Australasian Journal of Herpetology **39:23-52.**
Published 12 June 2019.

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

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.

LSID urn:lsid:zoobank.org:pub:C00F4C27-CF70-4549-BBAF-0D101D622709

RAYMOND T. HOSER

488 Park Road, Park Orchards, Victoria, 3134, Australia.
***Phone*: +61 3 9812 3322 *Fax*: 9812 3355 *E-mail*: snakeman (at) snakeman.com.au**
Received 30 May 2019, Accepted 6 June 2019, Published 12 June 2019.

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.

REFERENCES CITED

Ackermann, T. 2006. Nutzung eines Wintergartens als Terrarienstandort für ein Wüstenterrarium. Teil 2: *Tympanocryptis tetraporophora*. *Reptilia* (Münster) 11(60):62-67.

Ackermann, T. and Fritz, P. 2006. Australische Taubagamen *Tympanocryptis tetraporophora*. *Iguana Rundschreiben* 19(1):17-28.

Anonymous 1987. Case 2531. Three works by Richard W. Wells and C. Ross Wellington: proposed suppression for nomenclatural purposes. (allegedly written by the "President of the Australian Society of Herpetologists", who at the time was Richard Shine, then at University of Sydney, where he remained as of 2019), *Bulletin of Zoological Nomenclature* 44(2):116-121.

Anonymous 2001. Toads Threaten Crocs. *Herald-Sun* (Melbourne, Australia), November 9.

Anstis, M. 2002. *Tadpoles of South-eastern Australia*. Reed New Holland Publishers, Frenchs Forest, NSW, Australia:281 pp.

Aplin, K. 1999. Amateur Taxonomy in Australian Herpetology: Help or Hindrance? *Monitor: Journal of the Victorian Herpetological Society* 10(2/3):104-109.

Barker, D. G. and Barker, T. M. 1994. *Pythons of the World, Volume 1, Australia.* Advanced

Vivarium Systems Inc., California, USA:189 pp.

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

Banks, C. B., Robertson, P., Magrath, M. J. L. and Harley, D. 2017. Searching for the Grassland Earless Dragon '*Tympanocryptis pinguicolla*' in Western Victoria. *Victorian Naturalist* 134(6):187-198.

Beck, M. 2011a. Brutality claims fuelled by graphic video footage. *Sydney Morning Herald*, 14 December, online at: https://www.smh.com.au/national/brutality-claims-fuelled-by-graphic-video-footage-20111214-1ov0s.html (downloaded 1 May 2019)

Beck, M. 2011b. Victim of police bashing may sue. *The Age*, December 16, online at:
https://www.theage.com.au/national/victoria/victim-of-police-bashing-may-sue-20111215-1owwe.html
(downloaded 1 May 2019).

Beck, M. 2012. Officer sacked over on-camera assault. *The Age*, April 19, online at: https://www.theage.com.au/national/victoria/officer-sacked-over-on-camera-assaults-20120418-1x7jy.html (downloaded 1 May 2019).

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

Brown, D. 2014. *A guide to Australian Lizards in Captivity*. ABK Reptile Publications, Tweed Heads, NSW, Australia:948 pp.

Buttler, M. and Dowsley, A. 2011. Police busted bashing hoon driver in Mansfield. *Herald-Sun*, 15 December, online at: https://www.heraldsun.com.au/archive/news/police-busted-bashing-hoon-driver-in-mansfield/news-story/665c0d618265e7dd3ef68e8440a1bf87 (downloaded on 1 May 2019)

Cogger, H. G. 1975. *Reptiles and Amphibians of Australia*, Reed Publishing, Sydney, NSW, Australia:584 pp.

Cogger, H. G. 1983. *Reptiles and Amphibians of Australia* (Revised Edition). Reed Books, Sydney, NSW, Australia. 660 pp.

Cogger, H. G. 1992. *Reptiles and Amphibians of Australia*, Revised Edition, Reed Publishing, Sydney, NSW, Australia:775 pp.

Cogger, H. G. 1996. *Reptiles and Amphibians of Australia*, Revised Edition, Reed Publishing, Sydney, NSW, Australia.

Cogger, H. G. 2013. Email to Raymond Hoser, 17 August 2013.

Cogger, H. G. 2014. Reptiles and Amphibians of Australia, 7th ed. CSIRO Publishing, xxx + 1033 pp.

Cogger, H. G., Cameron, E. E. and Cogger, H. M. 1983. *Zoological Catalogue of Australia, Volume 1: Amphibia and Reptilia*. Australian Government Publishing Service, Canberra.

Court of Appeal Victoria 2014. Hoser v Department of Sustainability and Environment [2014] VSCA 206 (5 September 2014).

Coventry, A. J. 1970. Reptile and amphibian type specimens housed in the National Museum of Victoria. *Mem. Natl. Mus. Vic.* 31:115-124.

Cox, L. 2019. 'Egg boy' Will Connolly donates $100,000 to Christchurch mosque attack survivors. *The Guardian*, 29 May, online at: https://www.theguardian.com/australia-news/2019/may/29/egg-boy-will-connolly-donates-100000-to-christchurch-mosque-attack-survivors (downloaded on 29 May 2019).

Doughty, P., Kealley, L., Shoo, L. P. and Melville, J. 2015. Revision of the Western Australian pebble-mimic dragon species-group (*Tympanocryptis cephalus*: Reptilia: Agamidae). *Zootaxa* (online):4039 (1):85-117.

Dubois, A. 2014. Email to Raymond Hoser, 14 May.

Dubois, A., Bour, R., Brygoo, E. and Lescure, J. 1988. Comments on the proposed suppression for nomenclature of three works by R. W. Wells and C. R. Wellington (Case 2531: see BZN 44: 116-121; 257-261 and 45: 52-54). *Bulletin of Zoological Nomenclature* 45(2):146-149.

Eipper, S. 2013. Post on Facebook, 16 December 2013.

Engstrom, T. N., Bradley Shaffer, H. and McCord, W. P. 2002. Phylogenetic Diversity of Endangered and Critically Endangered Southeast Asian Softshell Turtles (Trionychidae: *Chitra*). *Biological Conservation* 104(2):173-179.

Freynik, C. and Drewes, O. 2011. *Die Bartagame, Zwergbartagame & Australische Taubagame.* Vivaria-Verlag, Meckenheim:80 pp.

Fritz, P. and Ackermann, T. 2012. *Die Australische Taubagame,* Tympanocryptis tetraporophora. Natur und Tier Verlag:64 pp.

Goodman, R. 2019. Snake snatcher cops hefty fine for taking the python. *The Age*, 21 March, online at:
https://www.theage.com.au/national/victoria/snake-snatcher-cops-hefty-fine-for-taking-the-python-20190321-p51696.html
(downloaded 1 May 2019)

Greenbaum, E. 2000. Herpetofaunal observations in disparate habitats in south Australia, New South Wales, and Queensland, Australia. *Herpetological Bulletin* (72):6-16.

Greer, A. E. and Smith, S. 1999. Aspects of the morphology and reproductive biology of the Australian earless dragon lizard *Tympanocryptis tetraporophora. Australian Zoologist* 31(1):1-16.

Günther, A. 1867. Additions to the knowledge of Australian reptiles and fishes. *Ann. Mag. nat. Hist.* (3)20:45-57.

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

Hoser, R. T. 1989. *Australian Reptiles and Frogs*. Pierson and Co., Mosman, NSW, 2088:238 pp.

Hoser, R. T. 1991. *Endangered Animals of Australia*. Pierson Publishing, Mosman, NSW, Australia:240 pp.

Hoser, R. T. 1993. *Smuggled: The Underground Trade in Australia's Wildlife*. Apollo Publishing, Moss Vale, NSW, Australia:160 pp.

Hoser, R. T. 1994. *The Hoser Files; The fight against entrenched official corruption*. Kotabi Publishing Doncaster, Victoria, 3108, Australia:324 pp,

Hoser, R. T. 1996. *Smuggled-2: Wildlife Trafficking, Crime and Corruption in Australia*. Kotabi Publishing. Doncaster, Victoria, Australia:280 pp.

Hoser, R. T. 1998. Death adders (genus *Acanthophis*): an overview, including descriptions of five new species and one subspecies. *Monitor* 9(2): Cover, 20-30, 33-41.

Hoser, R. T. 1999a. *Victoria Police Corruption: The book the Victoria Police don't want you to read!* Kotabi Publishing, Doncaster, Victoria, 3108, Australia:736 pp.

Hoser, R. T. 1999b. *Victoria Police Corruption - 2: Including what the media didn't tell you!* Kotabi Publishing, Doncaster, Victoria, 3108, Australia:800 pp.

Hoser, R. T. 2000a. A revision of the Australasian Pythons. *Ophidia Review* 1:7-27.

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

Hoser, R. T. 2001. A current assessment of the status of the snakes of the genera *Cannia* and *Pailsus*, including descriptions of three new subspecies from the Northern Territory and Western Australia, Australia. *Boydii - Journal of the Herpetological Society of Queensland Incorporated*, July 2001:26-60.

Hoser, R. T. 2007. Wells and Wellington - It's time to bury the hatchet. *Calodema* Supplementary Paper 1:1-9.

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

Hoser, R. T. 2010. Sam the scam: Sam the Koala is an imposter. *Australasian Journal of Herpetology*, 8:1-64.

Hoser, R. T. 2012a. Exposing a fraud! *Afronaja* Wallach, Wüster and Broadley 2009, is a junior synonym of *Spracklandus* Hoser 2009! *Australasian Journal of Herpetology* 9 (3 April 2012):1-64.

Hoser, R. T. 2012b. Robust taxonomy and nomenclature based on good science escapes harsh fact-based criticism, but remains unable to escape an attack of lies and deception. *Australasian Journal of Herpetology* 14:37-64.

Hoser, R. T. 2013a. The science of herpetology is built on evidence, ethics, quality publications and strict compliance with the rules of nomenclature. *Australasian Journal of Herpetology* 18:2-79.

Hoser, R. T. 2013b. Division of the Asian Snake Genera *Liopeltis* Fitzinger, 1843 and *Gongylosoma* Fitzinger, 1843 (Serpentes:Colubridae). *Australasian Journal of Herpetology* 20:33-40.

Hoser, R. T. 2015a. Dealing with the "truth haters" ... a summary! Introduction to Issues 25 and 26 of *Australasian Journal of Herpetology*. Including "A timeline of relevant key publishing and other events relevant to Wolfgang Wüster and his gang of thieves." and a "Synonyms list". *Australasian Journal of Herpetology* 25:3-13.

Hoser, R. T. 2015b. The Wüster gang and their proposed "Taxon Filter": How they are knowingly publishing false information, recklessly engaging in taxonomic vandalism and directly attacking the rules and stability of zoological nomenclature. *Australasian Journal of Herpetology* 25:14-38.

Hoser, R. T. 2015c. Best Practices in herpetology: Hinrich Kaiser's claims are unsubstantiated. *Australasian Journal of Herpetology* 25.

Hoser, R. T, 2015d. Comments on *Spracklandus* Hoser, 2009 (Reptilia, Serpentes, ELAPIDAE): request for confirmation of the availability of the generic name and for the nomenclatural validation of the journal in which it was published (Case 3601; see *BZN* 70: 234-237; comments *BZN* 71:30-38, 133-135). *Australasian Journal of Herpetology* 25:39-52.

Hoser, R. T. 2015e. PRINO (Peer reviewed in name only) journals: When quality control in scientific publications fails. *Australasian Journal of Herpetology* 26:3-64.

Hoser, R. T. 2015f. Rhodin *et al.* 2015, Yet more lies, misrepresentations and falsehoods by a band of thieves intent on stealing credit for the scientific works of others. *Australasian Journal of Herpetology* 27:3-36.

Hoser, R. T. 2015g. Hitherto overlooked species of reptile from Northern Australia: A result of science, taxonomy, molecular biology, systematics, history and forensic herpetology. *Australasian Journal of Herpetology* 30:21-27.

Hoser, R. T. 2015h. Australian agamids: Eighteen new species from the genera *Amphibolurus* Wagler, 1830, *Lophognathus* Gray, 1842, *Rankinia* Wells and Wellington, 1984, *Diporiphora* Gray, 1842, *Tympanocryptis* Peters, 1863, as well as three new genera and six new subgenera. *Australasian Journal of Herpetology* 30:37-64.

Houston, T. F. 1978. *Dragon Lizards and Goannas of South Australia*. South Australian Museum, Adelaide, SA, Australia:84 pp.

Hugall, A. F., Foster, R., Hutchinson, M. and Lee, M. S. Y. 2008. Phylogeny of Australasian agamid lizards based on nuclear and mitochondrial genes: implications for morphological evolution and biogeography. *Biological Journal of the Linnean Society*, 93:343-358.

ICZN 1991. Decision of the commission. Three works by Richard W. Wells and C. Ross Wellington: proposed suppression for nomenclatural purposes. *Bulletin of Zoological Nomenclature* 48(4):337-38.

ICZN 2001. Opinion 1970. *Bulletin of Zoological Nomenclature* 58(1):74-75.

Jenkins, R. and Bartell, R. 1980. *A field guide to reptiles of the Australian high country*. Inkata Press, Melbourne:278 pp.

Kaiser, H. 2012a. SPAM email sent out to numerous recipients on 5 June 2012.

Kaiser, H. 2012b. Point of view. Hate article sent as attachment with SPAM email sent out on 5 June 2012.

Kaiser, H. 2013. The Taxon Filter, a novel mechanism designed to facilitate the relationship between taxonomy and nomenclature, vis-à-vis the utility of the Code's Article 81 (the Commission's plenary power). *Bulletin of Zoological Nomenclature* 70(4) December 2013:293-302.

Kaiser, H. 2014a. Comments on *Spracklandus* Hoser, 2009 (Reptilia, Serpentes, ELAPIDAE): request for confirmation of the availability of the generic name and for the nomenclatural validation of the journal in which it was published. *Bulletin of Zoological Nomenclature*, 71(1):30-35.

Kaiser, H. 2014b. Best Practices in Herpetological Taxonomy: Errata and Addenda. *Herpetological Review*, 45(2):257-268.

Kaiser, H., Crother, B. L., Kelly, C. M. R., Luiselli, L., O'Shea, M., Ota, H., Passos, P., Schleip, W. D. and Wüster, W. 2013. Best practices: In the 21st Century, Taxonomic Decisions in Herpetology are Acceptable Only When supported by a body of Evidence and Published via Peer-Review. *Herpetological Review* 44(1):8-23.

Kinghorn, J. R. 1924. Reptiles and batrachians from south and south-west Australia. *Records of the Australian Museum* 14(3):163-183.

Kwet, A. 2016. Liste der im Jahr 2015 neu beschriebenen Reptilien. *Terraria-Elaphe* 2016(3):56-67.

Loveridge, A. 1934. Australian reptiles in the Museum of Comparative Zoology, Cambridge, Massachusetts. *Bull. Mus. Comp. Zool.* Harvard 77:243-383.

Lucas, A. H. S. and Frost, C. 1895. Preliminary notice of certain new species of lizards from central Australia. *Proceedings of the Royal Society of Victoria*, 7:264-269.

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

Magistrates Court of Victoria 2014. *Department of Sustainability and Environment of Victoria, versus Raymond Hoser.* 21 October 2014.

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

McLean, C. A., Moussalli, A., Sass, S. and Stuart-Fox, D. 2013. Taxonomic assessment of the *Ctenophorus decresii* complex

(Reptilia: Agamidae) reveals a new species of dragon lizard from western New South Wales. *Records of the Australian Museum* 65(3):51-63.

Melville, J. 2018. Conservation genetics of eastern Australian herpetofauna in a rapidly changing landscape: a perspective on conservation management and policy implementation. *Pacific Conservation Biology* 24(3):310-317.

Melville, J., Goebel, S., Starr, C., Scott Keogh, J. and Austin, J. J. 2007. Conservation genetics and species status of an endangered Australian dragon, *Tympanocryptis pinguicolla* (Reptilia: Agamidae). *Conservation Genetics* 8:185-195.

Melville, J., Smith, K., Hobson, R., Hunjan, S. and Shoo, L. 2014. The Role of Integrative Taxonomy in the Conservation Management of Cryptic Species: The Taxonomic Status of Endangered Earless Dragons (Agamidae: *Tympanocryptis*) in the Grasslands of Queensland, Australia. PLoS One (online) 9(7): e101847. doi:10.1371/journal.pone.0101847

Melville, J., Ritchie, E. G., Chapple, S. 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.

Melville, J., Chaplin, K., Hutchinson, M., Sumner, J., Gruber, B., MacDonald, A.J. and Sarre, S. D. 2019. Taxonomy and conservation of grassland earless dragons: new species and an assessment of the first possible extinction of a reptile on mainland Australia. *R. Soc. open sci.* 6:190233. (24 pp. and supplements) http://dx.doi.org/10.1098/rsos.190233

Mertens, R. 1967. Die herpetologische Sektion des Natur-Museums und Forschungs-Institutes Senckenberg in Frankfurt am Main nebst einem Verzeichnis ihrer Typen. *Senckenbergiana Biologica* 48:1-106.

Mirtschin, P. and Davis, R. 1992. *Snakes of Australia, Dangerous and Harmless.* Hill of Content, Melbourne, Australia:216 pp.

Mitchell, F. J. 1948. A revision of the lacertilian genus *Tympanocryptis. Rec. South Austral. Mus.* 9: 57-86.

Müller, H. D. 1998. Die australische Agame *Tympanocryptis tetraporophora* im Terrarium. *Elaphe* 6 (4):2-6.

Mutton, N. 2014a. Private email (via Facebook) to Raymond Hoser. 6.31 AM, 30 May.

Mutton, N. 2014b. Two emails to Raymond Hoser, 9 June.

Naish, D. 2013. Taxonomic vandalism and the Raymond Hoser problem. Online blog at: http://blogs.scientificamerican.com/tetrapod-zoology/2013/06/20/taxonomic-vandalism-and-raymond-hoser/

Ng, J. Clemann, N., Chapple, S. N. J. and Melville, J. 2013. Phylogeographic evidence links the threatened 'Grampians' Mountain Dragon (*Rankinia diemensis* Grampians) with Tasmanian populations: conservation implications in south-eastern Australia. *Conservation Genetics* April 2014, 15(2):363-373. (Published online on 7 Nov 2013).

Osborne, W. S., Kukolic, K., Davis, M. S. and Blackburn, R. 1993. Recent records of the earless dragon *Tympanocryptis lineata pinguicolla* in the Canberra region and a description of its habitat. *Herpetofauna* (Australia) 23(1):16-25.

Patanant, K. C. 2016. DNA sequencing assigns Australian Earless Dragons (*Tympanocryptis*) in European stock to a different species. *Sauria* 38(1):60-62.

Peters, W. C. H. 1863. Eine Übersicht der von Hrn. Richard Schomburgk an das zoologische Museum eingesandten Amphibien, aus Buchsfelde bei Adelaide in Südaustralien. *Monatsber. königl. Akad. Wiss.* Berlin. 1863 (April):228-236.

Pianka, E. R. and Vitt, L. J. 2003. *Lizards: Windows to the Evolution of Diversity*. University of California Press, Berkeley, USA:347 pp.

Pyron, R. A., Burbrink, F. T. and Wiens, J. J. 2013. A phylogeny and revised classification of Squamata, including 4151 species of lizards and snakes. *BMC Evolutionary Biology* 13:93 (53 pages). [doi:10.1186/1471-2148-13-93].

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

Robertson, P. and Coventry, A. J. 2019. *Reptiles of Victoria: A guide to identification and ecology*. CSIRO Publishing, Clayton, Victoria, Australia:322 pages.

Rosauer, D., Byrne, M., Blom, M., Coates, D., Donnellan, S. C., Doughty, P., Keogh, S. J., Kinloch, J., Laver, R. J., Myers, C., Oliver, P. M., Potter, S., Rabosky,D., Afonso Silva, D., Smith, J. and Moritz. C. 2018. Real-world conservation planning for evolutionary diversity in the Kimberley, Australia, sidesteps uncertain taxonomy. *Conservation Letters* e12438 (online), at: https://onlinelibrary.wiley.com/doi/full/10.1111/conl.12438 (downloaded on 28 May 2019)

Scott, I. A. W. and Scott Keogh, J. 2000. Conservation genetics of the endangered grassland earless dragon *Tympanocryptis pinguicolla* (Reptilia: Agamidae) in Southeastern Australia. *Conservation Genetics* 1(4):357-363.

Shea, G. M. 1995. The holotype and additional records of *Pogona henrylawsoni* Wells and

Wellington, 1985. *Memoirs of the Queensland Museum*, 38(2):574.

Shea, G. M. and Sadlier, R. A. 1999. *A catalogue of the non-fossil amphibian and reptile type specimens in the collection of the Australian Museum: types currently, previously and purportedly present.* Technical Reports of the Australian Museum 15, 1999:1-91.

Shea, G. 2013a. Email to Raymond Hoser dated Fri, 8 Mar 2013 04:29:39 +0000.

Shea, G. 2013b. Post on Facebook at: http://www.facebook.com/glenn.shea.73?ref=ts&fref=ts on 8

March at 7.51 AM.

Shea, G. 2013c. Post on Facebook on 20 March at: http://www.facebook.com/glenn.shea.73?ref=ts&fref=ts#!/bryangrieg.fry?fref=ts

Shea, G. 2013d. Post on Facebook on 20 March at: http://www.facebook.com/glenn.shea.73?ref=ts&fref=ts#!/bryangrieg.fry?fref=ts

Shoo, L. P., Rose, R., Doughty, P., Austin, J. J. and Melville, J. 2008. Diversification patterns of pebble-mimic dragons are consistent with historical disruption of important habitat corridors in arid Australia. *Molecular Phylogenetics and Evolution* 48:528-542.

Smith, W. J. S., Osborne, W. S., Donnellan, S. C. and Cooper, P. D. 1999. The systematic status of earless dragon lizards, *Tympanocryptis* (Reptilia: Agamidae), in south-eastern Australia. *Australian Journal of Zoology* 47:551-564.

Sprackland, R., Smith, H. and Strimple, P. 1997. Case 3043, *Varanus teriae* Sprackland, 1991 (Reptilia, Squamata): proposed conservation of the specific name. *Bulletin of Zoological Nomenclature* 54(2):100-102.

Starr, C. R. and Leung, L. K. P. 2006. Habitat Use by the Darling Downs Population of the Grassland Earless Dragon: Implications for Conservation. *Journal of wildlife management* 70(4):897-903.

Sternfeld, R. 1925. Beiträge zur Herpetologie Inner-Australiens. *Abhandlungen Herausgegeben von der Senckenbergischen Naturforschenden Gesellschaft*, 38:221-251.

Storr, G. M. 1964. The agamid lizards of the genus *Tympanocryptis* in Western Australia. *J. R. Soc. West. Aust.* 47:43-50.

Storr, G. M. 1982a. Taxonomic notes on the genus *Tympanocryptis* Peters (Lacertilia: Agamidae). *Records of the Western Australian Museum* 10(1):61-66.

Storr, G. M. 1982b. Revision of the bearded dragons (Lacertilia: Agamidae) of Western Australia with notes on the dismemberment of the genus *Amphibolurus*. *Records of the Western Australian Museum* 10(2):199-214.

Storr, G. M. 1986. Note on *Tympanocryptis lineata macra* (Lacertilia Agamidae). *Records of the Western Australian Museum* 13 (3): 317-322.

Storr, G. M., Smith, L. A. and Johnstone, R. E. 1983. *Lizards of Western Australia 2: Dragons and Monitors.* Western Australian Museum, Perth, Western Australia, Australia:113 pp.

Swan, G., Shea, G. and Sadlier, R. 2004. *A field guide to reptiles of New South Wales*. Reed, New Holland, NSW, Australia:302 pp.

Thomson, S. 2003. Post at: http://forums.kingsnake.com/

view.php?id=279134,292763 dated Dec 29 03:59:46 downloaded on 16 May 2015.
Thorpe, S. 2013. Post to the Taxacom listserver, 21 May.
Thorpe, S. 2014a. Post on Taxacom listserver, 13 April.
Thorpe, S. 2014b. Email to ICZN, 29 April.
Thorpe S. 2014c. Email to Doug Yanega and ICZN listserver, 6 July.
Turner, G. and Valentic, R. 1998. Notes on the occurrence and habits of *Pogona brevis. Herpetofauna* 28 (1):12-18.
Tyler, M. J. 1992. *Encyclopedia of Australian Animals - Frogs*. The National Photographic Index of Australian Wildlife/Angus and Robertson, Pymble, NSW, Australia:124 pp.
Tyler, M. J., Smith, L. A. and Johnstone, R. E. 1994. *Frogs of Western Australia*. Western Australian Museum, Perth, Western Australia, Australia:87 pp.
VCAT 2015. *Hoser v Department of Environment Land Water and Planning* (Review and Regulation) [2015] VCAT 1147 (30 July 2015).
Voloder, D. 2019. Australian teenager Will Connolly, who became an internet sensation for smashing an egg on Fraser Anning's head, has donated $100,000 to help those affected by the terror attacks in Christchurch. *SBS News*, 29 May, online at: https://www.sbs.com.au/news/egg-boy-will-connolly-donates-100-000-to-help-christchurch-mosque-attack-survivors (downloaded on 29 May).
Wellington, C. R. 2013. Post on Facebook, 26 December.
Wellington, C. R. 2014a. Post on Facebook wall of Scott Eipper, 6 April.
Wellington, C. R. 2014b. Email to ICZN listserver and others on 9 July 2014.
Wells, R. W. 2013. Post on Facebook, 18 December.
Wells, R. W. 2014a. Post on Facebook wall of Scott Eipper, 6 April.
Wells, R. W. 2014b. Post on blogger.com, 7 July.
Wells, R. W. and Wellington, C. R. 1984. A synopsis of the class Reptilia in Australia. *Australian Journal of Herpetology* 1(3-4):73-129.
Wells, R. W. and C. R. Wellington. 1985. A classification of the Amphibia and Reptilia of Australia. *Australian Journal of Herpetology Supplementary Series* 1:1-61.
Wells, R. W. and Wellington, C. R. 1999. A response to Ken Aplin's article on Herpetology in Australia. *Monitor:Journal of the Victorian Herpetological Society* 10(2/3):110-112.
Wermuth, H. 1967. Liste der rezenten Amphibien und Reptilien. Agamidae. *Das Tierreich* 86:1-127.
Wilson, S. 2012. *Australian Lizards: A natural history*. CSIRO Publishing, Collingwood, Victoria, Australia: 196 pp.
Wilson, S. K. and Knowles, D. G. 1988. *Australian Reptiles. A photographic reference to the terrestrial reptiles of Australia.* Collins Australia. 447 Pages.
Wilson, S. and Swan, G. 2010. *A complete guide to reptiles of Australia*, 3rd ed. Chatswood: New Holland:558 pp.
Wilson, S. and Swan, G. 2017. *A complete guide to reptiles of Australia*, 5th ed. Chatswood: New Holland:647 pp.
Worrell, E. 1963. *Reptiles of Australia*. Angus and Robertson (Sydney):xv + 207 pp.
Wüster, W., Broadley, D. G. and Wallach, V. 2014. Comments on *Spracklandus* Hoser, 2009 (Reptilia, Serpentes, ELAPIDAE): request for confirmation of the availability of the generic name and for the nomenclatural validation of the journal in which it was published (Case 3601; see *BZN* 70: 234–237). *Bulletin of Zoological Nomenclature* 7(1):37-38.