. nov.* has until now been variously treated as *T. cephalus*, *T. intima* and *T. bottomi.* However it is readily distinguished and separated from all three by the following unique set of characters: A generally mud-brown dorsal surface with minimal markings of any form and a tail which has no obvious markings, cross-bands or similar (as seen in all other species in the *T. cephalus*, *T. intima*, *T. bottomi* complex); forelegs and hind legs do have cross-bands but they are very indistinct; raised tubercles on the back form blunt spines and are spaced to form irregular lines running down the back becoming dense around the pelvic girdle and tail, head barely marked, being brownish, with slightly lighter indistinct patches. Raised scales forming blunt spines on the foreparts of upper hind legs, but absent on other limbs.

Distribution: Known only from the vicinity of Wanaaring in western New South Wales, Australia.

Etymology: Named in honour of Tony Love-Linay of Taylors Lakes, Victoria, Australia and also Albury-Woodonga, Australia and his fantastic staff at Reconnect Telecommunications, who runs a network of mobile phone stores across southern New South Wales and Victoria in recognition of his assistances to the local community and their telecommunications needs, various overseas charities he works with and assisting Snakebusters, Australia's best reptiles shows with logistical support for their ongoing wildlife conservation and research programmes in south-east Australia, including via telecommunications support, printing and copying. On one occasion Tony Love-Linay did emergency motor vehicle repairs to a severely immobilized Toyota Land Cruiser, that he meticulously removed the engine from, pulled apart into numerous fragments laid across the floor of the lounge of the Snakeman's house and then diligently re-assembled in working order.

TYMPANOCRYPTIS RECONNECTORUM SP. NOV.

LSID urn:lsid:zoobank.org:act:650FC9B3-EDDD-4060-8D69-0293ED4517B0

Holotype: A preserved specimen at the South Australian Museum in Adelaide, South Australia, Australia, specimen number: R42859, collected from 33 km south of Noonbah Station, Queensland, Australia, Latitude 24.23 S., Longitude 143.18 E. The South Australian Museum in Adelaide, South Australia, Australia is a government-owned facility that allows access to its holdings.

Paratype: A preserved specimen at the South Australian Museum in Adelaide, South Australia, Australia, specimen number: R42854, collected from 32 km south of Noonbah Station, Queensland, Australia, Latitude 24.22 S., Longitude 143.13 E.

Diagnosis: While molecular results show both subspecies of *Tympanocryptis reconnectorum sp. nov.* to be recently divergent (est 1 MYA divergence) from one another, each population are morphologically significantly different. Furthermore while in close proximity by distribution, they do appear to be separated by a zone of habitat apparently unsuitable for the species and are therefore also isolated from one another and clearly evolving as separate species.

The best way to diagnose the species *T. reconnectorum sp. nov.* is by way of diagnosing each of the two subspecies.

T. reconnectorum clintonlogani subsp. nov. is separated from *T. intima* and all others in the species complex by the following unique suite of characters: Unusually large irregular blunt spines on the back of the head and neck, including as an incomplete circle around the upper part of the back of the jaw; on the body the irregular raised blunt spines forming irregular lines are orange in colour and many usually have black tips; dorsally the body is an orangeish yellow (significantly lighter in colour than the irregular spines referred to already) with broken whitish yellow lines running down the body.

The upper surface has has reduced darker areas, that are semi-distinct and form the shape of bars running across the body. The limbs have semidistict bands of orange and brown, lacking spines; there is a distinctive and mainly unbroken whitish line running down the length of the tail, with broken darker and lighter cross-bands prominent at the anterior end of the tail.

T. reconnectorum reconnectorum subsp. nov. is similar in many respects to *T. reconnectorum clintonlogani subsp. nov.* but is separated from it and all other species in the complex by the following suite of characters: Orangeish red to grey in general dorsal colour, often with a distinctive dark colouration across the nape forming a collar-like marking. Other than one or more patches of darker scales on the head, there are no obvious markings on the head and body, notwithstanding three indistinct greyish stripes running down the upper part of the body, one being vertebral and the others on the top of the sides of the upper surface. Legs have indistinct but well-formed bands.

There are few if any raised scales forming irregular blunt spines on the body and if present, widely scattered on the upper flanks, but there are sharp, distinct well-formed spines on the lower part of the each side of the back of the head. There are 10-13 alternating pairs of dark and light relatively distinct cross-bands along the entire length of the tail, with no formation of any kind of band or stripe along the upper surface. Feet (all four) and especially the fore-feet are noticeably lighter than the rest of the limbs.

*T. reconnectorum sp. nov.*images of the nominate subspecies is seen in life in Wilson and Swan (2017) on page 453 middle.

T. reconnectorum clintonlogani subsp. nov. in life is seen online at: https://www.flickr.com/photos/euprepiosaur/37373631602/in/photostream/ and https://www.flickr.com/photos/euprepiosaur/23552179358/ and https://www.flickr.com/photos/euprepiosaur/37373630892/in/photostream/ (downloaded on 21 May 2019).

Distribution: *T. reconnectorum sp. nov.* is found in drier parts of the northern half of Queensland, Australia including lower Cape York, but not including the most western parts.

T. reconnectorum reconnectorum subsp. nov. is found in a region generally bound by Mount Isa, Hughendon and Longreach in Queensland, Australia.

The subspecies *T. reconnectorum clintonlogani subsp. nov.* is found in a region generally bound by Georgetown in the East, Karumbah in the north west and Taldora in the south-west.

Etymology: Named in honour of Tony Love-Linay and the many fantastic staff at Reconnect Telecommunications, who run a network of mobile phone stores across southern New South Wales and Victoria in recognition of assistances to the local community and their telecommunications needs and assisting Snakebusters, Australia's best reptiles shows with logistical support for their ongoing wildlife conservation and research programmes.

TYMPANOCRYPTIS RECONNECTORUM CLINTONLOGANI SUBSP. NOV.

LSID urn:lsid:zoobank.org:act:BE078414-2FAE-4E9A-A741-B1E3649A2713

Holotype: A preserved specimen at the National Museum of Victoria, Melbourne, Victoria, Australia, specimen number: D74071 collected at the Gulf Development Rd, 130 km south of Normanby, Queensland. This is a government-owned facility that allows access to its holdings.

Paratype: A preserved specimen at the National Museum of Victoria, Melbourne, Victoria, Australia, specimen number: D74072 collected at the Gulf Development Rd, 130 km south of Normanby, Queensland.

Diagnosis: *T. reconnectorum clintonlogani subsp. nov*. is separated from *T. intima* and all others in the species complex by the following unique suite of characters: Unusually large irregular blunt spines on the back of the head and neck, including as an incomplete circle around the upper part of the back of the jaw; on the body the irregular raised blunt spines forming irregular lines are orange in colour and many usually have black tips; dorsally the body is an orangeish yellow (significantly lighter in colour than the irregular spines referred to already) with broken whitish yellow lines running down the body. The upper surface has has reduced darker areas, that are semi-distinct and form the shape of bars running across the body. The limbs have semidistict bands of orange and brown, lacking spines; there is a distinctive and mainly unbroken whitish line running down the length of the tail, with broken darker and lighter cross-bands prominent at the anterior end of the tail.

T. reconnectorum reconnectorum subsp. nov., the only other subspecies of *T. reconnectorum sp. nov.*, is similar in many respects to *T. reconnectorum clintonlogani subsp. nov.* but is separated from it and all other species in the complex by the following suite of characters: Orangeish red to grey in general dorsal colour, often with a distinctive dark colouration across the nape forming a collar-like marking. Other than one or more patches of darker scales on the head, there are no obvious markings on the head and body, notwithstanding three indistinct greyish stripes running down the upper part of the body, one being vertebral and the others on the top of the sides of the upper surface. Legs have indistinct but well-formed bands. There are few if any raised scales forming irregular blunt spines on the body and if present, widely scattered on the upper flanks, but there are sharp, distinct well-formed spines on the lower part of the each side of the back of the head. There are 10-13 alternating pairs of dark and light relatively distinct cross-bands along the entire length of the tail, with no formation of any kind of band or stripe along the upper surface. Feet (all four) and especially the fore-feet are noticeably lighter than the rest of the limbs.

*T. reconnectorum sp. nov.*images of the nominate subspecies is seen in life in Wilson and Swan (2017) on page 453 middle.
T. reconnectorum clintonlogani subsp. nov. in life is seen online at: https://www.flickr.com/photos/euprepiosaur/37373631602/in/photostream/ and https://www.flickr.com/photos/euprepiosaur/23552179358/ and https://www.flickr.com/photos/euprepiosaur/37373630892/in/photostream/ (downloaded on 21 May 2019).

Distribution: The subspecies *T. reconnectorum clintonlogani subsp. nov.* is found in a region generally bound by Georgetown in the East, Karumbah in the north west and Taldora in the south-west.

Nominate *T. reconnectorum reconnectorum subsp. nov*. is found in a region generally bound by Mount Isa, Hughendon and Longreach in Queensland, Australia.

Etymology: Named in honour of Clinton Logan of Genoa, far north-east Victoria, Australia for his many contributions to herpetology.

TYMPANOCRYPTIS SAMSUNGORUM SP. NOV.

LSID urn:lsid:zoobank.org:act:DE2F4CE5-496C-433C-8D88-594F8F3802AC

Holotype: A preserved specimen at the Western Australian Museum, Perth, Western Australia, Australia, specimen number: R112659 collected from Brooks Soak, (located beneath a granite rock on soil), Latitude 32.08 S., Longitude 123.58 E. The Western Australian Museum, Perth, Western Australia, Australia, is a government owned facility that allows access to its holdings.

Paratype: A preserved specimen at the Western Australian Museum, Perth, Western Australia, Australia, specimen number: R93174, collected from 15 km east of Kilidwerinia, Western Australia, Australia, Latitude 32.04 S. Longitude 124.06 E.

Diagnosis: *Tympanocryptis houstoni* Storr, 1982 and *T. samsungorum sp. nov.* are unique in the species complex by having a significantly thickened mid-dorsal stripe, versus thin line in all others. *T. samsungorum sp. nov.* until now has been treated as a far western population of *T. houstoni.*

However *T. samsungorum sp. nov.* is readily separated from *T. houstoni* by having upper hind legs with alternating orange brown and yellow white cross bands, versus dark brown and orange, or brownish-black and yellow-grey in *T. houstoni.*
The white line on the lower part of the rear side of the rear leg of *T. samsungorum sp. nov.* is distinct versus semi-distinct in *T. houstoni.*
Both *T. houstoni* and *T. samsungorum sp. nov.* have a dorsal patterning of three alternating (mainly) dark and light patches on the body. In *T. houstoni* the lighter patches are all of similar size, whereas in *T. samsungorum sp. nov.* the anterior light patches (first pair from the mid-dorsal line) are noticeably larger than those that follow.

Until now, *T. lachlanheffermani sp. nov.* known only from the Tennant Creek area of the Northern Territory has been regarded as a northern outlier population of *T. centralis* Sternfeld, 1925, or alternatively a wider *T. lineata* Peters, 1839.

T. lachlanheffermani sp. nov. and *T. centralis* Sternfeld, 1925 are similar in most respects and until now, both would have been identified *T. centralis* Sternfeld, 1925 on the basis of other diagnostic material in this paper.

T. lachlanheffermani sp. nov. and *T. centralis* Sternfeld, 1925 are readily separated from all other species in the complex by having a pale mid-dorsal stripe that is not or scarcely wider than the mid-dorsal stripe, and an extremely conspicuous and usually continuous white mid lateral stripe on each side.

T. centralis Sternfeld, 1925 from central Australia is separated from *T. lachlanheffermani sp. nov.* known only from near Tenant Creek in the Northern Territory and areas immediately east of there, by its strongly spinose hind legs (blunt spines formed from raised scales) and a strong deep reddish-brown colouration versus a washed out reddish colouration in *T. lachlanheffermani sp. nov.*. In *T. lachlanheffermani sp. nov.* the hind limbs are only slightly rugose.

Until now, *T. vodafone sp. nov*. has been regarded as a variant of *T. lineata* Peters, 1863. *T. vodafone sp. nov.* from north of the Eyre Peninsula in South Australia is separated from all other similar species of *Tympanocryptis* in South Australia by having a unique pattern consisting of four large dark circles running down the mid dorsal line (the circles alone being unique in this species complex) and with the line being broken on at least some of these circles, these breaks in this configuration being unique in the species complex. On the tail, there is usually an unbroken dark patch across the foretail upper surface.

T. vodafone sp. nov. is also unique among species of *Tympanocryptis* from South Australia in having heavily spinose rear legs on the dorsal anterior surfaces, the spines being small and narrow, versus raised scales forming low blunt spines, which is a unique diagnostic trait of *T. optus sp. nov.* from north-west South Australia and nearby parts of Western Queensland as well as *T. centralis* Sternfeld, 1925.

Until now *T. optus sp. nov.* has been regarded as a form of *Tympanocryptis lineata* Peters, 1863. *T. optus sp. nov.* is different among species in the complex and separated from all of them in having relatively indistinct dorsal markings in adults and is usually a greyish-brown or reddish colour.The dorsolateral lines are often broken, but if so, over light parts of the upper body and not the darker regions, where they remain distinct.

Until now *T. snakebustersorum sp. nov.* has been regarded as typical and type form of *Tympanocryptis lineata* Peters, 1863 as defined by Houston 1978 at page 47 at top left image. However Melville *et al.* (2019) provided data that showed that the type specimen of *Tympanocryptis lineata* Peters, 1863 was in fact from the Australian Alps in New South Wales and provided a photo of the relevant lectotype ZMB 740 that confirmed the fact. A better quality image of the same animal can be found online via a Google search of images for "*Tympanocryptis lineata*", where diagnostic tail blotches can be easily counted.

Based on the molecular data and morphological data of Melville *et al.* (2019) this means that the south east South Australian animals previously treated as *Tympanocryptis lineata* Peters, 1863 are until now an undescribed species.

For this reason the relevant taxon is elsewhere in this paper named *Tympanocryptis snakebustersorum sp. nov..*

T. snakebustersorum sp. nov. is readily separated from all other species formerly treated as *T. lineata* in South Australia by the possession of the following suite of characters: distinct markings on upper and lower limbs, no obvious circles running down the midline (this is seen in *T. vodafone sp. nov.* to the exclusion of all other similar species), a U-shaped blotch on the dorsal tail behind the hind limbs and on a whiteish background, versus not-U-shaped in all other species; a whitish line running along the top rear of each of the hind limbs (versus none in all other species, except occasionally in some *T. centralis*) and wider light areas than dark areas on the upper body, versus the reverse in all other species. The darker cross bands, broken by the dorsolateral lines are wide at the mid body line, narrowing to the first dorsolateral line on the sides of the dorsal surface, occasionally forming a very slight widening or etching on the meeting point at these lines, versus an obvious widening in *T. houstoni* Storr, 1982, *T. samsungorum sp. nov.* (a species previously treated as a population of *T. houstoni*), *T. alexteesi* Hoser, 2015, *T. centralis* Sternfeld, 1925 and *T. lachlanheffermani* sp. nov..

Tympanocryptis markteesi Hoser, 2015 was in the past treated as a variant of so called *T. lineata* Peters, 1863 now known as *T. snakebustersorum sp. nov.*. However *T. markteesi sp. nov.* can be separated from *T. snakebustersorum sp. nov.* by its generally greyish colour versus orangeish in *T. snakebustersorum sp. nov.*.

Furthermore *T. snakebustersorum sp. nov.* is characterised by two more-or-less vertical thick creamy bars on the upper labials beneath the eye, whereas *T. markteesi sp. nov.* is characterised by one only (the rear one) and the equivalent front bar being reduced to a largeish spot. In *T. snakebustersorum sp. nov.* the light barring of the forelimbs is distinct, versus indistinct or non-existent in *T. markteesi sp. nov.* and the similar species *T. karumba* Wells and Wellington, 1985, treated (improperly) by most authors as merely *T. lineata.*

T. karumba is characterised by semi-circular blotches on the dorsolateral surface, versus squareish in *T. markteesi sp. nov.*. Like *T. snakebustersorum sp. nov.*, *T. Karumba* is characterised by two more-or-less vertical thick creamy bars on the upper labials beneath the eye, whereas *T. markteesi sp. nov.* is characterised by one only (the rear one) and the equivalent front bar being reduced to a largeish spot.

Tympanocryptis alexteesi sp. nov. described by Hoser (2015h), is readily separated from *Tympanocryptis markteesi sp. nov.*, *T. karumba* Wells and Wellington, 1985, and *T. snakebustersorum sp. nov.* by the fact that the dark dorsal blotches are orange-brown as opposed to greyish as well as the deep reddish orange lighter background colour of the dorsal surfaces. *Tympanocryptis alexteesi sp. nov.* is also readily separated from the other three taxa by the considerable whitish yellow peppering on the lower neck region as well as a relative lack of white bars or spots on the upper labials, this being no more than two obvious ones.

T. snakebustersorum sp. nov., *T. vodafone sp. nov*, *T. alexteesi* Hoser, 2015, *T. houstoni* Storr, 1982, *T. optus sp. nov.*, *T. centralis* Sternfeld, 1925 and *T. lachlanheffermani sp. nov.* can all be readily separated from all of *Tympanocryptis pinguicolla* Mitchell, 1848, *T. lineata* Peters, 1863 and *T. telecom* Wells and Wellington, 1985 by having 4-5 transverse dark dorsal bands or markings, versus 6-7 in the latter three species and the absence, versus presence of a lateral skin fold.

Tympanocryptis houstoni Storr, 1982 from the Nullarbor Plain region of South Australia and Western Australia as well as the species *T. samsungorum sp. nov.* described in this paper are readily separated from all other similar species by the presence of extremely wide darker dorsal bands on the body (usually four), the widest of which includes two joined white spots radiating on either side of the mid-dorsal stripe. The fore and hind limbs are heavily banded with dark cross-bands, a trait is shares only with *T. vodafone sp. nov.* and *T. snakebustersorum sp. nov.*.

Tympanocryptis pinguicolla Mitchell, 1948 is readily separated from all other *Tympanocryptis* species by having almost vertically oriented dorsal tubercles that either lack a terminal spine or have only a small projection. They can be separated from *T. lineata* Peters, 1863 and *T. telecom* Wells and Wellington, 1985 by having enlarged tubercular scales scattered on the thighs, compared to the absence of this scalation.

T. vodafone sp. nov. is depicted on page 47, bottom right in Houston (1978). Similar species depicted on the same page of Houston (1978), showing comparative differences in dorsal patterning are, *T. snakebustersorum sp. nov.*, top left, *T. centralis*, top right and *T. houstoni* at bottom left.

T. samsungorum sp. nov. is seen in an image online at: http://www.arod.com.au/arod/reptilia/Squamata/Agamidae/Tympanocryptis/houstoni (downloaded on 21 May 2019).

Distribution: *T. samsungorum sp. nov.* is believed to be geographically isolated from *T. houstoni* and at the westernmost extremity of the known range of what was formerly included in *T. houstoni.*

The known range of *T. samsungorum sp. nov.* is effectively bounded by the following locations in southern Western Australia: In the east at 15 km east of Kilidwerina Granite Rock, Latitude 32.06 S., Longitude 124.10 E; in the south at 20 km south west of Balladonia Homestead, Latitude 32.36 S., Longitude 123.45 E. and in the north-west at 16 km north east of Fraser Range Latitude 31.54 S., Longitude 122.53 E.

The known range of *T. houstoni* is in the region generally east of about 14 km west of Cocklebiddy, Western Australia, Latitude 32.03 S., Longitude 125.95 E into the Nullarbor section of South Australia and not including the Eyre Peninsula.

The status of the limited number of specimens assigned previously to *T. houstoni* recorded from the intervening zone in Western Australia is unknown.

Etymology: Named in honour of the Samsung Company. Samsung is a South Korean multinational conglomerate headquartered in Samsung Town, Seoul. It comprises numerous affiliated businesses, most of them united under the Samsung brand and is the largest South Korean chaebol. Samsung was founded by Lee Byung-chul in 1938 as a trading company. In particular their mobile phones sold as so called “smart phones” have aided scientists in the field and to share knowledge globally. The spelling “*samsungorum*” is intentional and should not be changed unless mandated by rules of the ICZN.

SUBGENUS *WILLIAMCONNELLYSAURUS SUBGEN. NOV.*

LSID urn:lsid:zoobank.org:act:F6085AC2-7986-4A34-932F-AB217973BA3A

Type species: *Tympanocryptis williamconnellyi sp. nov.* (this paper).

Diagnosis: Species within *Williamconnellysaurus gen. nov.* are moderately large and relatively slender lizards within the wider genus *Tympanocryptis* Peters, 1863. They have larger and longer limbs and tail and more subdigital lamellae.than members of the nominate subgenus *Tympanocryptis* (17-22 v 15-20) and with less rotund body than members of the subgenus *Rotundacryptus* Wells and Wellington, 1985.

Rotundacryptus Wells and Wellington, 1985 is further separated from both other subgenera by the presence of dorsal tubercles more or less arranged into longitudinal rows (usually4) versus mainly scattered.

Williamconnellysaurus gen. nov. are further diagnosed and defined by the following unique suite of characters: A pre-anal pore discernible in most specimens. Usually no femoral pore. Lamellae under fourth toe. Scales on head strongly keeled. Scales on back varying much in size, the largest being spinose and more strongly keeled than others. No midlateral fold. Gulars weakly keeled and mucronate. Dorsal and lateral ground colour pale reddish-brown to greyish-brown. A pale grey vertebral stripe and a brownish-white to greyish-white dorsolateral stripe occasionally discernible; vertebral stripe no wider than dorsolateral. Reddish-brown to greyish-brown cross-bands on body, limbs and tail, interrupted by the longitudinal stripes and sometimes barely discernible on body. No pattern on head or indication of midlateral stripe. Tail is about 150% of body length.

Distribution: The Kimberley district of WA and the nearby Victoria River region of north-west Northern Territory.

Etymology: As for the species *Tympanocryptis williamconnellyi sp. nov.* (see earlier in this paper).

Content: *Tympanocryptis williamconnellyi sp. nov.* (type species); *T. macra* Storr, 1982; *T. uniformis* Mitchell, 1948.

BIODIVERSITY INVENTORY AND CONSERVATION OUTCOMES

Rosauer *et al.* (2018) emphatically confirmed using molecular data, that the taxonomic diversity of Australia’s herpetofauna has been seriously underestimated. This is a belated recognition of the same view peddled by Wells and Wellington (1984, 1985) (as of that date and when far less reptile taxa had been formally recognized) and reiterated by Hoser (2007). Contrary to this view and since shown to be erroneous has been that of Anonymous (1987) (= Richard Shine *et al.*) and repeated by Kaiser *et al.* (2013).

As all the species and subspecies described and recognized herein have been confirmed as distinct by molecular methods and results (as cited herein), their immediate recognition by herpetologists and others involved in wildlife conservation should be a forgone conclusion.

However the anarchist doctrine of Kaiser *et al.* (2013), better known as Wüster *et al.* (2013) is being used to harass and intimidate other herpetologists and pretty much everyone else not to use the taxonomy and nomenclature herein and in the short to medium term at least recognize the species named herein as being synonymous with their otherwise nearest currently recognized relative.

This is not a conservative or cautious view as alleged by Kaiser *et al.* or some supporters of the group.

The species named herein are supported by a peer reviewed body of evidence, which while being an alleged tenet of Kaiser *et al.* is in fact systematically ignored and abused by them and held in disdain by them.

In practice Kaiser and the Wüster gang treat peer review with complete contempt.

This is exactly why Kaiser and the group will deny existence of the evidence relied on in this paper and that all has been peer reviewed. Hence, as just stated, while Kaiser *et al.* (2013) claim to support peer review, in practice they despise it.

None of this is simply just a matter of personalities and egos, or a just a petty name dispute, although this is exactly how Kaiser *et al.* treat it and at times ask others to as well.

My acceptance of the taxonomy and nomenclature of Wells and Wellington in 2007 (Hoser, 2007) and call for others to do likewise was rooted in the undeniable fact that after an intense audit of their publications, I found the unavoidable (and usually very obvious) fact that most of their 1984 and 1985 taxonomic proposals (Wells and Wellington, 1984 and 1985) were in fact correct and to pretend otherwise ran the risk of putting relevant species at risk of extinction.

For the first time ever, it is possible to state with complete confidence that the statements and actions of Shine *et al.* (Anonymous 1987) and their group (later known as the Wüster gang or Kaiser *et al.*) in doing all they can to suppress then works of Wells and Welllington and the taxonomy and nomenclature within their papers, using totally unscientific and unethical methods, has in fact resulted in the wholly avoidable (almost certain) extinction of a species of *Tympanocryptis*, namely *T. pinguicolla* (as of 2019).

In 1985, Wells and Wellington restricted *T. pinguicolla* to Victoria. At the time both Hoser (1989) and Hoser (1991) was published, case Case 2531, seeking suppression of the Wells and Wellington papers and all the nomenclature within was before the International Commission for Zoological Nomenclature (ICZN) and at the time both books were published was undecided.

In mid 1991 the ICZN found in favour of Wells and Wellington and against the name thieves.

In spite of this improperly created uncertainty of nomenclature, both Hoser (1989) and Hoser (1991) recognized the Wells and Wellington taxonomy (leaving the nomenclature in doubt pending ICZN resolution), (see for example "*Egernia cunninghami*" at page 89 and "*Varanus gouldii*" at page 115 of Hoser, 1989).

Both Hoser (1989) and Hoser (1991) also called for the urgent captive breeding of potentially endangered Australian reptiles to avert extinctions.

Had the quite correct and proper and lawful ICZN compliant taxonomy and nomenclature of Wells and Wellington (1985) with respect to *T. pinguicolla* and the northern species they formally named, namely *T. telecom* Wells and Wellington, 1985, been properly adopted by Shine *et al.* (Anonymous 1987), later to become known as Wüster *et al.* (as outlined in Kaiser *et al.* 2013), instead of the original authors being attacked with lies, smear, innuendo, mental gymnastics, smoke screens and the like, both species could have been properly managed from 1985.

For the record, the southern species *T. pinguicolla* was sighted in the wild near Melbourne, Victoria as recently as 1988 and 1990, as recorded in the Victorian Biodiversity Atlas, published online at: https://www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas or in the supplementary data of Melville *et al.* (2019).

T. pinguicolla could have been readily rescued from the brink of extinction, but this was completely dependent on it being recognized as separate from the NSW / ACT species and therefore at risk.

Shine *et al.* (AKA the Wüster gang), must now stand culpable for the deliberate and reckless extinction of this iconic species of Victorian dragon lizard.

The pig-headed refusal to recognize and conserve taxa named by Wells and Wellington (1985), even though the available peer reviewed scientific evidence to support recognition of taxa they formally named was generally overwhelming, extended to all areas of herpetology as the Wüster gang and earlier incarnations of the same group of individuals sought to harass, bludgeon and influence by all means possible, others working in the wildlife space.

The Victorian Government wildlife department, known under countless names and acronyms over the three decades preceding 2019, and their business arm, "Zoos Victoria", owner of the three main government-owned zoos in Melbourne, Victoria, Australia claims ownership of the registered trademark incorporating the key words "Fighting Extinction" (Australian registered trademark number: 1470848) which they ruthlessly protect and stop others from using.

However in spite of claims to be protecting the states reptiles, both the department overseeing Zoos Victoria and "Zoos Victoria" itself allowed *T. pinguicolla* to become extinct in Victoria over the relevant 24 years post-dating the publication of Wells and Wellington (1985).

Melville *et al.* (2019) in agreeing with Wells and Wellington (1985) in determining the Victorian *T. pinguicolla* are a different species to NSW specimens which they assign to two other species, then found that *T. pinguicolla* are almost certainly extinct and the preceding herein is written on that basis.

In any event, had the taxonomy and nomenclature of Wells and Wellington (1985) been adopted and implemented at the relevant time as it should have been, along with a proper conservation plan for the remainder of the species populations, there is effectively no doubt at all that *T. pinguicolla* would not be extinct as of 2019.

While populations of all other known species of *Tympanocryptis* appear to be stable as of 2019, those from the ACT and Cooma regions in NSW are small, fragmented and highly vulnerable to precipitous decline and extinction as is the newly described *T. mccartneyi* Melville *et al.*, 2019. This is due to their proximity to rapidly expanding centres of human population and Australian governments generally being indifferent to wildlife conservation at all levels.

They should immediately be given the highest practical levels of protection and management possible and in a way that positively involves all stakeholders, so as to maximise chances of long term success.

The species *Tympanocryptis tonylovelinayi sp. nov.* and *T. samsungorum sp. nov.* while both found a long distance from areas of large human populations are within regions of intensive agriculture and grazing activity as well as introduced pest species and so are vulnerable to precipitous decline. Combined with the limited geographical ranges of each taxon, known with a high degree of certainty, both species should be surveyed with a view to ascertaining actual extant populations and then management pracfices implemented to preserve those remaining populations.

Other species within *Tympanocryptis* identified within this paper do not appear to under any known threat of significant decline or extinction, living mainly in relatively remote and uninhabited places, but noting the ever increasing rate of pathogen dispersals facilitated by humans and their trade and outright habitat change and destruction caused by a rapidly increasing Australian human population, the conservation status of any species could change rapidly.

Failure to recognize any of the relevant species immediately could be a precursor to their extinction.

The ugly lesson of the likely extinction of *T. pinguicolla* caused by the reckless actions of Shine *et al.* (Anonymous 1987) and more recently continued by Kaiser *et al.* (2013) as repeatedly rehashed and amended, shows that the ongoing activities of Kaiser *et al.* in the form of lies, smear, false claims and reckless unscientific synonymisation of species named in the presence of good peer reviewed scientific evidence must be stopped.

The equally evil taxonomic vandalism practiced by the Kaiser *et al.* gang of thieves, including by Jane Melville *et al.* (Melville *et al.* 2018 and 2019) with respect to the Australian agamidae and *Tympanocryptis* in particular needs to be stopped immediately as dealing with their unwanted dual nomenclature has several devastating and diversionary side effects that will hasten demise of relevant species.

Firstly, scientists have to waste time synonymising the illegally coined names of Melville and others before other people in the herpetology and wildlife conservation space get confused as to which species is which. This time wasted dealing with those who illegally rename species in breach of the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999) would be better spent on dealing with the conservation needs of the relevant taxa.

Secondly, competent taxonomists who have their name improperly blackened by Kaiser *et al.* and their false claims of being unscientific and the like will leave the field and this is detrimental to conservation as a whole. No species can be conserved unless it is formally named according to the rules of the *International Code of Zoological Nomenclature* and as of 2019 there remain dozens of reptile species in Australia awaiting formal recognition. This is principally due to the lack of competent taxonomists working on Australian reptiles.

The shortage was in large part caused by the improper attacks on Wells and Wellington (1984, 1985), still ongoing and also including the taxonomic works of myself (Raymond Hoser) from 1998 to present, which in turn significantly discouraged and continues to discourage many potentially great scientists from entering the field of reptile taxonomy. This was and is, due to a well-grounded fear that they will be subjected to improper character assassination, including on specially created “Wikipedia” hate pages, that their works would be improperly lampooned or suppressed, or as an equally evil twin part of the Kaiser *et al.* (2013) manifesto, the results of many years hard work would be stolen and rebadged as a “new discovery” by a thief who is part of the same group of “non-scientists”, exactly as done by Melville *et al.* (2018).

Personal suffering of people is one thing, but the reptile extinctions caused by the activities of Shine *et al.* (Anonymous 1987), Kaiser *et al.* (2013), better known as Wüster *et al.* including their followers like Melville *et al.* (2018 and 2019) is exactly why these people need to be outed for what they are, thieves and rougues. This should be done before yet more species are driven to a wholly avoidable extinction.

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Richard Shine *et al.* (1987), Hinrich Kaiser *et al.* (2013), Jane Melville *et al.* (2018 and 2019): Australian Agamids and how rule breakers, liars, thieves, taxonomic vandals and law breaking copyright infringers are causing reptile species to become extinct.

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ABSTRACT

In 1987 a renegade group of herpetologists, including Richard Shine decided on a new means of dealing with people they saw as rivals in the science of reptile taxonomy in Australia. They unsuccessfully petitioned the International Commission of Zoological Nomenclature, (ICZN) to formally suppress the works of two authors, Richard Wells and Cliff Ross Wellington so they could rename species and genera in violation of the *International Code of Zoological Nomenclature Nomenclature* (Ride *et al.* 1999). The ICZN was fed a raft of lies and innuendo about two major Wells and Wellington papers from 1984 and 1985 that had already named hundreds of species and genera.

However in 1991 reason prevailed and the ICZN refused to suppress the works. Since then, the same group opposing Wells and Wellington has continued to run an unlawful campaign of effectively boycotting the taxonomy and nomenclature of Wells and Wellington.

The evil business plan involves synonymising all relevant named taxa with earlier named forms, even when the taxa are clearly different species or genera.

More recently the group, now known as the Wüster gang, best known for their war cry, a blog opinion piece called Kaiser *et al.* (2013) have formally put their manifesto as one to refuse to cite or use the works of an ever increasing number of authors, including, Wells, Wellington, Raymond Hoser, John Cann (all from Australia), John Edward Gray (UK), Demangel Miranda (Chile), William McCord (USA), Mehdi Joseph-Ouni (USA), Cris Hagen (USA) and anyone else whose work they wish to steal and re-badge as their own.

The second part of this Kaiser *et al.* (2013) manifesto is to ignore all rules of science, peer review, established conventions and even copyright law to ostensibly allow the group and their supporters to steal from published works of others to rename species and genera in breach of the rules of the *International Code of Zoological* and to refuse to cite the works they steal from. This is known taxonomic vandalism!

Besides the ethical and legal issues arising from the preceding acts of misconduct, these actions have caused significant downsides for science and conservation of relevant species. At least one species of reptile has become extinct as a direct result of the actions of the Wüster gang and others are likely to suffer a similar fate.

In 2018 and 2019, Jane Melville as senior author published two PRINO (peer reviewed in name only) papers, renaming agamid taxa in Australia

This taxonomic vandalism cited the long disproven lies in the Kaiser *et al.* (2013) manifesto as justification for it. This paper gives a detailed critique of the unlawful actions by Melville *et al.* (2018 and 2019) and further identifies the species *Tympanocryptis pinguicolla* Mitchell, 1948 as the first extinction likely to have been caused by the reckless actions of the Wüster gang.

Keywords: Richard Shine; Jane Melville; Wolfgang Wüster; Hinrich Kaiser; Taxonomic vandalism; theft; copyright breach; plagiarisation; agamid lizards; reptilian; agamidae; Australia; extinction; Wells and Wellington; Raymond Hoser; Victoria.

INTRODUCTION

In 1983, Hal Cogger, his wife Heather Cogger and Elizabeth Cameron, working for the Australian government published *The Zoological Catalogue of Australia, 1, Amphibia and Reptilia* (Cogger *et al*. 1983).

This 313 page book was the culmination of many years work and for the first time ever listed all Australian reptiles and amphibians by species and genus names and also all known synonymies as classified by Cogger.

As a conservative “lumper” in taxonomy, Cogger synonymised many forms, but all were listed.

The opposite side of this spectrum were a pair of so-called “splitters”, Richard Wells and Cliff Ross Wellington, who had a well-founded view that the Australian herpetofauna was grossly underestimated at the species and genus level.

Using Cogger *et al.* (1983) as a map of known Australian reptiles and frogs, Wells and Wellington used their many years of combined knowledge derived from fieldwork in most parts of Australia to set about reclassifying Australian reptiles and frogs as they saw it.

This culminated in two major publications Wells and Wellington (1984 and 1985), which in combination named hundreds of species and genera for the first time and also resurrected from synonymy many others.

The majority of species first named by the authors in these publications were well known as undescribed forms to herpetologists in Australia and so in the normal course of events, the new Wells and Wellington names would have been adopted and used by others virtually immediately.

However due what was seen at the time as a near comprehensive review of Australia’s herpetofauna and its taxonomy, a number of other aspiring taxonomists in Australia saw Wells and Wellington as scooping work and name authority for species that they may have at some later stage decided to formally name. They therefore viewed the Wells and Wellington publication with hostility and sought legal means to suppress and rename the various taxa.

The rules of the *International Code of Zoological Nomenclature* fourth edition (Ride *et al.* 1999) governs the naming of all animals, including reptiles, as did earlier versions of the same code and these effectively bind all practicing taxonomists and scientists in general.

Wells and Wellington’s publications of 1984 and 1985 made a point of complying with the rules of the second edition of the *International Code of Zoological Nomenclature* and meaning names for previously unnamed taxa first proposed by Wells and Wellington had to be used for them and in favour of any later names coined.

In 1987 a renegade group of so-called herpetologists, with Richard Shines as the apparent front man, petitioned the ICZN to formally suppress the works of Wells and Wellington for nomenclatural purposes (Anonymous 1987). If successful, the renegades would have gained the right to rename any or all validly named species and genera previously named by Wells and Wellington, this being completely contrary to the *International Code of Zoological Nomenclature*.

The petitioners to the ICZN did so under the banner “President: Australian Society of Herpetologists”. No lead author was identified or named in the publication, but at the time this person was Richard Shine. In 1987, he was relatively new to herpetology but as a publishing herpetologist it was seen as likely he would aspire to a career as a taxonomist seeking “name authority” for species at some later stage.

The published claims against Wells and Wellington were many and most were completely false. This is not to say the papers of Wells and Wellington were perfect. In fact they were far from it. The two men had prepared their papers with minimal outside help or resources and so by necessity both were brief in terms of each formal description and published to minimal standards, as was the case for other papers published by the pair at the time or for that matter most of their contemporaries..

Notwithstanding this, the taxonomic judgements and descriptions themselves in terms of compliance with the rules of the *International Code of Zoological Nomenclature* were almost all correct and in full compliance.

However most of the published claims in relation to the Wells and Wellington papers by later authors have in fact been completely false. Furthermore they can readily be shown as false by simply cross-referencing the false claim with the original cited paper, which in itself disproves the claim (as seen in the example published later in this paper).

In spite of false claims to be representing the majority of Australian herpetologists, the group led by Shine and others and including such persons as Wolfgang Wüster lost their case.

Petitioners against the name thieves included the herpetology curator at the Australian Museum in Sydney, Dr. Allen E. Greer who did in fact speak for the largely harassed and silenced, silent majority.

It was in 1991, that by near unanimous vote, reason prevailed and the ICZN commissioners refused to suppress the works (ICZN 1991).

A second attempt to have the ICZN formally suppress Wells and Wellington material again failed in 2001 (ICZN 2001).

That should have ended the matter and the relevant Wells and Wellington names should have come into general usage.

This has happened in part, largely due to their adoption by Dr. Hal Cogger, who incidentally was the only ICZN commissioner out of about 20, who voted against the works of Wells and Wellington in the earlier case, but once the ruling was handed down, he abided by the ruling.

Cogger has published seven editions of the major work identifying all of Australia’s reptiles and amphibians, including most recently Cogger (2014), which is replete with numerous species and genera named by Wells and Wellington in 1984 and 1985.

However in contrast to the actions of Cogger, the same group of renegades opposing Wells and Wellington has continued to run a campaign of effectively boycotting the taxonomy and nomenclature of Wells and Wellington with a business plan of synonymising all relevant named taxa with earlier named forms, even when the taxa are clearly different species or genera.

Cogger has played into the hands of this group by refusing to publish in his books names of species or genera that are in any way in contention or doubt.

So by continuing to improperly raise doubt as to the validity of species and genera named by Wells and Wellington and harassing other potential users of their taxonomy and nomenclature to not do so, many Wells and Wellington named taxa remain ignored, unnamed and unpublished by Cogger and therefore generally unknown to most of the wider herpetological community.

Only about 25% of the species formally described by Wells and Wellington appear in Cogger (2014), even though this publication post dated the Wells and Wellington papers by 3 decades and even a brief analysis of the relevant Wells and Wellington papers shows that the majority of species the pair named are valid.

In fact as of 2019, the majority of these said taxa have also been validated by the evidence of molecular studies involving both nuclear and mitochondrial DNA.

It is also noteworthy to state that this technology which is excellent at determining whether or not given animals are of different species was not available to Wells and Wellington at the time they published their papers, so they invariably had to do most of their taxonomic work by looking at the relevant animals themselves.

One such example is *Rankina boylani* Wells and Wellington 1984 as shown by Hoser (2015g) to be valid based on all of morphology, geographical range and DNA divergence and yet outside of publications of this author (Raymond Hoser), the name *Rankina boylani* Wells and Wellington 1984 is not seen in print as of 2019 and the very distinct species is treated as synonymous with *R. diemensis* (Gray, 1841) by all relevant authors.

What we have seen has been a well orchestrated boycott of works and names of Wells and Wellington and the species they have discovered and named decades back in that they are being forcibly ignored as detailed by Hoser (2007, 2009, 2012a, 2012b, 2013, 2015a-f and sources cited therein).

Richard Shine and others in the group, now generally known as the Wüster gang (named after the main ringleader, Wolfgang Wüster, now at Wales in the UK), have managed to maintain the boycott on use of Wells and Wellington taxonomy and nomenclature by getting members of their group on editorial committees of major herpetology journals who then tell authors not to cite the works of Wells and Wellington or use genus and species names of theirs.

Papers that do are simply rejected or alternatively the authors are forced to use an alternative and erroneous taxonomy and nomenclature instead.

More recently this group is now known as the Wüster gang, best known for their blog hate rant, marketed as a "paper" called Kaiser *et al.* (2013). The same small but vocal group of renegades and thieves, continually alleging they represent herpetology, rather than accurately stating they represent a noisy minority have authored similar hate rants cited here as Kaiser (2012a, 2012b, 2013, 2014a and 2014b and others not cited here). They have formally put their manifesto Kaiser *et al.* (2013) (and similar documents) as one to refuse to cite or use the works of an ever increasing number of authors, including, Wells, Wellington, Raymond Hoser (this author), John Cann (all from Australia), John Edward Gray (UK), Demangel Miranda (Chile), William McCord (USA), Mehdi Joseph-Ouni (USA), Cris Hagen (USA) and anyone else whose work they wish to steal and rebadge as their own.

The second part of this Kaiser *et al.* (2013) manifesto is to ignore all rules of science, peer review, established conventions and even copyright law to ostensibly allow the group and their supporters to steal from published works of others to rename species and genera in breach of the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999) and to refuse to cite the works they steal from. This is known taxonomic vandalism!

Kaiser *et al.* (2013) and later incarnations consistently champion themselves as the effective owners of "peer review" and claim that their publications have this, while those they target for suppression do not.

The reality is in fact the complete opposite as demonstrated by Hoser (2012a, 2012b, 2013, 2015a-f and sources cited therein).

The publications of the Wüster gang consistently lack any credible peer review as seen by the material that gets published. Bare faced lies, irrelevant comments and all out rants get published, masquerading as science, while ostensibly peer reviewed scientific descriptions of allegedly new taxa invariably include work stolen from earlier uncited authors, typically copied verbatim in key parts, or alternatively include species named in the absence of evidence, when a cursory examination of the said taxon shows that it has already been named in any event.

The papers of Wüster gang member and listed co-author of Kaiser *et al.* (2013) Wulf Schleip (e.g. Schleip 2008 and 2014) are holotype examples, including Schleip (2008) (discredited by Hoser 2009) and Schleip (2014) (discredited by Hoser 2015a-f). Both Schleip papers make false statements about the papers and author from where work is stolen and both papers engage in the ethically repugnant act of taxonomic vandalism, in that species previously named are renamed by Schleip.

The crimes of Schleip are made much worse by other members of the Wüster cohort who then force other reptile databases (e.g. the Peter Uetz run "The Reptile Database") and journal editors (e.g. "*Memoirs of Museum Victoria*") to use the invalid Schleip names or other invalid names, even when they know they are not legal and/or in some cases, not even biological entities.

Besides the ethical and legal issues arising from the preceding ethical misconduct, these actions have caused significant downsides for science and conservation of relevant species. At least one species of reptile has become extinct as a direct result of the actions of the Wüster gang and others are likely to suffer a similar fate. That species *Tympanocryptis pinguicolla* Mitchell, 1948, now believed to be extinct, is dealt with later in this paper.

In terms of the unethical conduct of Wüster, Schleip and other members of the gang, such as UK-based Mark O'Shea, this is covered in detail in earlier papers of Hoser 2009, 2012a, 2012b, 2013 and 2015a-f and sources cited therein), although it is simply too hard to keep up with the non-stop unlawful actions of the Wüster gang. These actions go beyond acts of scientific fraud and taxonomic vandalism.

The gang attack enemies in all ways possible, both legal and illegal.

Wüster *et al.* regularly create and edit Wikipedia hate pages that they then protect by robot to prevent correction by others. These pages have all their invalid names in use with false statements to the effect that they are the correct ones.

The Wikipedia hate page on "Raymond Hoser" (created and managed Wüster under his user ID "Mokele" and lackey Mark O'Shea under user name "Papblak") makes too many false claims to be dealt with here, but include such niceties such as to allege I have plagiarised material from others (I never have, but the Wüster gang do so regularly) and that I have killed my own daughter, testing illegally devenomized snakes on her that had supposedly regenerated venom.

Every part of that claim is false including, 1/ I killed my daughter, 2/ I had illegally devenomized snakes and 3/ That the said snakes had ever regenerated venom.

Several Australian courts have issued orders for that page to be removed but both the Wüster gang and Wikipedia act in contempt of court to keep the unlawful hate page online.

TYMPANOCRYPTIS PINGUICOLLA MITCHELL, 1948.

This taxon was originally described as a subspecies of the morphologically similar *T. lineata* Peters, 1863 from elsewhere in south-east Australia.

In line with other previous authors, Wells and Wellington (1985) assumed that *T. lineata* had been collected from near Adelaide in South Australia and that the specimens from Southern Victoria were Mitchell's *T. lineata pinguicolla* as this matched the given type locality for this taxon.

Lizards from the Australian Capital Territory (ACT) and nearby southern New South Wales (near the ACT and further south around Cooma, had until the time of the Wells and Wellington paper in 1985 been treated as being of the same subspecies.

In what was seen as a radical move, Wells and Wellington (1985) first elevated *T. pinguicolla* to full species status and then split the northern population from the ACT and nearby off into a separate species.

The new species was formally named *T. telecom* Wells and Wellington, 1985.

The Wells and Wellington description for this species was mixed up and confusing and while complying with the relevant articles of the relevant *International Code of Zoological Nomenclature* did not in fact give any means to separate *T. telecom* and *T. pinguicolla* from one another.

Due to both the poor original description of *T. telecom* and the widespread push to suppress the works of Wells and Wellington, no herpetologist so much as tested the assertion by Wells and Wellington that their *T. telecom* was in any way different from *T. pinguicolla.*

By 2014, Cogger (2014) had adopted what by then was the consensus position in Australian herpetology in recognizing *T. pinguicolla* as different and distinct from *T. lineata* and listed both in his book as separate species.

In line with all other authors, the ACT and nearby southern NSW populations from the population centred on Cooma, an hour's drive south of Canberra city were also assigned to *T. pinguicolla.* As of 2014, with the exception of Wells and Wellington themselves, no publishing herpetologist had considered *T. telecom* a valid species save for the publication of Hoser (2007).

THE T*YMPANOCRYPTIS* PAPER OF JANE MELVILLE PUBLISHED IN 2019

In May 2019, Jane Melville (Melville *et al.* 2019) published a significant paper on the genetics and taxonomy of the *T. lineata* species group. This was the most recent in a number of papers by a number of authors on or including *T. lineata* and/or lizards until recently treated as the same species, which included *T. pinguicolla.*

Central to her analysis was Australian tax-payer funded genetic data that accurately delineated the relevant species in the complex, or at least those the authors had sampled.

The main findings of the paper were that the lectotype of *T. lineata* assigned by Wells and Wellington (1985), while sourced from 4.5 km west of Gawler (near Adelaide) in South Australia, was in fact caught on a collecting expedition from at or near the southern highlands of New South Wales.

This meant these southern highlands of New South Wales lizards were in fact *T. lineata* and not what was until then thought to be the main species population in southern South Australia. That was a different and potentially unnamed species.

This finding was supported by the morphology of the lizard itself, being of the southern highlands form (or one of them) and recently obtained diary entries relevant to the original capture of this specimen.

A second important finding was that not only was the ACT population of *T. pinguicolla* a separate species from the type form from near Melbourne in Victoria, but that the population centred on Cooma in southern New South Wales was also specifically distinct from the ACT population (also found in immediately adjacent NSW) as well as the Victorian population of *T. pinguicolla*.

Melville *et al.* (2019) then attempted to ascertain whether the lectoptype came from the Cooma or the ACT population and after publishing a complex set of statistical calculations stated that it was most likely an ACT animal on a probability basis.

This in effect led to the next logical step which was to synonymise *T. Telecom* with the earlier named *T. lineata.*

Melville *et al*. (2019) then asserted that both the Cooma population was an undescribed form as was what had until then been the South Australian population of the alleged nominate form of *T. lineata*.

While she didn’t explicitly state this, her paper also provided further evidence that the population thought to consist of nominate *T. lineata* with a distribution centred on South Australia did in fact consist of up to four or more species including the species *Tympanocryptis alexteesi* Hoser, 2015.

Significantly, rather than citing the Hoser species and paper, Melville instead cited Kaiser *et al.* (2013) as a justification for ignoring the Hoser-named species and paper.

That Melville was aware of the Hoser paper of 2015 (Hoser 2015g) had been confirmed in a letter from the editor of another journal she had published in a year earlier.

She had also posted adverse comments about the Hoser (2015g) paper on Facebook shortly after it had been published.

In this regard, Melville’s conduct of pretending Hoser (2015g) did not exist was both unethical and for that matter also unscientific.

Of course Melville’s actions in suppressing the information about the Hoser-named species and 2015 paper from readers would mislead them into believing of the existence of an undescribed species in need of being formally named, when she knew at all times this was not the case.

Her actions created a very real risk that another herpetologist may waste valuable time naming an already named species and then worse still, other herpetologists would have to waste valuable time dealing with the consequences of an unnecessarily created synonym.

Melville further determined that a recently found population attributed to *T. pinguicolla* from near Bathurst, New South Wales was also a separate species and named it, even though she was aware I was working on these reptiles and so to this extent, she scooped me to grab “name authority” for that species taxon.

As a result of Melville’s main findings summarized above, Melville *et al.* (2019) formally named the Bathurst species *T. mccartneyi* (the taxonomic decision itself not being contentious or in dispute) and the Cooma population as *T. osbornei.*

Unfortunately for Melville, it is clear from her supplementary data and the paper itself, both published together and at the same time in May 2019, that she either had no idea which form the badly preserved lectotype of *T. lineata* really was, or perhaps more damningly, (and most likely based on the contents of her own paper) did and chose to hide this fact.

To solve the problem of identity of the lectotype for *T. lineata* she did a confusing statistical analysis of characters known to both forms and plumped for the one with the most matches. What was omitted from this analysis was the single characteristic that consistently separated the two species.

The ACT population has 7-11 caudal blotches, versus 12 or more in the Cooma species.

We know this critically important fact because Melville herself stated this as the only consistent difference between the two species in the paper.

Melville *et al*. (2019) included a poor quality photo of the lectotype of *T. lineata* and it showed clearly that it had more than 12 caudal blotches, making it a Cooma-type animal, also matching the account of its collection, hidden in the supplementary data and not in the published paper itself, that being all most readers would ever see..

In other words, Melville had made a serious error in her ostensibly peer reviewed paper and inadvertently renamed *T. lineata* as *T. osbornei.* The preceding also meant that the ACT population was in fact *T. telecom* as this was now the only available name for it.

Now even a high school student could have counted the tail blotches of the lectotype to confirm which species it was, so it beggars belief that any peer reviewer would let such an error slip through to publication.

Or for that matter, how could an allegedly PhD qualified author make such a stupid error before getting to peer review stage?

And should I also mention the other alleged co-authors of the paper as well. How could they all miss the obvious identity of the lectotype and get it wrong?

In other words her paper was PRINO, meaning “peer reviewed in name only”.

Melville *et al.* (2019) also asserted that the species name *T. telecom* was “*nomen nudem*” without giving any proper explanation, but reference to the original description at page 20 of Wells and Wellington (1985) when cross referenced with the definition of “*nomen nudem*” in the *International Code of Zoological Nomenclature* (edition 4) showed quite emphatically that the Wells and Wellington name was not *nomen nudem* based on the definition within the code or potential creative interpretation of it.

Again, any peer reviewer should have checked both the Wells and Wellington (1985) paper and the *International Code of Zoological Nomenclature* to see if the extremely significant *nomen nudem* claim was correct. The clear failure of any to do so, which on its own would have stopped the paper being published in the form it was, confirms that the Melville *et al.* (2019) paper was either not peer reviewed or PRINO in every sense of the acronym.

Hence while Melville *et al.* (2019) had done the ostensibly beneficial act of formally recognizing *T. mccartneyi* for the first time (scooping myself), noting that the species is highly vulnerable to extinction, their potentially good work was negated by her effective act of taxonomic vandalism by renaming *T. lineata* as *T. osbornei* (for the Cooma-type population) and the improper labelling of *T. telecom* as *T. lineata.*

***TYMPANOCRYPTIS TELECOM* WELLS AND WELLINGTON, 1985.**

With the allegation by Melville *et al*. (2019) that *T. telecom* was *nomen nudem* and myself working on the taxonomy of the genus, I was forced to check the claim and test it.

This I did and as stated already, it came out in the negative.

Both the description and the relevant parts of the *International Code of Zoological Nomenclature* had to be cross-referenced to see if the first complied within all the rules of the second, which it did.

However it is important that without asking for explanations or excuses from Wells and Wellington, I objectively viewed the relevant description of *T. telecom* to determine if the name is available for the relevant species and I do have relevant comments to make.

Rather than give a long winded explanation of what the two authors said, it is easier to copy and paste the entire, very brief description herein.

At page 20 of Wells and Wellington (1985) it read:

"*Tympanocryptis telecom* sp. nov.

Holotype: An adult specimen at the Australian National Wildlife Collection, CSIRO Division of Wildlife Research, Canberra. Collected on Black Mountain, A. C. T. by CSIRO staff.

Diagnosis: A small stout member of the *Tympanocryptis lineata* complex, most closely allied with *Tympanocryptis pinguicolla* of southern Victoria and readily identified by consulting the description in Jenkins and Bartell (1980:96-97, Plate on page 97) who regard this species as '*Tympanocryptis lineata pinguicolla*'. Mitchell (1948) should be consulted for comparative data on *T. pinguicolla. Tympanocryptis telecom* is only known from the site occupied by the Post Office Tower on Black Mountain, A. C. T. Its survival status is unknown, but must be considered as potentially endangered, as no further specimens have been reported since the disturbance of its habitat for the Telecom facility. More intensive field work may reveal the existence of this species ranges in the southern highlands."

The description on face value is lousy. The authors, probably by way of inadvertent omission, failed to give a specimen number for their holotype. This has been done before by other authors, including in peer reviewed journals and in the absence of qualifying material in the description could make it either invalid, or a *nomen nudem*.

The authors identified the institution where the specimen was held, what it had been identified as and its location of collection.

A first reviser could easily have gone to the Australian National Wildlife Collection (ANWC), viewed any of the specimens conforming to the above and assigned a relevant lectotype and still can do so. None of this is terribly difficult or uncommon and hence the failure to include a specimen number does not fatally invalidate the Wells and Wellington description.

I should also note that the same paper has dozens of other species descriptions which all appear to conform to the normal practice of citing institution and specimen number, clearly indicating that the omission of a relevant specimen number for *T. telecom* was an editorial oversight in the production process and not a standard act of bad practice by the said authors.

A read of the description diagnosis including by cross referencing of the texts cited therein does not in my view diagnose the relevant species or separate it from *T. pinguicolla*. Now I may have missed something here, but in any event this is not relevant.

In order to comply with the *International Code of Zoological Nomenclature* and be an available name, the description does not need to accurately separate the alleged taxon *T. telecom*, or even do so. In fact it only merely needs to "purport" to do so.

As the Wells and Wellington paper clearly purports to separate *T. telecom* from the other species, it cannot be invalidated on that basis either.

The paper was published in hard copy in the usual way and so complies with Article 8 of the Code and so the name cannot be invalidated on that basis.

Shine *et al*. (1987) as the "President of the Australian Society of Herpetologists" petitioned the ICZN to formally suppress the Wells and Wellington paper of 1985 and that attempt failed in 1991 with a ruling in favour of Wells and Wellington (ICZN 1991), followed by a second failed attack on the pair (ICZN 2001)..

More recently in 2013, Kaiser *et al.* (as cited by Melville *et al.* 2019) decided to step outside the rules of the *International Code of Zoological Nomenclature* and among other things decreed that publications alleged to be not peer reviewed or failing some other ill-defined standards could be ignored, suppressed and over-written by merely citing Kaiser *et al.* (2013) when doing so.

This included to the point of non-citation and literally faking the fact that the earlier paper never even existed!

As there is no other basis to suppress or ignore and not use or recognize as valid, the name *T. telecom*, as done by Melville *et al.* (2019), the sole and entire basis for doing so must be Kaiser *et al.* (2013) as cited by her in that paper.

The law-breaking decrees and edicts of Kaiser *et al.* have long since been discredited (see for example Hoser 2012b, 2013, 2015a-f and sources cited therein).

Therefore use of Kaiser *et al.* (2013) or later incarnations of it as a basis to allege that *T. telecom* is either invalid or *nomen nudem* is also removed.

Hence the name *T. telecom* Wells and Wellington is available and also the only available name that can be applied to the relevant population of lizards.

Furthermore, unless the rules governing names of animals is changed, *T. telecom* Wells and Wellington, 1985 will be the only available name in perpetuity.

THE EXTINCTION OF *TYMPANOCRYPTIS PINGUICOLLA* CAUSED BY THE ACTIONS OF THE WÜSTER GANG

Rosauer *et al.* (2018) emphatically confirmed that the taxonomic diversity of Australia's herpetofauna has been seriously underestimated. This is a belated recognition of the same view peddled by Wells and Wellington (1984, 1985) (as of that date and when far less reptile taxa had been formally recognized) and reiterated by Hoser (2007). Contrary to this view and since shown to be erroneous has been that of Anonymous (1987) (= Richard Shine *et al.*) and repeated by Kaiser *et al.* (2013).

However the anarchist doctrine of Kaiser *et al.* (2013), better known as Wüster *et al.* (2013) as Kaiser earlier said Wüster had written the rant, is being used to harass and intimidate other herpetologists and pretty much everyone else not to use the taxonomy and nomenclature of Wells and Wellington and others they have targeted to steal works from.

Hence they seek to treat all relevant species as being synonymous with their otherwise nearest currently recognized relative.

This is not a conservative or cautious view of taxonomy as alleged by Kaiser *et al.* or some supporters of the group.

The species of concern have long been supported by a peer reviewed body of evidence, which while being an alleged tenet of Kaiser *et al.* is in fact systematically ignored and abused by them and held in disdain by them.

This is exactly why Kaiser and the group have denied the existence of *T. telecom* and *T. pinguicolla* as defined by Wells and Wellington as geographically restricted taxa right up to the present date (2019).

None of this is simply just a matter of personalities and egos, although this is exactly how Kaiser *et al.* treat it and at times ask others to as well.

For the first time ever, it is possible to state with complete confidence that the statements and actions of Shine *et al.* (Anonymous 1987) and their group (later known as the Wüster gang) in doing all they could to suppress then works of Wells and Wellington and the taxonomy and nomenclature within their papers, using totally unscientific and unethical methods, has in fact resulted in the wholly avoidable (almost certain) extinction of a species of *Tympanocryptis*, namely *T. pinguicolla* (as of 2019).

As already noted, in 1985, Wells and Wellington restricted *T. pinguicolla* to Victoria. At the time both Hoser (1989) and Hoser (1991) was published, case Case 2531, seeking suppression of the Wells and Wellington papers and all the nomenclature within was before the International Commission for Zoological Nomenclature (ICZN) and at the time both books were published was undecided.

In mid 1991 the ICZN found in favour of Wells and Wellington and against the name thieves, which they again did in 2001.

In spite of this improperly created uncertainty of nomenclature, both Hoser (1989) and Hoser (1991) recognized the Wells and Wellington taxonomy (leaving the nomenclature in doubt pending ICZN resolution), (see for example "*Egernia cunninghami*" at page 89 and "*Varanus gouldii*" at page 115 of Hoser, 1989).

Both Hoser (1989) and Hoser (1991) also called for the urgent captive breeding of potentially endangered Australian reptiles to avert extinctions.

Had the quite correct and proper and lawful ICZN compliant taxonomy and nomenclature of Wells and Wellington (1985) with respect to *T. pinguicolla* and the northern species they formally named, namely *T. telecom* Wells and Wellington, 1985, been properly adopted by Shine *et al.* (Anonymous 1987), later to become known as Wüster *et al.* (as outlined in Kaiser *et al.* 2013), instead of attacked with lies, smear, innuendo, mental gymnastics, smoke screens and the like, both species could have been properly managed from 1985.

For the record, the southern species *T. pinguicolla* was sighted in the wild near Melbourne, Victoria as recently as 1988 and 1990, as recorded in the Victorian Biodiversity Atlas, published online at: https://www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas or in the supplementary data of Melville *et al.* (2019).

That postdates Wells and Wellington (1985) by five years and represented ample time to rescue remaining specimens from the urban development of greater Melbourne (Victoria) and prevent the species becoming extinct.

T. pinguicolla could have been readily rescued from the brink of extinction, but this was in effect completely dependent on it being recognized as separate from the NSW / ACT species and therefore recognized as being at risk.

Shine *et al.* (AKA the Wüster gang), must now stand culpable for the deliberate and reckless extinction of this iconic species of Victorian dragon lizard.

The pig-headed refusal to recognize and conserve taxa named by Wells and Wellington (1985), even though the available scientific evidence to support recognition of taxa they formally named was generally overwhelming is what caused the extinction.

The suppression of the names of Wells and Wellington extended to all areas of herpetology as the Wüster gang and earlier incarnations of the same group of individuals sought to harass, bludgeon and influence by all means possible, others working in the wildlife space.

The Victorian Government wildlife department, known under countless names and acronyms over the three decades preceding 2019, and their business arm, “Zoos Victoria”, owner of the three main government-owned zoos in Melbourne, Victoria, Australia claims ownership of the registered trademark incorporating the key words “Fighting Extinction” (Australian registered trademark number: 1470848) which they ruthlessly protect and stop others in the wildlife conservation “business” from using.

However in spite of claims to be protecting the states reptiles from extinction, both the department overseeing “Zoos Victoria” and “Zoos Victoria” itself allowed *T. pinguicolla* to become extinct in Victoria over the relevant 24 years post-dating the publication of Wells and Wellington (1985).

Melville *et al.* (2019) in agreeing with Wells and Wellington (1985) in determining the Victorian *T. pinguicolla* are a different species to NSW specimens which they assign to two other species, then found that *T. pinguicolla* are almost certainly extinct.

The preceding herein is written on that basis.

In any event, had the taxonomy and nomenclature of Wells and Wellington (1985) been adopted and implemented at the relevant time as it should have been for *T. pinguicolla*, along with a proper conservation plan for the remainder of the species populations, there is effectively no doubt at all that *T. pinguicolla* would not be extinct as of 2019.

While populations of all other known species of *Tympanocryptis* appear to be stable as of 2019, those from the ACT and Cooma regions in NSW are small, fragmented and highly vulnerable to precipitous decline and extinction as is the newly described *T. mccartneyi* Melville *et al.*, 2019 from around Bathurst in NSW. This is due to their proximity to rapidly expanding centres of human population and Australian governments being generally indifferent to wildlife conservation at all levels.

The relevant species should immediately be given the highest practical levels of protection and management possible and in a way that positively involves all stakeholders, so as to maximise chances of long term success.

There are other species of *Tympanocryptis* at potential risk elsewhere in Australia as detailed in a separate paper published at the same time as this.

Failure to recognize any of the properly identified and named relevant species immediately could be a precursor to their extinction.

The ugly lesson of the likely extinction of *T. pinguicolla* caused by the reckless actions of Shine *et al.* (Anonymous 1987) and more recently continued by Kaiser *et al.* (2013), shows that the ongoing activities of Kaiser *et al.* in the form of lies, smear, false claims and reckless unscientific synonymisation of species named in the presence of good peer reviewed scientific evidence must be stopped.

The equally evil taxonomic vandalism practiced by the Kaiser *et al.* gang of thieves, including by Jane Melville *et al.* (Melville *et al.* 2018 and 2019) with respect to the Australian agamidae and *Tympanocryptis* in particular needs to be stopped immediately.

This is because dealing with their unwanted dual nomenclature has several devastating and diversionary side effects that will hasten demise of relevant species.

Firstly, scientists have to waste time synonymising the illegally coined names of Melville and others before other people in the herpetology and wildlife conservation space get confused as to which species is which. This time wasted dealing with those who illegally rename species in breach of the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999) and would be better spent on dealing with the conservation needs of the relevant taxa.

Secondly, competent taxonomists who have their name improperly blackened by Kaiser *et al.* and their false claims of being unscientific and the like will leave the field and this is detrimental to conservation as a whole. No species can be conserved unless it is formally named according to the rules of the *International Code of Zoological Nomenclature* and as of 2019 there remain dozens of reptile species in Australia awaiting formal recognition. This is principally due to the lack of competent taxonomists working on Australian reptiles.

The shortage of reptile taxonomists in Australia over the 34 years since 1985 was in large part caused by the improper attacks on Wells and Wellington (1984, 1985), still ongoing and also including the baseless attacks on taxonomic works of myself (Raymond Hoser) from 1998 to present, which in turn significantly discouraged and continues to discourage many potentially great scientists from entering the field of reptile taxonomy. This was and is, due to a well-grounded fear that they will be subjected to improper character assassination, including on specially created “Wikipedia” hate pages, that their works would be improperly lampooned or suppressed, or as an equally evil twin part of the Kaiser *et al.* (2013) manifesto, the results of many years hard work would be stolen and rebadged as a “new discovery” by a thief who is part of the same group of “non-scientists”.

This is exactly as done by Melville *et al.* (2019) in terms of Mitchell’s *T. lineata* and/or the Wells and Wellington *T. telecom.*

Personal suffering of people is one thing, but the reptile extinctions caused by the activities of Shine *et al.* (Anonymous 1987), Kaiser *et al.* (2013), better known as Wüster *et al.* including their followers like Melville (2018 and 2019) is exactly why these people need to be outed for what they are, thieves and rogues. This should be done before yet more species are driven to a wholly avoidable extinction.

MELVILLE *ET AL.* (2018) TAXONOMIC VANDALISM AND POTENTIAL COPYRIGHT BREACH

As mentioned already, the Wüster gang manifesto Kaiser *et al.* (2013) and various ever-changing incarnations of it published since, advocate the forced suppression of names and works from authors they target to steal names and works from in breach of the rules of the *International Code of Zoological Nomenclature.* The manifesto also directs authors not to cite the works of people they seek to steal works from (in breach of copyright law) and to raise bogus claims against relevant authors of unscientific methods used or a lack of peer review, or even that they refuse the recognize the validity of the publication the paper was published in on the basis that their mob had not acted to censor or vet the work.

The more destructive part of the Kaiser manifesto is the unlawful direction to others to break the law and breach copyright by using someone else's work and not citing it, with the even more nefarious addition that validly named species, genera or other taxa should be illegally renamed.

Jane Melville as senior author of paper Melville *et al.* (2018) did exactly what was directed in the Kaiser *et al.* (2013) manifesto to engage in a fraudulent case of pseudo-science and taxonomic vandalism.

Hoser (2015g) published a major paper naming 18 new species, 3 new genera and 6 new subgenera of Australian agamid. The paper was published in accordance with the rules of the *International Code of Zoological Nomenclature* (current edition 4, Ride *et al.* 1999) and so the names were available according to the rules.

Furthermore, each species, genus and subgenus was identified as distinct on the basis of well-quantified morphological differences, none interbred, and all were also separated on a calibrated molecular basis by way of known timeline of divergence at levels in excess of what was usually required to make such distinction.

The paper was also peer reviewed!

None of these latter facts mattered in terms of the names being available under the rules of the *International Code of Zoological Nomenclature*, but these added facts meant that each and every species should have been immediately recognized by the wider herpetological community and the names used to describe the relevant taxa as needed.

In fact based on posts on social media shortly after publication, it was self-evident that people working in the field had absolutely no doubt at all, that I, Raymond Hoser had discovered and named for the first time ever for science, unique biological entities.

The two taxa relevant here were:

Lophognathus wellingtoni Hoser, 2015 was listed at the ICZN's repository at time of publication at:

http://www.zoobank.org/NomenclaturalActs/24fb5585-f73e-428c-84ed-5c7b71cf4148

with LSID urn:lsid:zoobank.org:act:24FB5585-F73E-428C-84ED-5C7B71CF4148

and because it was named on the basis of peer reviewed scientific evidence it was widely recognized and listed in numerous indexes such as the "Global Names Index" at:

http://resolver.globalnames.org/name_resolvers/cyr5dz1m08eh

and

Melvillesaurea Hoser, 2015 also listed at the ICZN's repository at time of publication at:

http://www.zoobank.org/NomenclaturalActs/13e8878a-f06a-4ec6-8e52-5c1751cbbbd1

with LSID urn:lsid:zoobank.org:act:13E8878A-F06A-4EC6-8E52-5C1751CBBBD1

and listed in numerous indexes such as the "Global Names Index" at:

http://resolver.globalnames.org/name_resolvers/wktzdml2ypy4

This meant that from time of publication in 2015, the relevant taxonomic entities and their correct ICZN names were well-known globally.

In line with the Kaiser *et al.* (2013) manifesto of making false claims and then forcibly ignoring the works of persons they deem outside their group, Melville went onto Facebook at end 2015 to voice her disapproval of my paper as did others in their group.

Her stated disapproval of the paper is not at issue here, after all she is legally allowed to refuse to accept the taxonomy within the paper, but it did show she had read it (or at least claimed to have) as far back as 2015 and so could not have ignored it and pretend she didn't know about it at some later date.

In 2018, Jane Melville, an employee at the National Museum of Victoria, Australia, published an alleged review of some Australian agamids in the in-house online journal "*Memoirs of Museum Victoria*".

The basis of the online paper was to rename a genus and species previously named by Hoser (2015g).

These were genus *Tropicagama* Melville *et al.* 2018 being an objective junior synonym of *Melvillesaurea* Hoser, 2015 and the species *Lophognathus horneri* Melville *et al.* 2018 being a junior subjective synonym of *Lophognathus wellingtoni* Hoser, 2015.

Grammatophora temporalis Günther, 1867 is the type species of *Melvillesaurea* Hoser, 2015 as well as for *Tropicagama* Melville *et al.* 2018.

The holotype for *Lophognathus wellingtoni* Hoser, 2015 was specimen number D73809 at the National Museum of Victoria, Australia listed in Melville's paper as a specimen of her own *Lophognathus horneri*, her designated holotype being collected immediately proximal to the Hoser one.

Of course the unnecessary creation of junior synonyms in breach of the rules of the *International Code of Zoological Nomenclature* is the sort of thing no self-respecting scientist would do, let alone one who works at a taxpayer funded government-owned State Museum, being the National Museum of Victoria at Melbourne, Australia.

Just so there is no doubt as to the exact publication we are talking about here, it's full citation is:

Melville, J., Ritchie, E. G., Chapple, N. J., Glor, R. E. and Schulte, J. A. 2018. Diversity in Australia's tropical savannas: An integrative taxonomic revision of agamid lizards from the genera *Amphibolurus* and *Lophognathus* (Lacertilia: Agamidae). *Memoirs of Museum Victoria* 77:41-61.

Significantly, besides a complete absence of reference to any work of Hoser (2015g), the above paper, cited herein as Melville *et al.* (2018) also did not cite Kaiser *et al.* (2013), which has been used by that group and like-minded name thieves as a justification for acts of name authority theft and illegal creation of synonyms in breach of the *International Code of Zoological Nomenclature.*

Being aware of Melville's earlier statements about Hoser (2015g) on Facebook, it seemed near impossible that Melville could have inadvertently overlooked that 2015 paper.

However near certainty is not absolute certainty and so I decided to give Melville the benefit of any doubt and sent her an email outlining my earlier paper and her need to renounce her illegally coined names as soon as possible to avoid instability of names.

An email was sent to Melville on 30 November 2018 (Hoser 2018) and it was apparently ignored and so it was re-sent a number of times.

Phone messages were left on her phone and she chose not to reply.

After it became abundantly clear that she had no intention of speaking with me or retracting her illegally coined names, I wrote a letter on 18 Feb 2019 to the editor of the same in-house journal, Richard Marchant, (Hoser 2019), similarly seeking retraction of the names or at least some kind of publication pointing out the correct senior synonyms.

Marchant, the editor of the journal replied on 19 Feb 2019, with an email stating that they were relying on Kaiser *et al.* (2013) as a basis to illegally over-write the Hoser (2015g) names (Marchant 2019).

Marchant went further and said he would ignore any further correspondence from me on the matter, meaning that as far as they were concerned, the case was 'closed".

The exact text of the Marchant email follows:

"RE: Taxonomic vandalism in Memoirs of Museum Victoria - Please correct this with urgency - see email below.

Richard Marchant <rmarch@museum.vic.gov.au>

Tue 19/02/2019 2:41 PM

To: Raymond Hoser - The Snakeman

Dear Mr Hoser,

Dr Melville relied on advice from the Australian Society of Herpetologists when she published her recent paper in the Memoirs of Museum Victoria (vol 77, pages 41-61, (2018)): "the Society strongly recommends that the documents distributed under the banners *Australian Biodiversity Record* and *Australasian Journal of Herpetology* not be regarded as publications for the purposes of nomenclature, and the Society recommends that any names or nomenclatural acts proposed in those documents not be regarded as available."

It is clear to me that her decision was eminently sensible.

Please do not email me further on this matter as I will not reply.
Richard Marchant
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Besides the fact that the renaming of taxa is a direct breach of the *International Code of Zoological Nomenclature*, Melville and it appears the journal editor, Richard Marchant who masquerades as an entomologist also knowingly engaged in the highly illegal and potentially criminal act of Copyright infringement, which no Kaiser *et al.* (2013) edict can ostensibly over-rule!

In fact there is little doubt that Melville did breach copyright in both her formal descriptions, which she than had the audacity to fraudulently market to the world as her original research.

Her claims or inferences in this regard were outright lies.

The description of her species *Lophognathus horneri* was in materially significant ways a direct rip-off of the description of *Lophognathus wellingtoni* in Hoser (2015g), which I have already noted was not cited in any way in her paper.

Significantly Hoser (2015g) was the first publication anywhere that had identified and detailed the morphology separating the relevant species (*L. wellingtoni*) from nearest congeners.

For the record, Hoser (2015g) in the diagnosis for the newly named species wrote:

"*Lophognathus wellingtoni sp. nov.* is readily separated from *Lophognathus gilberti* Gray, 1842 by the presence of a thick creamish-white bar that runs on both the upper and lower jawline, versus mainly on the upper side in *L. gilberti*. In *L. wellingtoni sp. nov*. the upper margin of this white line is effectively straight whereas in *L. gilberti* there is a strong uptick in the region of the eye (usually a fraction behind the lowest point), meaning there is no straight line appearance at the upper margin of the bar.

In *L. wellingtoni sp. nov.* the dark region between the eye and the ear is bounded at the top by a well defined line. This is not the case in *L. gilberti*, where the colour merely merges into that at the top of the head."

In turn Melville *et al.* (2018) paraphrased this stating pretty much exactly the same thing when it seems she essentially lifted the Hoser description and re-arranged the words when she wrote:

"*Diagnosis.* A member of the Australian genus *Lophognathus* Gray, 1842, characterised by broad white stripe on the upper and lower lips, extending along the full extent of the jaw, a pale stripe from behind the eye to the top of the ear, which is cream, white, grey or yellow in life. This pale stripe is well defined ventrally and dorsally by a row of darkly pigmented scales (fig. 6). It is a large robust dragon with long head and well-built moderately long limbs. It has heterogenous scales on the back, both at the midline and dorsolaterally, associated with a weak to prominent row of enlarged strongly keeled scales. *Lophognathus horneri* is distinguished from *Lophognathus gilberti* by the presence of a distinct white spot on the tympanum (fig. 7). This well-defined white spot is wholly surrounded or bordered dorsally and to the anterior by an area of black pigmentation that is positioned on the upper posterior quarter of the tympanum. This area of black pigmentation also runs along a raised ridge that extends from the outer dorsoposterior edge of the tympanum towards its centre (fig. 9)."

In terms of the renaming of the genus *Melvillesaurea*, Melville not only ripped off the description from Hoser (2015g), but went further by ripping off the relevant species description from Cogger (2014) which she also failed to cite or acknowledge anywhere in her paper.

Hoser (2015g) wrote:

"Diagnosis: *Melvillesaurea gen. nov.* is separated from all similar genera (e.g. *Gowidon* Wells and Wellington, 1984 and *Lophognathus* Gray, 1842), by the following suite of characters:

The nostril is nearer the snout than the eye (versus equidistant in *Gowidon*), the light labial stripe includes supralabials and several scale rows above them (the labial stripe does not include supralabials and several scale rows above them in *Gowidon*), the posterior margin of the ear does not have a small white spot (versus a small white spot on the black posterior margin of the ear in *Gowidon*).

***Gowidon* and *Melvillesaurea gen. nov.* are both separated from the morphologically similar genus *Lophognathus* by the fact that the keels of dorsal scales form ridges running obliquely to the vertebral scale row, versus running parallel in *Lophognathus*.**

A key to separate these and other recognized Australian agamid genera is in Cogger (2014), pages 692-693."

Significantly and ethically, Hoser (2015g) cited Cogger's work, down to the page numbers, even though Hoser (2015g) had clearly come to the same findings by independent means. Hoser (2015g) also gave full credit and citation to Cogger (2014) at the end of the paper in the usual scientific way.

Melville *et al.* (2018) in what appears to be a most serious breach of copyright in terms of both Hoser (2015g) and Cogger (2014) wrote:

"*Diagnosis.* A monotypic genus consisting of a large agamid lizard in the subfamily Amphibolurinae, with exposed tympanum, gular scales smooth to weakly keeled, ventral scales smooth to weakly keeled. Very long-limbed, prominent erectable nuchal crest. Long tail and head relatively narrow for length. Dorsal scales uniform, with keels converging posteriorly toward midline. Prominent pale dorsolateral stripes that are broadly continuous with wide pale stripe along upper and lower jaw. Lacks well-defined pale stripe between eye and ear. Upper portion of head usually dark grey or black and uniformly coloured. Under the head, on the chin, gular and neck areas, there is dark grey or black uniform pigmentation in adult males, with two narrow white stripes extending from the back of the jaw anteriorly under the chin, parallel to the jaw, ending approximately half way along the jaw. Femoral pores 1-6; preanal pores 2 (range 1-3)."

Neither Hoser (2015g) or Cogger (2014), from where her diagnostic information was effectively lifted, were cited in any way by Melville *et al.* (2018), even though her work was clearly derived from the earlier publications.

Melville and her publisher have in effect been guilty of fraud, scientific fraud, plagiarisation, taxonomic vandalism, misleading and deceptive conduct, breaching the *International Code of Zoological Nomenclature* which supposedly binds all taxonomists and also almost certainly engaged in significant copyright infringement making her and her employer liable for damages.

The evil and dishonest taxonomic vandalism practiced by the Kaiser *et al.* gang of thieves, including by Jane Melville *et al.* (Melville *et al.* 2018 and 2019) with respect to the Australian agamidae needs to be stopped immediately as dealing with their unwanted dual nomenclature has several devastating and diversionary side effects that will hasten demise of relevant species and if unchecked potentially lead to extinctions.

As already stated, scientists have to waste time synonymising the illegally coined names of Melville and others before other people in the herpetology and wildlife conservation space get confused as to which species is which. Time wasted dealing with those who illegally rename species in breach of the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999) would be better spent on the conservation needs of the relevant taxa instead.

Significantly, competent taxonomists who have their name improperly blackened by Kaiser *et al.* and their false claims of being unscientific and the like will leave the field and this is detrimental to conservation as a whole. No species can be conserved unless it is formally named according to the rules of the *International Code of Zoological Nomenclature* and as of 2019 there remain dozens of reptile species in Australia awaiting formal recognition. This is principally due to the lack of competent taxonomists working on Australian reptiles caused by a reluctance of young scientists entering a field where they are likely to suffer such fates as character assassination and theft of works.

As inferred already, the acute shortage of reptile taxonomists in Australia was in large part caused by the improper attacks on Wells and Wellington (1984, 1985), still ongoing and also including the taxonomic works of myself (Raymond Hoser) from 1998 to present, which in turn significantly discouraged and continues to discourage many potentially great scientists from entering the field of reptile taxonomy. This was and is, due to a well-grounded fear that they will be subjected to improper character assassination, including on specially created "Wikipedia" hate pages, that their works would be improperly lampooned or suppressed, or as an equally evil twin part of the Kaiser *et al.* (2013) manifesto, the results of many years hard work would be stolen and rebadged as a "new discovery" by a thief who is part of the same group of "non-scientists", exactly as done by Melville *et al.* (2018).

Personal suffering of people is one thing, but the reptile extinctions caused by the activities of Shine *et al.* (Anonymous 1987), Kaiser *et al.* (2013), better known as Wüster *et al.* including their followers like Melville *et al.* (2018 and 2019) is exactly why these people need to be outed for what they are; thieves and rogues. This should be done before yet more species are driven to a wholly avoidable extinction.

END NOTE – THE NEXT AGAMID EXTINCTION IN VICTORIA? *RANKINIA JAMESWHYBROWI* HOSER, 2015.

Rankinia jameswhybrowi was formally identified as a new species of Mountain Dragon by Hoser (2015g). It has a 7.8% mitochondrial DNA divergence from its nearest relative, *Rankinia hoserae* Hoser, 2015 found just 110 km to the east, and generally occurring to the north, west and east of *Rankinia jameswhybrowi.* This means the two species diverged some 4 MYA, meaning that the identity and existence of each taxon as full and unique species is not possibly in any doubt.

Rankinia jameswhybrowi is known only from the Big River State Forest of Victoria, an area subject to numerous threats including logging by the anti-conservation Victorian State Government and entities they control as well as uncontrolled bushfires, such as the Sandstone Road blaze that destroyed several hundred hectares of important habitat in early 2019.

There are other unaccounted for potential risks such as feral cats, foxes, habitat degradation by deer plagues as well as potentially introduced pathogens.

In line with Shine *et al.* (1987) and the more recent incarnation of Kaiser *et al.* (2013), Jane Melville, Peter Robertson, Ron Waters and other important players at the Victorian State Government in terms of regulating and controlling reptiles have recklessly pretended for four years to 2019 that *Rankinia jameswhybrowi* Hoser, 2015 does not even exist!

None have initiated any significant actions to conserve the species in any way for reasons that will be apparent in the account that follows.

Using Kaiser *et al.* (2013), Melville *et al.* (2019) at fig 2, pretended that all *Rankinia* consist a single species (i.e. *R. diemensis* Gray, 1841), even though Hoser (2015g) readily separated six named species on the basis of both mitochondrial and nuclear DNA divergences and morphological differences.

Peter Robertson a loyal employee of the Victorian State Wildlife department, known currently (in 2019) as Department of Land, Environment, Water and Planning (DELWP) and long time business adversary of myself (Raymond Hoser), through their rival business "Zoos Victoria" has since 2015 scandalously pretended all Victorian Mountain Dragons (*Rankinia* Wells and Wellington, 1985) were of the oldest named species, *R. diemensis* (Gray, 1841).

This is even though molecular data their own State Government employee, Jane Melville obtained, shows a 4 million year separation between the two taxa.

Similar applies to another employee (now former) but still key advisor to DELWP, Ron Waters, who has also publicly adopted the Kaiser *et al.* (2013) doctrine, including at the Victorian Civil and Administrative Tribunal (VCAT) in 2015 to refuse to accept the existence of any taxa formally named by Raymond Hoser.

Waters was chastised by the VCAT judge for his unscientific attitude and to make things worse, in his important management role at "Parks Victoria", Ron Waters has significant management control of much of the area this species is found.

Since 2015 and in spite of being lampooned by the VCAT Judge, Ron Waters continues to post in support of Kaiser *et al.* on social media such as Facebook.

As a result of the preceding and in spite of being in possession of Hoser (2015g) since 2015, the DELWP and associated State Government entities have steadfastly pretended that *Rankinia jameswhybrowi* Hoser, 2015 does not exist.

Therefore the State Government mega-department empowered to regulate and protect wildlife and all that comes with it, such as protection of habitat has not done a single thing to protect this potentially endangered species.

As to how endangered the species is, one need look no further than early 2019, when an uncontrolled bushfire ripped through hundreds of hectares of the Sandstone Road area of the Big River State Forest, potentially wiping out a significant number of *R. jameswhybrowi* (Vic Emergency 2019).

However this is nothing compared to the ongoing threat of logging throughout the entire known range of this species (Carey, 2019), with this going on under the direct watch of the persons already named, all with the power to potentially stop the extinction of this relatively uncommon species.

Hence, the long term prognosis for the *R. jameswhybrowi* is simply not good.

In their 2019 book "*Reptiles of Victoria*", Peter Robertson and John Coventry, again ran the Kaiser *et al.* (2013) line and at pages 213 to 2015 defied all reason to pretend that all Victorian Mountain Dragons were of the species *R. diemensis*, (Gray 1841).

The authors did mental, taxonomic and nomenclatural gymnastics throughout the book to ensure that the name "Hoser" was not seen in any part of the book as part of their ongoing campaign against myself and to attack our successful wildlife conservation and education business that they see as a competitor against their own dysfunctional "zoos Victoria" business. This was even though it was clear that in many parts of the very same book, the works of Hoser were being relied upon and yet they made a point of no citations of "Hoser" in the references section of the book.

For the record the species. *R. diemensis* is confined to Tasmania and immediately offshore islands and does not occur in Victoria, making the account of the "species" in Victoria in their book bordering on the farcical and not unlike a "Monty Python" act.

In other words, the State Government of Victoria and their employed scientists (or perhaps in this case pseudo-scientists) have not learnt a positive thing from their deliberately orchestrated extinction of *Tympanocryptis pinguicolla* in the period from 1985 to 2019.

As of 2019, *Rankinia jameswhybrowi* Hoser, 2015 is under extinction threat from a state Wildlife Department that pig-headedly refuses to accept its existence, simply because a person they deem as not one of them, had the fortitude to discover it and name it, coupled with the fact that the same State Government is now aggressively logging and destroying the last known habitat where it occurs.

By the time the State Government accepts the scientific reality of the existence of *Rankinia jameswhybrowi* Hoser, 2015 it will possibly be extinct.

DELWP and "Zoos Victoria" will have done nothing to fight extinction in this case, while using their so-called "wildlife protection laws" to aggressively stop anyone else from lending a hand in any way to save the species or even do field research on it.

As always no one will be held to account.

Now the environmental catastrophe of the extinction of *Rankinia jameswhybrowi* Hoser, 2015 may well be minor compared to the same refusal by the Victorian and other governments to accept scientific reality of the perils of their ongoing drive for human overpopulation and potential climate change their activities may bring.

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CONFLICT OF INTEREST

In terms of this paper there are none.

From Facebook
Richard Wells
May 26 at 4:24 PM ·

A recent taxonomic revision of Tympanocryptis lineata by Melville et al (published just a few days ago), requires a comment or two. Now I have read this paper fairly carefully and it does contain some useful data and I will discuss this further in a moment. But as is so often happening in taxonomy these days new descriptions of species are being published using supposedly state of the art techniques in genetics, biological scanning and advanced statistical mathematics that make a paper describing new species almost incomprehensible to even the most experienced herpetologist let alone the layperson. But I think there is a very big problem that is very much the elephant in the room and no one dares to mention for fear they will be labelled as a lesser being in the rarefied world of the taxonomist. And this is simply the fact that such advanced (and advancing) techniques have been largely developed for medical research and there are serious protocols and caveats on applying and interpreting the significance of the results using such techniques. Unfortunately, I have observed that a number of recent papers naming new species of reptiles in Australia and elsewhere in recent years (and the trend is increasing) appear to use such techniques in a fairly cavalier way when compared with the controls applying in medical research. Although I am only the son of a shearer, I have also worked in medical research (histopathology) and I often wonder what a competent medical researcher familiar with such methodology must think of such papers where the techniques used and the results derived may be so easily misinterpreted or even abused. Anyway, to me the current offering from Melville's stable appears to be just another example of the potential misuse of such high-powered scientific methodology that can easily end up producing low-grade outcomes in my opinion. But before I get into how they went about their work in describing these new species of lizard, let's look at the very beginning of their paper.

On starting to read the paper, I immediately raised an eyebrow when I was confronted with a scientific paper that starts off like an internet rave on the blogosphere. They outlined a strong focus on conservation, research and extinction-risk, posturing about how good they were at doing taxonomy as well as other peripheral opinions but this sort of dribble would have been better dealt with elsewhere in the paper or better still in another article altogether such as in a magazine like Readers Digest. There is an overtone of extinction panic in the paper – which coincidentally is quite topical nowadays – that as expected has already been picked up by the popular press globally where the paper's assertion that one of more of these species may be facing extinction or have already reached this position [https://www.theguardian.com/…/elusive-and-cryptic-lizard-hu…] – The British press has trumpeted that Australia may have already achieved its first extinction of a mainland reptile (quoting Melville et al) – rapidly following on from the recently publicised loss of species of lizards from Christmas Island. And so the crisis grows.

This kind of popular-press powered taxonomy just stacks another card on the card-house of classification in my view for although it might appear smart to whip the public into a frenzy of concern to justify your taxonomic games it can easily blow up in your face if you are wrong about the survival status of the species concerned. To reinforce their conservation views, the authors have even gone to the extent of idiotically restricting the precise localities from their descriptions of the new species so as to supposedly protect the species from any risks to its conservation – when destruction of the species' habitat (which is fully described) has always been the primary driver in their presumed demise! In any case any moron that is capable of doing a Google Search on the Internet can have a full list of all known specimens of these species and the precise localities to the square metre thanks to GPS-based surveys and a plethora of other detailed scientific papers, as well as numerous Government and Private reports that are also on the Internet for any and all to see if required. The author's noting of the perilous survival status of the species is fair enough, but it just gets a bit overdone to such an extent that the paper starts to read like a Grant Application rather than a taxonomic paper.

Yes, it may be sound to point out where future ecological or taxonomic work may be required, the recommendations and concerns expressed just add to an undercurrent of self-interest that permeates the paper from start to finish. Rightly or wrongly, one is left with the creeping suspicion that the authors appear more concerned about ensuring that the Grant Gravy Train keeps rolling for those in the driver's seat for research on the Grassland Earless Dragons than for the actual classification of the species – relegating the eventual naming of the species to virtually an afterthought of the paper! This is a problem to me because concerns about the survival status of species (that have never been adequately surveyed any way) as a justification for their classification can run the real risk of being hand-on-the-heart intentions, turning into foot-in-the-mouth outcomes, as it is a potentially flawed proposition to justify taxonomic actions. Many have made this mistake in the past, including myself, and I cannot over-emphasize how important it is to stay focused on the primary objective of classifying rather than preaching.

So, this paper was hard work from the outset when it should have been a no-brainer. I just wanted to know what new species had been described and I soon found myself hacking my way through a word jungle where I had to crow-bar every truth out of the depths of opinion. As I kept reading, my eyebrows kept rising higher and higher until I felt that I must have been starting to look like a monkey to my wife - who was herself starting to show similar levels of eyebrow raising over my occasional gasps of disbelief. However, as is so often the case with such papers, just as you are about to throw the offending item onto an ever growing pile of crap that may someday provide insulation for your home to offset the effects of climate change, the inconsistencies start to show themselves like distant flashes of light from a star blowing up in deep space.

For instance, as hard as it is to excuse the various self-serving platitudes and the other polemic a paper may contain, it is impossible to take hypocritical abuse masquerading as informed comment without at the very least a bit more eyebrow raising. A perfect example of this appears in Melville's paper where she waxes lyrically about how 'good' taxonomy by professionals (them) is essential for conservation policy and how 'bad' taxonomy by in effect those naughty amateur taxonomists can potentially cause species to become extinct! Mmmm…This made me instantly recall Shakespeare's Hamlet "The lady doth protest too much, methinks" as the paper was starting to emit an odour of insincerity about it at this point and the smell was getting stronger the more I read. As this appeared to me to be little more than a back-handed swipe that embedded yours truly in the latter group, I decided to look even closer at the paper's content and sure enough there it was in the content of their Supplementary Material where obvious reference to Wells and Wellington's earlier work on the Grassland Earless Dragon of over 30 years ago appears (when she was a student in primary school by the way). I mean to say, nothing personal here madam, but your concern for bad taxonomy and extinction risk is a bit rich, given that you are part of an institution (Museum Victoria) that not only operates as a scientific cemetery for millions of native animals that have been collected from nature without barely a thought for the environmental consequences of such collecting. It is also part of an Institutional structure that has long provided a refuge for under-performing and unproductive taxonomic outputs as collections grew to those millions of specimens, but species remained undescribed or largely unstudied even as they were going down the gurgler towards extinction. I mean it is breath-taking hypocrisy even on the surface, for a museum-employed author in Australia to now have concerns for conservation so as to justify her research while at the same time bagging those who did have such concerns and were ignored. So please forgive me for thinking that this might seem a bit ingenuous to even a homeless person living in the gutter – let alone to someone who actually knows what really goes on in zoological research.

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