ISSUE 43, PUBLISHED 25 APRIL 2020

Australasian Journal of Herpetology

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

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Australasian Journal of Herpetology

Issue 43, 25 April 2020.

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Cover Photo: *Limnodynastes alexantenori sp. nov.* from Berwick, Victoria, Australia.

Photo: Raymond Hoser.

Australasian Journal of Herpetology ®

Publishes original research in printed form in relation to reptiles, other fauna and related matters, including classification, ecology, public interest, legal, captivity, "academic misconduct", etc. It is a peer reviewed printed journal published in hard copy for permanent public scientific record in accordance with the *International Code of Zoological Nomenclature* (Ride *et al.* 1999), with sizeable print run and global audience and high impact.

Full details at:

http://www.herp.net

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

Online journals (this issue) do not appear for a month after the actual and listed publication date of the printed journals. Minimum print run of first printings is always at least fifty hard copies.

Australasian Journal of Herpetology 43:3-14.
Published 25 April 2020.

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

Three new species of frog in the genus *Limnodynastes* Fitzinger, 1843 from east Australia, two new *Platyplectron* Peters, 1863 species from east Australia and three new species of *Ranaster* Macleay, 1878 from north Australia.

LSID URN:LSID:ZOOBANK.ORG:PUB:90825970-D876-494E-B4CA-D98F28B62B9D

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Received 12 November 2018, Accepted 9 February 2020, Published 25 April 2020.

ABSTRACT

The Australasian frog genus *Limnodynastes* Fitzinger, 1843 as understood by most herpetologists in year 2020 is formally divided three ways using existing available names for each genus based on previously published phylogenies for the assemblage.

Three new species of frog in the genus *Limnodynastes* Fitzinger, 1843 from east Australia, are formally named for the first time. They are in the *Limnodynastes peronii* (Duméril and Bibron, 1841) species group and herein named *L. alexantenori sp. nov*. and *L. cameronganti sp. nov*., as well as a north Queensland population of the putative species *L. tasmaniensis* herein named *L. shanescarffi sp. nov*..

Two new species of frog in the genus *Platyplectron* Peters, 1863, in a species group currently assigned by most publishing authors into the genus *Limnodynastes* Fitzinger, 1843 from Eastern Australia are formally identified and named for the first time.

One had been confused with the species *Platyplectron terraereginae* (Fry, 1915), better known as "*Limnodynastes terraereginae* Fry, 1915" from far north Queensland and this taxon is formally named *Platyplectron gerrymarantellii sp. nov.*. The second is a population until now treated as *P. dumerilii* (Peters, 1863) from the New England Tableland Region of New South Wales, herein formally named as *Platyplectron timjamesi sp. nov.*.

Two other species also formally named for the first time were until now treated as populations of the species *Ranaster lignarius* (Tyler, Martin and Davis, 1979) *comb. nov.* a taxon originally placed in a monotypic genus *Megistolotis* Tyler, Martin and Davis, 1979, erected at the time the species was formally named. More recently this putative species has been placed in the genus *Limnodynastes*, but the first available name for the relevant species group is in fact *Ranaster* Macleay, 1878.

Those speces are formally named *R. scottyjamesi sp. nov.* and *R. henrywajswelneri sp. nov.*.

The diagnosis of these species is also supported by molecular data as cited within this paper, in particular the work of Schäuble *et al*. (2000).

A third new species of *Ranaster* from eastern Queensland is also formally named *R. snakemansboggensis sp. nov.*

Keywords: Taxonomy; amphibia; nomenclature; Frog; Australia; Queensland; Northern Territory; Arnhem Land, Western Australia; Kimberley Division; New South Wales; Victoria; *Platyplectron*; *Limnodynastes*; *Ranaster*; *peronii*; *tasmaniensis*; *affinis*; *terraereginae*; *dumerilii*; *lignarius*; Alex Antenor; Cameron Gant; Gerry Marantelli; Scotty James; Tim James; Raymond Hoser; Henry Wajswelner; new species; *alexantenori*; *cameronganti; shanescarffi*; *gerrymarantellii*; *timjamesi*; *snakemansboggensis*; *henrywajswelneri*; *scottyjamesi*; new subspecies; *divergens*.

INTRODUCTION

The Australasian frogs of the genus *Limnodynastes* Fitzinger, 1843, as recognized by most publishing herpetologists in year 2020 (*sensu* Cogger 2014) are abundant where they occur and generally well-known to Australian herpetologists.

Molecular studies including that of Roberts and Maxon (1986), Schäuble *et al.* (2000) or more recently Pyron and Wiens (2011) p. 563, support a three-way split of the genus into three well-defined and divergent species groups based on timelines of divergence as seen on page 565 of Roberts and Maxon (1986).
I support this contention and herein resurrect the available names as listed by Cogger *et al.* (1983).
The type group *Limnodynastes* is the species similar to the type species *Cystignathus peronii* Duméril and Bibron, 1841 (now known as *Limnodynastes peronii*).

The species *L. peronii* is also clearly a composite species consisting of at least four distinct forms, with names available for the two northern forms if they are recognized as separate species as done herein. They are *L. peronii* from the Sydney region and nearby parts of New South Wales to north-east Victoria and *L. lineatus* De Vis 1884 generally found along the Queensland coast.

L. kreffti Günther, 1863 is a synonym of *L. peronii.*
The original description of *L. peronii* by Duméril and Bibron in 1841 matches that of the specimen depicted in Hoser (1989) on page 27 (middle photo).
Two morphologically distinct and geographically disjunct species from Victoria are formally named for the first time as *L. alexantenori sp. nov.* from Melbourne and parts east of there including the Latrobe Valley and South Gippsland and *L. cameronganti sp. nov.* from south-west Victoria and immediately adjacent parts of south-east South Australia.

For the so-called *dorsalis* (Gray, 1841) group, including "*L. terraereginae*", *Platyplectron gerrymarantellii sp. nov.* and *Platyplectron timjamesi sp. nov.* first formally named and described within this paper, the name *Platyplectron* (Peters, 1863) is available, with the type species of *L. dumerilii* Peters, 1863. Hence all species from *Limnodynastes* within this species group are herein transferred to the genus *Platyplectron.*

In the event a revising author concludes that *Platyplectron* is in fact a mis-spelling of *Platyplectrum* Günther, 1863, now attributed to a different group of frogs (type species being *P. marmoratum* Günther, 1863), the first available name for the relevant group of frogs would be *Heliorana* Steindachner, 1867. The type species for *Heliorana* is *H. grayi* Steindachner, 1867, being treated by many as a junior synonym of *P. dumerilii* (Peters, 1863), but herein as a separate full species.

In terms of my use of *Platyplectron* herein, I rely on the relevant comments on page 17 of Cogger *et al.* (1983) who also refer to the name as a valid name, in their case confirming the name as being originally identified as *subgen. nov.*.
Based on the phylogeny of Schäuble *et al.* (2000), *P. grayi* from the Sydney region in New South Wales is in fact more closely related to *P. terraereginae* and *P. gerrymarantellii sp. nov.* than *P. dumerilii.*

For the species originally described as *Ranaster convexiusculus* Macleay, 1878, currently widely known as *Limnodynastes convexiusculus* (Macleay, 1878), the originally designated genus name is available for this and closely allied species.

Within the genus *Ranaster*, three new species are formally named for the first time in this paper, being one previously confused with the species originally described as *Limnodynastes salmini* Steindachner, 1867, and two geographically disjunct species, until now treated as populations of the species originally described as *Megistolotis lignarius* Tyler, Martin and Davis, 1979.

If full genus status is not recognized by later authors for these preceding species groups, the relevant and very distinctively different species groups should all be formally recognized at the subgenus level. Placing all in a single genus *Limnodynastes* as seen for example in Cogger (2014) or more recently Eipper and Rowland (2018), without reference to the genus-level groupings within, or even by way of identifying species groups, hides the important groupings and relationships within this assemblage of species.

The relevant species within each species group are separated from one another by the Key in Cogger (2014) at page 46 for all relevant species (not including those formally named herein, which would key as the most similar identified species instead), and notably is excluding those species in the genera *Platyplectrum* Günther, 1863 and *Rotundishius* Hoser, 2016, as defined by Hoser (2016), noting these species have been placed by other authors in the genus *Limnodynastes*, including Cogger *et al.* (1983).

The taxonomy that follows in this paper recognizes the following species groups including the following content of species, which also reflects the molecular results of Roberts and Maxson (1986) and Schäuble *et al.* (2000).

Genus *Limnodynastes* Fitzinger, 1843.
Limnodynastes peronii (Duméril and Bibron, 1841) (type species); *L. affinis* Günther, 1863; *L. alexantenori sp. nov.*; *L. cameronganti sp. nov.*; *L. depressus* Tyler, 1976; *L. fletcheri* Boulenger, 1888; *L. lineatus* De Vis, 1884, *L. shanescarffi sp. nov.* and *L. tasmaniensis* Günther, 1858.

Genus *Platyplectron* (Peters, 1863).
Platyplectron dumerilii (Peters, 1863) (type species); *P. dorsalis* (Gray, 1841); *P. gerrymarantellii sp. nov.*(this paper); *P. grayi* (Steindachner, 1867); *P. insularis* (Parker, 1940); *P. interioris* (Fry, 1913); *P. terraereginae* (Fry, 1915) and *P. timjamesi sp. nov.* (this paper).

Genus *Ranaster* Macleay, 1877.
Ranaster convexiusculus Mackleay, 1877 (type species); *R. henrywajswelneri sp. nov.* (this paper);
R. lignarius (Tyler, Martin and Davis, 1979) (*comb. nov.*) (including subspecies *R. lignarius divergens subsp. nov.*); *R. snakemansboggensis sp. nov.* (this paper); *R. salmini* (Steindachner, 1867) and *R. scottyjamesi sp. nov.* (this paper).

The species *P. interioris* (Fry, 1913) is only tentatively recognized herein on the basis it appears to be morphologically distinct and reproductively isolated from the others, even though it has been shown by Schäuble *et al.* (2000) to be genetically similar to *P. dumerilii.*

MATERIALS, METHODS AND RESULTS

These are inferred in both the abstract and introduction and self evident in the descriptions that follow.

An audit of relevant species in the genus *Limnodynastes* Fitzinger, 1843 *sensu lato* confirmed the preceding generic level assignment of species.

Live specimens of all relevant species (named and until now unnamed) were examined both live in the wild and via museum collections and their records, including all State and Territory Museums on mainland Australia. Furthermore photos and data with accurate locality data was also assessed, as was all relevant previously published scientific literature and the so-called grey literature in the form of popular mass-market books, internet sites, blogs, photo-sharing sites and the like.

The final results of this audit found that the species originally described as *L. peronii* is clearly a composite species consisting of at least four distinct forms worthy of species recognition.

Names are available for the two northern forms if they are recognized as separate species as done herein, these are *L. peronii* from the Sydney region and nearby parts of New South Wales to north-east Victoria and *L. lineatus* De Vis 1884 generally found along the Queensland coast.

L. kreffti Günther, 1863 is a synonym of *L. peronii.*
Two morphologically distinct and geographically disjunct species from Victoria are formally named for the first time as *L. alexantenori sp. nov.* from Melbourne and parts east of there including the Latrobe Valley and South Gippsland, being a belt of generally cooler and wetter terrain to the dry zone barriers to the species north, west and east of where they occur (and are usually replaced by *L. tasmaniensis* Günther, 1858) and *L. cameronganti sp. nov.* from south-west Victoria and immediately adjacent parts of south-east South Australia, which is also constrained in distribution by similar factors (i.e. surrounding dry zones or Bass Strait).

A distinctive north Queensland population of the putative species *L. tasmaniensis* Günther, 1858 is herein formally named *L. shanescarffi sp. nov.*.

The audit found that the current classification of the so-called *dorsalis* (Gray, 1841) group including various species and subspecies to be not in accordance with either morphological or genetic evidence.

Hence an effective rewrite of the taxonomy of that species group herein.

To that extent, some forms of *P. dumerilii* Peters, 1863 treated as subspecies by authors in recent times (e.g. Eipper and Rowland, 2018) have been synonymized with *P. dumerilii* Peters, 1863, while others have been treated as full species. No subspecies are recognized herein for the species *P. dumerilii* and the list for the group is given already in this paper. In summary, *P. insularis* (Parker, 1940) and *P. grayi* (Steindachner, 1867) are recognized as full species, while *P. dumerilii fryi* Martin, 1972 is relegated to synonymy of *P. dumerilii.*

A new species, *Platyplectron timjamesi sp. nov.* is formally described and named, having previously been treated as a New England (New South Wales) population of *P. dumerilii.*

Limnodynastes terraereginae Fry, 1915 is in fact two separate and well-defined species and one was until now not formally identified or named. Molecular evidence of Schäuble *et al.* (2000) supports this contention.

In 1978 when hitch-hiking back to my home in Sydney after a reptile collecting trip at in far north Queensland, I asked the car driver to stop on the side of the road to let me open my bowels to pass a feaces. This was just south of Rockhampton, Queensland.

I jumped a fence and stood at a swamp, or bog, as they are sometimes called and relieved myself, by doing what Australians call “a bog”.

I then lifted a large log half in the water at the water’s edge. The frog I caught was what I then regarded as an unusually coloured *Limnodynastes salmini* Steindachner, 1867, having distinctive yellow-coloured stripes and markings on the upper body, as opposed to the salmon colouration of *L. salmini.* This location became known as the Snakeman’s bog, in reflection of both the bog habitat and the bog (feces) done by myself at the same location.

I was familiar with the species *L. salmini*, having caught large numbers of them at a swamp between Nevertire and Nyngan to the north side of the highway in August 1976.

Investigations over the following 40 years, including a field trip to the relevant area in central eastern Queensland in July and August 2019 confirmed that these so-called *L. salmini* from east-flowing drainage basins in coastal and near-coastal parts of Queensland are in fact a morphologically divergent species separate from the *L. salmini*, found in association with the south-west flowing Darling River system.

A review of relevant literature, including the molecular evidence of Schäuble *et al.* (2000) further corroborated the view that the two relevant forms are sufficiently divergent as to be recognized as different species.

The original description of *L. salmini* by Steindachner in 1867 is clearly of the form from west draining rivers (because he even refers to the red on the frog, not present in eastern specimens), making the eastern form until now an unnamed species.

It is herein formally named *Limnodynastes snakemansbogensis sp. nov.*.

The species originally described as *Megistolotis lignarius* Tyler, Martin and Davis, 1979 is in fact a complex of three species with two until now unnamed.

Molecular evidence of Schäuble *et al.* (2000) also supports this contention.

Anstis (2013) contends that there are two species under the existing putative species label *Ranaster lignarius* (Tyler, Martin and Davis, 1979). She divides the species primarily on the basis of colouration, the nominate form being of a distinctive reddish-orange dorsal base colour and different pattern to the other alleged form with a greyish dorsal base colour.

However the distribution of the three main populations tells a different story.

The nominate form is in the east Kimberley of Western Australia and this wholly divides the other two populations to the west and the east. These are found in suitable escarpment habitat in the West and North Kimberley (one form) and the other superficially morphologically similar form is found in ArnhemLand, Northern Territory.

Whether the ancestors of the extant species diverged, east to west, vice-versa or even from the central population zone doesn’t alter the fact that the likelihood of the outlier populations being more closely related to one another than the central one is almost non-existent.

Furthermore inspection of numerous specimens of the two greyish populations also yields consistent morphological differences that confirm that while superficially similar, they are not conspecific and that at least some of the similarities between them is due to convergence, as opposed to a particularly close relationship.

DISCUSSION OF RESULTS IN MORE DETAIL AND FORMAL DESCRIPTIONS

An illegal armed raid and theft of materials on 17 Aug 2011 effectively stopped the publication of a variant of this paper being published back then and a significant amount of materials taken in that raid was not returned. This was in spite of court orders telling the relevant State Wildlife officers to do so (Court of Appeal 2014, Victorian Civil and Administrative Tribunal 2015).

Rather than run the risk of species becoming threatened or extinct due to non-recognition of them as shown in Hoser (2019a, 2019b), I have instead opted to publish this paper in its current form, even though a significant amount of further data was intended to be published and is not.

Naming of taxa is perhaps the most important step in their ultimate preservation and it is with this motivation in mind (protection of biodiversity) that I have chosen to publish this paper.

Until now, no new (and generally recognized) species within the so-called *P. dorsalis* (Gray, 1841) group have been formally named for more than 100 years (since 1915 to be exact) and all are similar in morphology and habit. Molecular studies (e.g. Schäuble *et al.* (2000) and Pyron and Weins, (2011)) have shown all species to be closely related, even though they have a distribution spanning the length and width of continental Australia including the tip of Cape York in far north Queensland and far south-west Western Australia (as seen in Cogger 2014 (pages 47 and 53) and relevant pages of Eipper and Rowland 2018).

In terms of the putative species *L. peronii* (Duméril and Bibron, 1841), the two southern species formally named in this paper, previously treated as *L. peronii*, besides being geographically disjunct are also readily morphologically distinguishable and diagnosable as seen in the descriptions that follow.

A similar situation is seen in for the currently unnamed population of the putative species L. tasmaniensis *L. tasmaniensis* Günther, 1858 from north Queensland, herein formally named *L. shanescarffi sp. nov.*.

L. salmini Steindachner, 1867 is in fact two species, being a coastal and an inland form which are morphologically and genetically diagnosable, as demonstrated by Schäuble *et al.* (2000). As mentioned already it is the coastal form which until now was unnamed.

Of the formally described and named species in the genus *Platyplectron*, one in particular, currently known by most authors as “*Limnodynastes terraereginae* Fry, 1915” is recognized to be highly variable in colour (Eipper and Rowland, 2018), although until now, no author anywhere has ever mooted that there may be more than one species involved (see for example Wells and Wellington, 1985, Cogger *et al.* 1983, Cogger, 2014 or Eipper and Rowland, 2018). Inspection of live specimens across the putative range of this species, this being north eastern New South Wales to far north-east Queensland, by myself over more than four decades alerted me to obvious differences between the regional populations.

These morphological and colouration differences are consistent

and coincide with biogeographical barriers and absence of collected specimens in museums in relevant intervening areas, leading to the inescapable conclusion that more than one species is involved.
Each population are clearly evolving independently of one another. This is particularly the case for populations in far north-east Queensland, which are by the far the most distinctive and also broken into more than one subgroup.

The populations from northern New South Wales and nearby south-east Queensland until now treated as being putative *P. terraereginae* are in many respects morphologically more similar to the species *P. grayi* (Steindachner, 1867), as currently known, rather than the nominate type form of *P. terraereginae*, which in fact has a type locality of Somerset, Cape York, Queensland, Australia.
It is prudent to compare images of both forms as seen on page 53 of Cogger (2014) (*P. gerrymarantellii sp. nov.* identified as *P. terraereginae*) and page 394 of Anstis (2013) (*P. grayi*).

The populations from northern New South Wales and nearby south-east Queensland of putative *P. terraereginae* is sufficiently diagnosably distinct from both other relevant (preceding named) species to warrant being formally named for the first time as a new species as done within this paper as *P. gerrymarantellii sp. nov.*.
The newly named species *P. timjamesi sp. nov.*, while clearly a member of the *P. dumerilii* species complex, was shown by Schäuble *et al.* (2000) to be more divergent from nominate *P. dumerilii* than all of *P. interioris* (Fry, 1913) and *P. insularis* (Parker, 1940) and so I had no hesitation in naming this form as a new species as opposed to subspecies.

While five subspecies of *Platyplectron dumerili* are recognised by herpetologists as of 2020, being *P. dumerili dumerili* in south-eastern South Australia, central and northern Victoria, parts of New South Wales, and in south-east Queensland; *P. dumerili grayi* (Steindachner, 1867) from the central coast of New South Wales; *P. dumerili fryi* (Martin, 1972) in the Snowy Mountains; *P. dumerili insularis* (Parker, 1940) in south east Victoria and Tasmania; and *P. dumerili variegatus* (Martin, 1972) in south-western Victoria and south-eastern South Australia, the last of these appears to be nothing more than a colour morph of the better-known *P. dumerili*.
P. interioris (Fry, 1913) also appears to be nothing more than a large variant of *L. dumerilii*, but is herein tentatively treated as a separate species.

The smooth skinned form known generally is *P. dumerili grayi* is sufficently divergent as to be treated as a separate species as is the form formally described in this paper, namely *P. timjamesi sp. nov.*, being significantly divergent of all other currently recognized subspecies of *P. dumerilii*. This divergence explains why I have described the taxon as a full species and not a subspecies.

Excluding *P. dumerili variegatus* discussed above, none of the other recognized subspecies are sufficiently divergent as to warrant full species recognition, but molecular evidence does suggest subspecies designations are appropriate.
Exceptional to this is the relatively smooth-skinned *P. dumerili grayi* (Steindachner, 1867) as depicted in Anstis (2013) at page 394 at top, which is herein treated as a full species separate to *P. dumerili* and in fact more closely related to both *P. terraereginae* and the newly named species *P. gerrymarantellii sp. nov.* (previously identified as *P. terraereginae*).

The morphological basis of the division of putative *Ranaster salmini* (Steindachner, 1867) is dicussed previously. I also note the biogeographical barrier of the Great Dividing Range coinciding with the molecular basis separating the two forms at the species level.
The unnamed eastern form is herein formally named *R. snakemansbogensis sp. nov.*.
I note that the exact collection location of the syntypes is not known, but from the original description of Steindachner, translated for me by Roman Hulimka (formerly of Park Orchards, Victoria, now of Bayswater, Victoria), the description (and syntypes themselves) can only match the better-known form from west of the Great Dividing Range.

The species of frog originally described as *Megistolotis lignarius* Tyler, Martin and Davis, 1979, herein included in the genus *Ranaster* Macleay, 1877 was examined by myself over some decades across the known range for the putative species.
There is zero doubt that this is in fact a complex of at least three very different species with two until now unnamed.

All three are geographically disjunct and separated by well defined and well-known biogeographical barriers in terms of saxacoline species.
All three species are inhabitants of upland sandstone habitats, which is obligatory for them, separated by unsuitable mainly flat lowland areas. The same barriers divided the putative species *Odatria glauerti* (Mertens, 1957) three ways, to include *O. hoserae* Hoser Hoser, 2013 and *O. davidhancocki* Hoser, 2018 as detailed in Hoser (2013b) and Hoser (2018), which included a robust body of molecular data to support the three-way species split and had been published following rigorous peer review.

Significantly the three relevant species of putative *Ranaster lignarius* are so different from one another that they can be readily and consistently identified and separated from one another at a glance. The molecular results of Schäuble *et al.* (2000) also supports a three way split of this putative species.

The nominate form of *R. lignarius* occurs in the East Kimberley region of Western Australia, generally around the Ord River Basin near Kunanurra. A divergent population found east of the main centre of distribution in the Gregory National Park, Northern Territory, Australia, is herein formally named as a subspecies, *R. lignarius divergens subsp. nov.*.

R. henrywajswelneri sp. nov. (this paper) occurs in the west and north Kimberley district of Western Australia, while *R. scottyjamesi sp. nov.* (this paper) occurs in the general region of the Arnhem Land escarpment in the Northern Territory, Australia.

INFORMATION RELEVANT TO THE FORMAL DESCRIPTIONS THAT FOLLOW

There is no conflict of interest in terms of this paper or the conclusions arrived at herein.

Several people including anonymous peer reviewers who revised the manuscript prior to publication are also thanked as a relevant staff at museums who made specimens and records available in line with international obligations.

In terms of the following formal descriptions, spellings should not be altered in any way for any purpose unless expressly and exclusively called for by the rules governing Zoological Nomenclature as administered by the International Commission of Zoological Nomenclature.

In the unlikely event two newly named taxa are deemed conspecific by a first reviser, then the name to be used and retained is that which first appears in this paper by way of page priority and as listed in the abstract keywords.

Some material in descriptions for taxa may be repeated for other taxa in this paper and this is necessary to ensure each fully complies with the provisions of the *International Code of Zoological Nomenclature* (Fourth edition) (Ride *et al.* 1999) as amended online since.

Material downloaded from the internet and cited anywhere in this paper was downloaded and checked most recently as of 7 February 2020, unless otherwise stated and were accurate in terms of the context cited herein as of that date.

Unless otherwise stated explicitly, colour descriptions apply to living adult specimens of generally good health and not under any form of stress by means such as excessive cool, heat, dehydration or abnormal skin reaction to chemical or other input.

While numerous texts and references were consulted prior to publication of this paper, the criteria used to separate the relevant species has already been spelt out and/or is done so within each formal description and does not rely on material within publications not explicitly cited herein.
Each newly named species is readily and consistently separable from their nearest congener and that which until now it has been previously treated as.

Delays in recognition of these species could jeopardise the long-

term survival of these taxa as outlined by Hoser (2019a, 2019b) and sources cited therein.

Therefore attempts by taxonomic vandals like the Wolfgang Wüster gang via Kaiser (2012a, 2012b, 2013, 2014a, 2014b) and Kaiser *et al.* (2013) (as frequently amended) to unlawfully suppress the recognition of these taxa on the basis they have a personal dislike for the person who formally named it should be resisted (Dubois *et al.* 2019).

Claims by the Wüster gang against this paper and the descriptions herein will no doubt be no different to those the gang have made previously, all of which were discredited long ago as outlined by Dubois *et al.* (2019), Hoser, (2007, 2009, 2012a, 2012b, 2013a, 2015a-f, 2019a, 2019b) and sources cited therein.

LIMNODYNASTES ALEXANTENORI SP. NOV.

LSIDurn:lsid:zoobank.org:act:6EF83369-0A5D-466F-A267-C8E0767F3186

Holotype: A preserved male specimen at the Museum of Victoria, Melbourne, Victoria, Australia, Herpetology Collection, specimen number D69522 collected 2 KM North of Boolarra, Gippsland, Victoria, Australia, Latitude -38.40 S., Longitude 146.28 E. This facility allows access to its holdings.

Paratypes: 1/ A preserved male specimen at the Museum of Victoria, Melbourne, Victoria, Australia, Herpetology Collection, specimen number D69523 collected 2 KM North of Boolarra, Gippsland, Victoria, Australia, Latitude -38.40 S., Longitude 146.28 E. 2/ A preserved specimen at the Museum of Victoria, Herpetology Collection, specimen number D47705 collected south of Hernes Oak, Latrobe Valley, Gippsland, Victoria, Australia, Latitude -38.22 S., Longitude 146.33 E.

Diagnosis: Until now, all of *Limnodynastes peronii* (Duméril and Bibron, 1841), *L. alexantenori sp. nov.*; *L. camerongantí sp. nov.* and *L. lineatus* De Vis, 1884 have been recognized by publishing herpetologists as simply *L. peronii* (*sensu* Cogger *at al.* 1983).

Notwithstanding this, molecular data as published by Schäuble *et al.* (2000) indicate at least four species being within the species complex and four forms are readily diagnosable and separable from one another on morphological features. They are also distributionally disjunct.

All four species are separated from all other *Limnodynastes* (*sensu lato*) species (including all species within the genera *Platyplectron* (Peters, 1863) and *Ranaster* Macleay, 1877 by the following unique combination of characters: There is no skin flap or papillae in the anterior corner of the eye; the innter metatarsal tubercle is small to moderate and not shovel-shaped; the metacarpal of the inner finger is much longer than that of the second finger; the toes are free and the snout is pointed and prominent.

Colouration is variable, but invariably brown or grey-brown above with a series of somewhat irregular dark-brown stripes or spots running anterior to posterior and dark irregular spots or mottling on the flanks. Dark dorsal markings may have lighter centres and there is sometimes a vertebral stripe which may be distinct, indistinct and of similar or different colour to other parts of the dorsum. There is a dark band along the snout, continuous behind the eye and running through the tympanum to the base of the forelimb. The band is usually bordered below by a white or yellow glandular fold.

All four species are characterised by two thick and usually irregular blackish stripes running down the spine, from between the eyes to the lower back or pelvic girdle, the stripes being separated by a lighter mid-dorsal line which may be thin or thick, and of variable colour, but invariably lighter in colour than the separated black stripes. Beyond these stripes, the dorsal surface is lighter, before there is another thick and irregular-shaped marking in the form of a stripe on the top of either flank. The flanks themselves are generally light in colouration with scattered bits of dark pigment, peppering or spots.

The limbs have scattered dark spots and irregular cross-bands, which may merge to form irregular stripes along the limb. The venter is generally whiteish and often flecked with brown or grey. There is no tibial gland.

Nominate *L. peronii* is of the form seen around Sydney, New South Wales and nearby coastal areas of New South Wales and far north-east Victoria. It is depicted in Hoser (1989) on page 27 (bottom two images) and Cogger (2014) on page 50 (top right). It is separated from the other three species, namely *L. alexantenori sp. nov.*, *L. camerongantí sp. nov.* and *L. lineatus*, by the following unique suite of characters: Flesh in the groin and armpits is either white or with only a slight yellowish tinge. Specimens with orange on the back, do not have this pigment bounded by black on the upper flank stripes as seen in *L. salmini* Steindachner, 1867 (a putative species which is in fact two, being a coastal and an inland form which are morphologically and genetically diagnosable). The mid and upper flanks of this species are characterised by having small to medium blackish spots of irregular shape. Limbs are mainly light with scattered irregular spots or blotches of small to medium size, exceptional to this is a series of 3-5 medium sized dark spots on the upper surface of the folded rear leg.

L. peronii is also characterised and separated from all of *L. alexantenori sp. nov.*, *L. camerongantí sp. nov.* and *L. lineatus* by having 2-6 scattered dark spots of irregular shape on each of the middle and lower flanks.

L. lineatus De Vis, 1884 from coastal Queensland is similar in most respects to *L. peronii* but most readily separated from that species by having well-defined light areas within the dark stripe area on the upper flanks, and heavy yellow pigment in groin and back of upper hind limbs. The dark mid-dorsal stripes run to the pelvic girdle, versus not that far in *L. peronii.*

L. lineatus is separated from all of *L. alexantenori sp. nov.*, *L. camerongantí sp. nov.* and *L. peronii* by having a well defined row of 5 to 9 large dark spots along each of the lower flanks. *L. lineatus* also has spots and/or peppering merged to form lines running longitudinally down each of the fore and hind limbs.

L. alexantenori sp. nov. are separated from *L. peroni*,, *L. lineatus* and *L. camerongantí sp. nov.* by having unpigmented versus pigmented eggs.

L. alexantenori sp. nov. from Melbourne are nearby parts of West Gippsland, including the Latrobe Valley is separated from the other three species *L. peronii*, *L. camerongantí sp. nov.* and *L. lineatus* by the black to dark brown stripe area of the upper flank being noticeably wider and more prominent at the anterior end of the body, than posterior, versus of more-or-less even thickness or prominence along the entire flank in the other three species.

L. alexantenori sp. nov. is also separated from all of *L. peronii, L. camerongantí sp. nov.* and *L. lineatus* by having no dark pigment on the middle or lower flanks save for a single large spot on the upper flank just posterior to the forelimb.

L. camerongantí sp. nov., from south-west Victoria and nearby parts of south-east South Australia near the coast is separated from the other three species *L. alexantenori sp. nov.*, *L. peronii*, and *L. lineatus* by having an extremely well-defined pattern of longitudinal stripes running down the body, including a well-defined dark stripe along each of the upper flanks and a well-defined large dark blotch forming a stripe on each of the lower flanks, this not being seen in any of the other species. *L. camerongantí sp. nov.* also has a consistently strong and well-defined beige to yellow mid-dorsal stripe running to the rear of the body, being well bounded by the adjoining black stripes, which are also thin and well-defined. The yellow or white mid-dorsal stripe in this species is also thicker than either of the blackish stripes that bound it on the body, which is in stark contrast to the other three species, where the reverse is the case. There is a well-defined dark stripe along the upper surface of the anterior part of each hind limb, but not on the forelimbs (in contrast to *L. lineatus*).

Photos of *L. peronii* in life can be found in Hoser (1989) at page 27 (two bottom images) and Cogger (2014) at page 51 and online at: https://www.flickr.com/photos/14807473@N08/3558432634/
Photos of *L. lineatus* in life can be found online at: https://www.flickr.com/photos/113096834@N02/12051078886/
and
https://www.flickr.com/photos/smacdonald/395057571/in/album-72157594543840677/

Photos of *L. alexantenori sp. nov*. in life can be found online at:
https://www.flickr.com/photos/craigboase/14068509511/
and
https://www.flickr.com/photos/gondwanareptileproductions/28732302793/
and
https://www.flickr.com/photos/160417453@N04/39688090763/
A photo of *L. camerongantí sp. nov*. in life can be found online at:
https://www.frogwatchsa.com.au/species/view/21

Distribution: *L. alexantenori sp. nov*. is restricted to the region bound by the Melbourne CBD in the west, the Great Dividing Range in the north, and east from these points to include the wetter parts of west and central Gippsland in the east, generally in a line from the Latrobe Valley in the north, south to Wilson's Promontary, this being the eastern limit of the range of this species and including the northern suburbs of Melbourne, the entire Yarra Valley and most of the Dandenong Ranges.

Etymology: Named in honour of (originally) Sydney-based herpetologist Alex Antenor in recognition of more than 50 years of contributions to Australian herpetology, including through working in close association with the late Graeme F. Gow who also made significant contributions to Australian herpetology in various roles.

LIMNODYNASTES CAMERONGANTI SP. NOV.

LSID urn:lsid:zoobank.org:act:785A65A0-CA57-4700-B55C-251AB0649276

Holotype: A preserved specimen at the Museum of Victoria, Melbourne, Victoria, Australia, Herpetology Collection, specimen number D25859 collected at Dismal Swamp, near Mount Gambier, South Australia, Australia, Latitude -37.68 S., Longitude 140.72 E. This facility allows access to its holdings.

Paratype: A preserved specimen at the South Australian Museum, Adelaide, South Australia, Australia, Herpetology Collection specimen number: R49328, collected from Tarpeena, South Australia, Latitude -37.70 S., Longitude 140.80 E.

Diagnosis: Until now, all of *Limnodynastes peronii* (Duméril and Bibron, 1841), *L. alexantenori sp. nov*.; *L. camerongantí sp. nov*. and *L. lineatus* De Vis, 1884 have been recognized by publishing herpetologists as simply *L. peronii* (*sensu* Cogger *at al*. 1983).

Notwithstanding this, molecular data as published by Schäuble *et al*. (2000) indicate at least four species being within the species complex and four forms are readily diagnosable and separable from one another on morphological features. They are also distributionally disjunct.

All four species are separated from all other *Limnodynastes* (*sensu lato*) species (including all species within the genera *Platyplectron* (Peters, 1863) and *Ranaster* Macleay, 1877 by the following unique combination of characters: There is no skin flap or papillae in the anterior corner of the eye; the innter metatarsal tubercle is small to moderate and not shovel-shaped; the metacarpal of the inner finger is much longer than that of the second finger; the toes are free and the snout is pointed and prominent.

Colouration is variable, but invariably brown or grey-brown above with a series of somewhat irregular dark-brown stripes or spots running anterior to posterior and dark irregular spots or mottling on the flanks. Dark dorsal markings may have lighter centres and there is sometimes a vertebral stripe which may be distinct, indistinct and of similar or different colour to other parts of the dorsum. There is a dark band along the snout, continuous behind the eye and running through the tympanum to the base of the forelimb. The band is usually bordered below by a white or yellow glandular fold.

All four species are characterised by two thick and usually irregular blackish stripes running down the spine, from between the eyes to the lower back or pelvic girdle, the stripes being separated by a lighter mid-dorsal line which may be thin or thick, and of variable colour, but invariably lighter in colour than the separated black stripes. Beyond these stripes, the dorsal surface is lighter, before there is another thick and irregular-shaped marking in the form of a stripe on the top of either flank. The flanks themselves are generally light in colouration with scattered bits of dark pigment, peppering or spots.

The limbs have scattered dark spots and irregular cross-bands, which may merge to form irregular stripes along the limb. The venter is generally whiteish and often flecked with brown or grey. There is no tibial gland.

Nominate *L. peronii* is of the form seen around Sydney, New South Wales and nearby coastal areas of New South Wales and far north-east Victoria. It is depicted in Hoser (1989) on page 27 (bottom two images) and Cogger (2014) on page 50 (top right). It is separated from the other three species, namely *L. alexantenori sp. nov*., *L. camerongantí sp. nov*. and *L. lineatus*, by the following unique suite of characters: Flesh in the groin and armpits is either white or with only a slight yellowish tinge. Specimens with orange on the back, do not have this pigment bounded by black on the upper flank stripes as seen in *L. salmini* Steindachner, 1867 (a putative species which is in fact two, being a coastal and an inland form which are morphologically and genetically diagnosable). The mid and upper flanks of this species are characterised by having small to medium blackish spots of irregular shape. Limbs are mainly light with scattered irregular spots or blotches of small to medium size, exceptional to this is a series of 3-5 medium sized dark spots on the upper surface of the folded rear leg.

L. peronii is also characterised and separated from all of *L. alexantenori sp. nov*., *L. camerongantí sp. nov*. and *L. lineatus* by having 2-6 scattered dark spots of irregular shape on each of the middle and lower flanks.

L. lineatus De Vis, 1884 from coastal Queensland is similar in most respects to *L. peronii* but most readily separated from that species by having well-defined light areas within the dark stripe area on the upper flanks, and heavy yellow pigment in groin and back of upper hind limbs. The dark mid-dorsal stripes run to the pelvic girdle, versus not that far in *L. peronii.*

L. lineatus is separated from all of *L. alexantenori sp. nov*., *L. camerongantí sp. nov*. and *L. peronii* by having a well defined row of 5 to 9 large dark spots along each of the lower flanks. *L. lineatus* also has spots and/or peppering merged to form lines running longitudinally down each of the fore and hind limbs.

L. alexantenori sp. nov. are separated from *L. peroni*,, *L. lineatus* and *L. camerongantí sp. nov*. by having unpigmented versus pigmented eggs.

L. alexantenori sp. nov. from Melbourne are nearby parts of West Gippsland, including the Latrobe Valley is separated from the other three species *L. peronii*, *L. camerongantí sp. nov*. and *L. lineatus* by the black to dark brown stripe area of the upper flank being noticeably wider and more prominent at the anterior end of the body, than posterior, versus of more-or-less even thickness or prominence along the entire flank in the other three species.

L. alexantenori sp. nov. is also separated from all of *L. peronii*, *L. camerongantí sp. nov*. and *L. lineatus* by having no dark pigment on the middle or lower flanks save for a single large spot on the upper flank just posterior to the forelimb.

L. camerongantí sp. nov., from south-west Victoria and nearby parts of south-east South Australia near the coast is separated from the other three species *L. alexantenori sp. nov*., *L. peronii*, and *L. lineatus* by having an extremely well-defined pattern of longitudinal stripes running down the body, including a well-defined dark stripe along each of the upper flanks and a well-defined large dark blotch forming a stripe on each of the lower flanks, this not being seen in any of the other species. *L. camerongantí sp. nov*. also has a consistently strong and well-defined beige to yellow mid-dorsal stripe running to the rear of the body, being well bounded by the adjoining black stripes, which are also thin and well-defined. The yellow or white mid-dorsal stripe in this species is also thicker than either of the blackish stripes that bound it on the body, which is in stark contrast to the other three species, where the reverse is the case. There is a well-defined dark stripe along the upper surface of the anterior part of each hind limb, but not on the forelimbs (in contrast to *L. lineatus*).

Photos of *L. peronii* in life can be found in Hoser (1989) at page 27 (two bottom images) and Cogger (2014) at page 51 and online at:
https://www.flickr.com/photos/14807473@N08/3558432634/

Photos of *L. lineatus* in life can be found online at:
https://www.flickr.com/photos/113096834@N02/12051078886/
and
https://www.flickr.com/photos/smacdonald/395057571/in/album-72157594543840677/

Photos of *L. alexantenori sp. nov*. in life can be found online at:
https://www.flickr.com/photos/craigboase/14068509511/
and
https://www.flickr.com/photos/gondwanareptileproductions/28732302793/
and
https://www.flickr.com/photos/160417453@N04/39688090763/
A photo of *L. cameronganti sp. nov*. in life can be found online at:
https://www.frogwatchsa.com.au/species/view/21

Distribution: *L. cameronganti sp. nov*. is restricted to the region bound by the Otway Ranges on south-west coast of Victoria through wetter near coastal areas of far south-west Victoria and into nearby parts of far south-east South Australia, north to about Kingston, South Australia.

Etymology: Named in honour of Cameron Gant, Physiotherapist at Mount Hotham, Victoria (2019) in recognition of his many contributions to the welfare and safety of ski and snowboarders at Mount Hotham as well as his secondary role of looking after the welfare of ski lodge patrons during ski seasons in Australia and Japan. Another of his achievements was being photographed doing a large snow jump on a snowboard at a Japenese ski resort while wearing nothing but his jocks (underwear), thereby giving some local women a thrill.
Myself, known as the Snakeman tried to upstage this by skiing completely naked (no underwear) at 92 kph (timed with an ap) down the Saddle Ski run at Whistler Canada in February 2019.

LIMNODYNASTES SHANESCARFFI SP. NOV.

LSID urn:lsid:zoobank.org:act:704E15BE-E3D2-4859-BA80-623801D290F9

Holotype: A preserved specimen at the Australian Museum, Sydney, New South Wales, Australia, specimen number R.148809, collected from Charmillan Creek, 11.6km south of Kennedy Highway at Ravenshoe, via the Tully Falls Rd, Queensland, Australia, Latitude -17.716 S., Longitude 145.516 E.

This facility allows access to its holdings.

Paratypes: 1/ A preserved specimen at the Queensland Museum, Brisbane, Queensland, Australia, specimen number J65844, collected from Gunnawarra Rd, North Queensland, Australia, Latitude -18.2153 S., Longitude 145.1336 E.

2/ A preserved specimen at the Queensland Museum, Brisbane, Queensland, Australia, specimen number J48949 collected from Blunder Creek, 3km south-east of Wooroora Homestead, north Queensland, Australia, Latitude -17.75 S., Longitude 145.4667 E.

3/ A preserved specimen at the Queensland Museum, Brisbane, Queensland, Australia, specimen number J65916, collected from Lumholtz National Park, north Queensland, Australia, Latitude 18.2367 S., Longitude 145.4758 E.

Diagnosis: Until now *Limnodynastes shanescarffi sp. nov.* has been treated as a northern population of the widespread species *Limnodynastes tasmaniensis* Günther,1858. Both would key out as the same species in Cogger (2014). While both species are variable in colour, *L. shanescarffi sp. nov.* is readily separated from *L. tasmaniensis* by the following unique combination of characters in adult frogs: A dorsal colouration incorporating a dominance of dark-greenish-blackish or dark-brownish-blackish spots and blotches (versus abviously green in *L. tasmaniensis*), with dark occupying more than 70% of the upper surface, versus less than 70% in *L. tasmaniensis*; an obvious purple tinge on the lower flanks and inner thighs (versus yellow in *L. tasmaniensis*) and a dark blotch beneath and slightly anterior to the eye of size nearly as large as the eye, versus significantly smaller in size in *L. tasmaniensis.* Male *L. shanescarffi sp. nov.*also have obvious orangeish-red spotting or peppering on the upper body and limbs, which is also present to a lesser extent in most females, this being separate from any vertebral stripe that may or may not be present.

The species *L. affinis* Günther, 1863 was treated by Cogger *et al.* (1983) as being a synonym of *L. tasmaniensis* and has been effectively ignored by all authors since, except for Wells and Wellington (1985), who like Cogger *et al.* (1983), did not provide diagnostic information by which to separate the forms.

Both *L. affinis* and *L. tasmaniensis* are separated from *L. shanescarffi sp. nov.* as defined above. However both *L. affinis* and *L. shanescarffi sp. nov.* are readily separated from *L. tasmaniensis* by the fact that they have a well defined white or yellowish-white stripe running beneath the eye and the ear to the front leg. This is either absent or ill-defined, or not white to creamy-white in *L. tasmaniensis.* This means all three species can be readily separated from one another.

An image of *L. shanescarffi sp. nov.* (including specimens of both sexes) can be found in Vanderduys (2012) on page 90 bottom.
Distribution: *L. shanescarffi sp. nov.* appears to be restricted to north-east Queensland. *L. affinis* is known from north-east New South Wales and nearby parts of southern Queensland, including inland areas. *L. tasmaniensis* appears to be confined to the New South Wales coast south of the Hunter Valley, southern Victoria and nearby areas.

Etymology: Named in honour of Shane Scarff of Heckenberg, a suburb in south-western Sydney, in the state of New South Wales, Australia, known for his snake breeding enterprise called Shane's Aussie Pythons, for services to wildlife conservation in Ausrtralia.

PLATYPLECTRON GERRYMARANTELLII SP. NOV.

LSID urn:lsid:zoobank.org:act:CAADCE7F-BDB1-4C2B-8102-2464A2F930B2

Holotype: A preserved specimen in the Queensland Museum, Brisbane, Australia, Amphibians and Reptiles Collection, Specimen number J12556 collected from Burpengary, Queensland, Australia, Latitude -27.17 S., Longitude 152.97 E. This facility allows access to its holdings.

Paratype: A preserved specimen in the Queensland Museum, Brisbane, Australia, Amphibians and Reptiles Collection, Specimen number J12555 collected from Burpengary, Queensland, Australia, Latitude -27.17 S., Longitude 152.97 E.

Diagnosis: Until now *Platyplectron gerrymarantellii sp. nov*. has been treated as the southern population of *P. terraereginae* (Fry, 1915).

Both species are separated from all other species in the same genus (*Platyplectron*) by having a groin suffused with scarlet (red), inner metatarsal tubercle is large and shovel-shaped and there is no skin flap or papillae in the anterior corner of the eye, this part of the diagnosis being effectively derived from Cogger (2014).

P. gerrymarantellii sp. nov. is however readily separated from *P. terraereginae* by appearance. The flanks, in particular the upper flanks have areas of light pigment formed by peppering. On the upper flanks, it is dark at the top, with lighter peppering increasing to form an indistinct lighter marking or indistinct line on the mid upper flank, being bound by grey below, with mainly yellow peppering or small spots recurring on the lower flanks, beyond a region on the mid-flanks of only grey colouration.

By contrast the flanks of *P. terraereginae* have an obviously marbled appearance. This is created by distinctively bright orange to yellow irregular blobs and blotches along the upper flank and to a lesser extent on the lower flanks on a whitish grey background. The marbled and brilliant appearance of these bright markings, which extend to the limbs and anteriorly to be below the eye in *P. terraereginae* are in stark contrast to *P. gerrymarantellii sp. nov.*. Yellowish markings under the throat are intense in *P. terraereginae* but are dull in *P. gerrymarantellii sp. nov.*.

In *P. terraereginae* there is a dark brown to black stripe running on the snout on either side from the nostril to the eye and beneath this is a well defined brown stripe between this and an area of grey on the upper lip, the stripe becoming yellow under the eye and running to near the forelimb. This is not the case in *P. terraereginae*, where the same area of the snout (beneath the upper line) is all greyish (as seen on the upper lip) and at best has some peppering or marbling, which invariably becomes bright orange or yellow marbling from the eye and further posterior.

P. gerrymarantellii sp. nov. has light brown pigment on the iris, versus dark brown in *P. terraereginae. P. gerrymarantellii sp. nov*. in life is depicted on page 53 of Cogger (2014) on top of page.

Distribution: *Platyplectron gerrymarantellii sp. nov.* is found in coastal regions and near coastal regions of northern New South Wales north of Coffs Harbour, including west of the Great Dividing Range through south-east Queensland as far north as Gladstone and including nearby parts of the Brigalow Belt west of the Dividing Range. *P. terraereginae* is found generally along the coast from just south of Rockhampton to the northern tip of Cape York in Queensland, Australia.

Etymology: Named in honour of Gerry Marantelli a frog expert, originally based in Melbourne, Victoria, Australia, but since travelled elsewhere to live, in recognition of his many contributions to herpetology at several levels and numerous roles, in particular with respect of frogs and their captive breeding, including practical programs for the conservation of threatened species.
When he discontinued his employment at Melbourne Zoo (Zoos Victoria) he commented that he found it untenable that he could masquerade as working for "captive breeding recovery programmes" that had as their principal aim to not breed the relevant species.
The perverse logic behind this was to ensure that the Melbourne Zoo maintained their monopoly and commercial self-interest in being the only facility with the species. By ensuring other zoos and potential keepers and breeders did not posess relevant rare and endangered species, Melbourne Zoo was able to maintain a monopoly position in being the only people to get favourable media for trying to save the species and to sell rights associated with them, be it admissions through their front gate, or for photos for books, for which they would seek large sums of cash in "royalties" and prominent "acknowledgements" in the relevant works.

Notable among these captive breeding recovery programs designed to ensure a Zoos Victoria monopoly on species by avoiding breeding too many of them were the Leadbeater's Possums *Gymonbeledius leadbeateri* McCoy, 1867 and the Baw Baw Frog *Philoria frosti* Spencer, 1901 programs.
See for example the webpages at:

https://www.zoo.org.au/fighting-extinction/local-threatened-species/baw-baw-frog/

or

https://www.zoo.org.au/fighting-extinction/local-threatened-species/leadbeaters-possum-lowland-population/

both of which have an identical sales pitch and which importantly are little more than clever sales pitches to gain paying customers at the zoo and to solicit donations for their business from duped well meaning conservation minded people. Each page begs readers to help "By visiting our zoos … Donate if you can."
Using Search Engine Optimisation (also known as SEO), Zoos Victoria have ensured that their fundraising pages come on top of Google searches for the relevant search terms "Leadbeater's Possums" and "Baw Baw Frog" to ensure that they get the money from swindled donors and this money does not go to anyone they perceive as competition in the wildlife business, including privately owned wildlife shelters and hands on animal rescue organisations.

PLATYPLECTRON TIMJAMESI SP. NOV.

LSID urn:lsid:zoobank.org:act:1D691F16-71FB-4102-9D4F-738E9B8EEFCC

Holotype: A preserved female specimen at the South Australian Museum, Adelaide, South Australia, Australia, specimen number R34733 collected from Llangothlin, New South Wales, Australia, Latitude -30.13 S., Longitude 151.68 E. This government-owned facility allows access to its holdings.

Paratype: A preserved specimen at the Australian Museum, Sydney, New South Wales, Australia, specimen number R.50036 collected at 24 miles south-east of Glen Innes at Fowlers Creek, New South Wales, Australia, Latitude -29.9044 S., Longitude 151.97527 E.

Diagnosis: *P. timjamesi sp. nov.* has until now been regarded as a population of *P. dumerilii* Peters, 1863, including at the subspecies level as defined by Eipper and Rowland (2018).

Eipper and Rowland (2018) provide diagnostic information separating all recognized subspecies of *P. dumerilii* as recognized by them.
The type form of *P. dumerilii* with type locality of near Gawler, South Australia is found in south-east Australia, but not including the New England region of New South Wales and immediately adjacent elevated regions north of there in Queensland, where it is replaced by *P. timjamesi sp. nov.*.
The putative species *P. interioris* Fry, 1913, which genetically is virtually indistinguishable from nominate *P. dumerilii* is separated from that species (*P. dumerilii*), *P. grayi* (Steindachner, 1867) and *P. timjamesi sp. nov.* by having a brilliant deep yellow colour on the belly and lower flanks invariably with yellow flecks, spots or these merged to form irregular blotches, sometimes with greyish-white peppering on the flanks and on the belly itself with only a few yellow spots or none at all, versus a belly that may be creamy yellow to white or whitish-grey, with distinct black or grey mottling or reticulations.
P. timjamesi sp. nov. is readily separated from both *P. grayi* and *P. dumerilii* (all subspecies), by having light brown pigment in the iris of the eye, versus bright reddish-orange in *P. grayi* or dark brown to orangeish-red in *P. dumerilii* (all subspecies).

Both *P. grayi* and *P. dumerilii* (all subspecies) have a well defined black or blackish line starting from the rear of the eye, angled downwards through the ear, before narrowing at a triangular angle. By contrast such a black or blackish line is entirely absent, or if present is effectively indistinct and very hard to see. In effect where this stripe would be, the colouration is either the same as the dorsum or similar, but potentially marginally darker, but not in any way demarcated by a line.

The dorsum of *P. timjamesi sp. nov.* is effectively unmarked, versus always well marked in some way in all subspecies of *P. dumerilii* and *P. grayi.*
The dorsum of *P. timjamesi sp. nov.* generally lacks markings and even on the flanks, any markings or pattern is greatly reduced as to be generally indistinct.

P. timjamesi sp. nov. is further separated from all subspecies of *P. dumerilii* and *P. grayi* by having large and prominent swellings on upper dorsal surface of the upper hind limbs. These swellings are reduced or absent in all subspecies of *P. dumerilii* and *P. grayi.*

The snout is generally unmarked in *P. timjamesi sp. nov.*, whereas it has at least some markings in all subspecies of *P. dumerilii* and *P. grayi. P. timjamesi sp. nov.* in life is depicted in Cogger (2014) at page 48, top left image.

Distribution: *P. timjamesi sp. nov.* is restricted to the higher areas of the New England region of New South Wales and adjacent parts of southern Queensland.

Etymology: Named in honour ot Tim James, brother of world famous Australian snowboard champion Scotty James, both of Warrandyte, Victoria, Australia in recognition of their contributions to the outdoor sport of snowboarding. In this case the name is recognizing Tim James, not Scotty. While Scotty James is known for winning the halfpipe at various winter sports contests and as the flag bearer for Australia at the 2018 Winter Olympics, where he won a bronze medal in halfpipe, it is Tim James who does a lot of the filming of Scotty James and bringing his exciting achievements to a global audience. Besides their sporting achievements, both men are amazing human beings willing to lend a hand to help others around them.

RANASTER SNAKEMANSBOGENSIS SP. NOV.

LSID urn:lsid:zoobank.org:act:B8406264-A843-47E6-98FC-3270EA62607F

Holotype: A preserved specimen at the Queensland Museum, Brisbane, Queensland, Australia, specimen number J85079 collected at Yaamba, Queensland, Australia, Latitude -23.0464 S., Longitude 150.3197 E.

This government-owned facility allows access to its holdings.

Paratype: A preserved specimen at the Queensland Museum, Brisbane, Queensland, Australia, specimen number J68801 collected at 20 km south of Marlborough, Queensland, Australia, Latitude -22.9989 S., Longitude 149.8725 E.

Diagnosis: *Ranaster snakemansbogensis sp. nov.* has until now been treated as a population of *R. salmini* (Steindachner, 1867), known in most texts under the genus *Limnodynastes* Fitzinger, 1843, (e.g. Cogger, 2014, Eipper and Rowland, 2018).

R. snakemansbogensis sp. nov. and *R. salmini* and other closely related species are sufficiently divergent from the type species group of *Limnodynastes* Fitzinger, 1843 (type species *Cystignathus peronii* Duméril and Bibron, 1841) to be placed in a separate genus. The name *Ranaster* Macleay, 1877 is available for this assemblage and is therefore used, as this is the procedure set out in the *International Code of Zoological Nomenclature* (Ride *et al.* 1999). The decree of the Wüster gang of thieves, Kaiser *et al.* (2013) calls for names such as *Ranaster* to be overwritten as it was coined without peer review and was not coined by a member of their group.

However as the original publication formally naming *Ranaster* was an ICZN compliant and scientific publication for the permenant record, the demands of Kaiser *et al.* (2013) are formally ignored.

R. snakemansbogensis sp. nov. and *R. salmini* are readily separated from all other species in the genera *Ranaster*, *Limnodynastes* and *Platyplectron* Peters, 1863 by the following suite of characters: There is no skin flap or papillae in the anterior corner of the eye; the inner metatarsal is small to moderate (not large), and not shovel shaped; the metacarpal of inner finger is equal to, or slightly longer or shorter than that of the second finger (but definitely not much longer than the second finger); there is a pale glandular fold or ridge from below the eye to the base of the forelimb; the first finger is longer than the second (as opposed to being equal to or shorter than) and there is a single metatarsal tubercle.

Adult *R. snakemansbogensis sp. nov.* are similar in most respects to *R. salmini*, but are readily separated by colouration. The red or salmon stripes running from either side from above the shoulder to the groin, vertebral stripe from middle of back to vent of same colour (sometimes running the full length of the body) and other orange markings or flushes on the body and limbs as seen in *R. salmini* are instead a washed out light yellow colour in *R. snakemansbogensis sp. nov.*, which may have a slight orange tinge, but not the brilliant orange, pink or red as seen in *R. salmini.* Importantly these differences are obvious in live specimens.

R. snakemansbogensis sp. nov. has mainly dark pigment on the upper labial area, versus mainly light in *R. salmini.*

R. salmini in life is depicted in Vanderduys 2012 at p. 89 bottom, or Anstis (2013) at p. 413 (both sexes), or Clyne (1969) at p. 57 (top).

R. snakemansbogensis sp. nov. in life can be found online at:

https://www.flickr.com/photos/smacdonald/362303412/

and

https://www.flickr.com/photos/toddburrows/6435136841/

and

https://www.flickr.com/photos/toddburrows/6435134219/

Distribution: *R. snakemansbogensis sp. nov.* occurs in habitat associated with drainages flowing east of the Great Dividing Range, generally north of Hervey Bay and south of Mackay, in central, eastern Queensland, Australia, centred on the Fitzroy River system. *R. salmini* is found generally west of the Great Dividing Range, from central Eastern Queensland, throughout the Darling River basin into central New South Wales and including the Macquarie and Bogan River Drainages.

Etymology: Named in reflection of the location where the species was first discovered by this author, which is in the region of the type locality for the holotype. It was a swamp, or bog, where I had to drop a feces in eastern Queensland, Australia, being a location otherwise known as Snakeman's Bog!

In training for a future Coronavirus pandemic, there was no toilet paper available, so I had to use leaves to wipe my bottom.

RANASTER HENRYWAJSWELNERI SP. NOV.

LSID urn:lsid:zoobank.org:act:FCFB9407-7E5C-4944-B941-957730BF7823

Holotype: A preserved specimen at the Western Australian Museum, Perth, Western Australia, Australia, specimen number R67477 collected at Beverley Springs Station, Western Australia, Australia, Latitude -16.7167 S., Longitude 125.4667 E. This government-owned facility allows access to its holdings.

Paratype: A preserved specimen at the Western Australian Museum, Perth, Western Australia, Australia, specimen number R97978 collected at Mount Hart, Western Australia, Australia, Latitude -16.9167 S., Longitude 125.0667 E.

Diagnosis: *Ranaster henrywajswelneri sp. nov.* and *R. scottyjamesi sp. nov.* have until now been treated as populations of the species *R. lignarius* (Tyler, Martin and Davis, 1979) (*comb. nov.*), originally formally named *Megistolotis lignarius*, Tyler, Martin and Davis, 1979, with a type locality of 6.5 km north of Lake Argyle Tourist Village, Western Australia, Australia.
Most recent texts, including Anstis (2013), Cogger (2014) and Eipper and Rowland (2018) have placed the putative species in the genus *Limnodynastes* Fitzinger, 1843.

However morphologically and phylogenetically, the best generic placement for the relevant species is in fact within the genus *Ranaster* Macleay, 1877, type species *R. convexiusculus* Macleay, 1877.

R. lignarius, *R. henrywajswelneri sp. nov.* and *R. scottyjamesi sp. nov.*, treated in Anstis (2013), Cogger (2014) and Eipper and Rowland (2018) as a single putative species, can be separated from all other species in the genera *Ranaster*, *Limnodynastes* and *Platyplectron*, Peters, 1863 by having a distinct skin flap with papillae in the anterior corner of the eye. A detailed description of the three species (treated as one) can be found in Cogger (2014), Anstis (2013) or the description of Tyler, Martin and Anstis (1979).

There are three main geographically disjunct populations and forms, these being one centred on the Arnhemland escarpment, the nominate form in the East Kimberley, centred on the Ord River drainage and a third form in the West Kimberley.

R. scottyjamesi sp. nov. from the Arnhemland escarpment and nearby areas is separated from both *R. lignarius* and *R. henrywajswelneri sp. nov.* by having a brownish or greyish dorsal colouration without distinctive markings and contrasting lighter areas being of a marbled appearance. These marbled markings, or spots or flecks are also on the flanks and limbs.

R. lignarius is readily separated from *R. scottyjamesi sp. nov.* and *R. henrywajswelneri sp. nov.* by having a a yellowish background colour on the dorsum punctuated with well defined medium-sized reddish-orange spots, the same colouration continuing on the limbs, but not the lower flanks, with the arrangement of markings on the limbs, not being in obvious spots as for the dorsal surface. The mid and lower flanks of *R. lignarius* are light as opposed to dark in *R. scottyjamesi sp. nov.*.

R. henrywajswelneri sp. nov. is readily separated from *R. scottyjamesi sp. nov.* and *R. lignarius* by having a creamish background on the dorsum with fairly distinct darker purplish-brown markings including one or more large and irregular shaped spots or blotches, usually seen on the upper or mid back. In terms of colouration both *R. henrywajswelneri sp. nov.* and *R. scottyjamesi sp. nov.* are similar, but the two can be readily separated by the fact that *R. henrywajswelneri sp. nov.* has weakly marked or defined pattern on the dorsal surfaces of the hind limbs, versus well marked and a well defined pattern of light blotches on a dark surface in *R. scottyjamesi sp. nov.*.

R. lignarius divergens subsp. nov. from the Gregory National Park, in north-west Northern Territory, Australia is similar in most respects to *R. lignarius* in colouration, as in having a yellowish background colour on the dorsum, but unlike the nominate subspecies, the darker dorsal markings do not show as well defined spots, but instead have a more-or-less marbled appearance, but unlike that seen in *R. scottyjamesi sp. nov.* the demarcation between light and dark is well defined.
R. lignarius divergens subsp. nov. is further separated from the nominate subspecies of *R. lignarius* by having small yellow spots on purplish forelimbs, versus large irregular yellow blotches of irregular shape and similar markings, including large spots on the forelimbs.

R. lignarius in life is depicted in Anstis (2013) on page 406, top right and page 407, bottom right and Eipper and Rowland (2018) on page 32 at bottom.

R. scottyjamesi sp. nov. in life is depicted in Cogger (2014) on page 50 at top left, Eipper and Rowland (2018) on page 32 at top and in Anstis (2013), on page 406 second down on right.

An image of *R. henrywajswelneri sp. nov.* in life can be found online at: https://www.mediastorehouse.com/australian-views/animals/frogs/woodworker-frog-limnodynastes-lignarius-10848498.html

Distribution: *R. henrywajswelneri sp. nov.* is confined to the West Kimberley region of Western Australia, Australia.

R. scottyjamesi sp. nov. is confined to Arnhemland and nearby hilly parts of the Northern Territory.

R. lignarius (of the nominate subspecies) is confined to the East Kimberley region, centred on the Ord River basin.

The subspecies *R. lignarius divergens subsp. nov.* is found in the Gregory National Park, north-west Northern Territory, Australia.

Etymology: Named in honour of Henry Wajswelner, Physiotherapist at Mount Hotham, Victoria Australia (2019), normally resident at Carlton, Victoria in recognition of his many contributions to the welfare and safety of ski and snowboarders at Mount Hotham, including at very strange hours of the day and night, as well as services to physiotherapy in general in Australia.

RANASTER SCOTTYJAMESI SP. NOV.

LSID urn:lsid:zoobank.org:act:49724BC4-1161-445E-99CF-275612376D13

Holotype: A preserved specimen at the Museum and Art Gallery of the Northern Territory, Darwin, Northern Territory, Australia, specimen number R.31044 collected at Remusatia Gorge, Mount Brockman, Northern Territory, Australia, Latitude -12.75 S., Longitude 132.93 E. This government-owned facility allows access to its holdings. The same specimen is listed as a paratype for the species *R. lignarius*, (holotype specimen from Western Australia) but it is herein treated as a separate taxon.

Paratype: A preserved specimen at the Australian Museum, Sydney, New South Wales, Australia, specimen number R.97512 collected at Jabiluka Project Area, Northern Territory, Australia, Latitude -12.533 S., Longitude 132.916 E.

Diagnosis: *Ranaster scottyjamesi sp. nov.* and *R. henrywajswelneri sp. nov.* have until now been treated as populations of the species *R. lignarius* (Tyler, Martin and Davis, 1979) (*comb. nov.*), originally formally named *Megistolotis lignarius*, Tyler, Martin and Davis, 1979, with a type locality of 6.5 km north of Lake Argyle Tourist Village, Western Australia, Australia.

Most recent texts, including Anstis (2013), Cogger (2014) and Eipper and Rowland (2018) have placed the putative species in the genus *Limnodynastes* Fitzinger, 1843.

However morphologically and phylogenetically, the best generic placement for the relevant species is in fact within the genus *Ranaster* Macleay, 1877, type species *R. convexiusculus* Macleay, 1877.

R. lignarius, *R. henrywajswelneri sp. nov.* and *R. scottyjamesi sp. nov.*, treated in Anstis (2013), Cogger (2014) and Eipper and Rowland (2018) as a single putative species, can be separated from all other species in the genera *Ranaster*, *Limnodynastes* and *Platyplectron*, Peters, 1863 by having a distinct skin flap with papillae in the anterior corner of the eye. A detailed description of the three species (treated as one) can be found in Cogger (2014), Anstis (2013) or the original description of Tyler, Martin and Anstis (1979). There are three main geographically disjunct populations and forms, these being one centred on the Arnhemland escarpment, the nominate form in the East Kimberley, centred on the Ord River drainage and a third form in the West Kimberley.

R. scottyjamesi sp. nov. from the Arnhemland escarpment and nearby areas is separated from both *R. lignarius* and *R. henrywajswelneri sp. nov.* by having a brownish or greyish dorsal colouration without distinctive markings and contrasting lighter areas being of a marbled appearance. These marbled markings, or spots or flecks are also on the flanks and limbs.

R. lignarius is readily separated from *R. scottyjamesi sp. nov.* and *R. henrywajswelneri sp. nov.* by having a a yellowish background colour on the dorsum punctuated with well defined medium-sized reddish-orange spots, the same colouration continuing on the limbs, but not the lower flanks, with the arrangement of markings on the limbs, not being in obvious spots as for the dorsal surface. The mid and lower flanks of *R. lignarius* are light as opposed to dark in *R. scottyjamesi sp. nov.*.

R. henrywajswelneri sp. nov. is readily separated from *R. scottyjamesi sp. nov.* and *R. lignarius* by having a creamish background on the dorsum with fairly distinct darker purplish-brown markings including one or more large and irregular shaped spots or blotches, usually seen on the upper or mid back. In terms of colouration both *R. henrywajswelneri sp. nov.* and *R. scottyjamesi sp. nov.* are similar, but the two can be readily separated by the fact that *R. henrywajswelneri sp. nov.* has weakly marked or defined pattern on the dorsal surfaces of the hind limbs, versus well marked and a well defined pattern of light blotches on a dark surface in *R. scottyjamesi sp. nov.*.

R. lignarius divergens subsp. nov. from the Gregory National Park, in north-west Northern Territory, Australia is similar in most respects to *R. lignarius* in colouration, as in having a yellowish background colour on the dorsum, but unlike the nominate subspecies, the darker dorsal markings do not show as well defined spots, but instead have a more-or-less marbled appearance, but unlike that seen in *R. scottyjamesi sp. nov.* the demarcation between light and dark is well defined.

R. lignarius divergens subsp. nov. is further separated from the nominate subspecies of *R. lignarius* by having small yellow spots on purplish forelimbs, versus large irregular yellow blotches of irregular shape and similar markings, including large spots on the forelimbs.

R. lignarius in life is depicted in Anstis (2013) on page 406, top right and page 407, bottom right and Eipper and Rowland (2018) on page 32 at bottom.

R. scottyjamesi sp. nov. in life is depicted in Cogger (2014) on page 50 at top left, Eipper and Rowland (2018) on page 32 at top and in Anstis (2013), on page 406 second down on right.

An image of *R. henrywajswelneri sp. nov.* in life can be found online at: https://www.mediastorehouse.com/australian-views/animals/frogs/woodworker-frog-limnodynastes-lignarius-10848498.html

Distribution: *R. scottyjamesi sp. nov.* is confined to Arnhemland and nearby hilly parts of the Northern Territory.

R. henrywajswelneri sp. nov. is confined to the West Kimberley region of Western Australia, Australia.

R. lignarius (of the nominate subspecies) is confined to the East Kimberley region, centred on the Ord River basin.

The subspecies *R. lignarius divergens subsp. nov.* is found in the Gregory National Park, north-west Northern Territory, Australia.

Etymology: Named in honour of Scotty James of Warrandyte, Victoria, Australia, in recognition for his services for snowboarding worldwide. He was the flag bearer for Australia at the 2018 Winter Olympics, where he won a bronze medal in halfpipe. He has won numerous titles since and has inspired countless young people to get out of their homes and to enjoy the outdoor environment in sport, which in turn encourages people to want to do what is needed to preserve and enhance the world's natural assets.

RANASTER LIGNARIUS DIVERGENS SUBSP. NOV.

LSID urn:lsid:zoobank.org:act:0D46468E-C03C-4C58-889C-1CC76DF3353E

Holotype: A preserved specimen at the Museum and Art Gallery of the Northern Territory, Darwin, Northern Territory, Australia, specimen number R25944 collected at Jasper Gorge, Gregory National Park, Northern Territory, Australia, Latitude -16.03 S., Longitude 130.739 E. This government-owned facility allows access to its holdings.

Paratype: A preserved specimen at the Museum and Art Gallery of the Northern Territory, Darwin, Northern Territory, Australia, specimen number R23873, collected at the Matt Wilson Escarpment, Gregory National Park, Northern Territory, Australia, Latitude -15.458 S., Longitude 131.253 E.

Diagnosis: *Ranaster scottyjamesi sp. nov.* and *R. henrywajswelneri sp. nov.* have until now been treated as

populations of the species *R. lignarius* (Tyler, Martin and Davis, 1979) (*comb. nov.*), originally formally named *Megistolotis lignarius*, Tyler, Martin and Davis, 1979, with a type locality of 6.5 km north of Lake Argyle Tourist Village, Western Australia, Australia.

Most recent texts, including Anstis (2013), Cogger (2014) and Eipper and Rowland (2018) have placed the putative species in the genus *Limnodynastes* Fitzinger, 1843.

However morphologically and phylogenetically, the best generic placement for the relevant species is in fact within the genus *Ranaster* Macleay, 1877, type species *R. convexiusculus* Macleay, 1877.

R. lignarius, *R. henrywajswelneri sp. nov.* and *R. scottyjamesi sp. nov.*, treated in Anstis (2013), Cogger (2014) and Eipper and Rowland (2018) as a single putative species, can be separated from all other species in the genera *Ranaster*, *Limnodynastes* and *Platyplectron*, Peters, 1863 by having a distinct skin flap with papillae in the anterior corner of the eye. A detailed description of the three species (treated as one) can be found in Cogger (2014), Anstis (2013) or the original description of Tyler, Martin and Anstis (1979).

There are three main geographically disjunct populations and forms, these being one centred on the Arnhemland escarpment, the nominate form in the East Kimberley, centred on the Ord River drainage and a third form in the West Kimberley.

R. scottyjamesi sp. nov. from the Arnhemland escarpment and nearby areas is separated from both *R. lignarius* and *R. henrywajswelneri sp. nov.* by having a brownish or greyish dorsal colouration without distinctive markings and contrasting lighter areas being of a marbled appearance. These marbled markings, or spots or flecks are also on the flanks and limbs.

R. lignarius is readily separated from *R. scottyjamesi sp. nov.* and *R. henrywajswelneri sp. nov.* by having a a yellowish background colour on the dorsum punctuated with well defined medium-sized reddish-orange spots, the same colouration continuing on the limbs, but not the lower flanks, with the arrangement of markings on the limbs, not being in obvious spots as for the dorsal surface. The mid and lower flanks of *R. lignarius* are light as opposed to dark in *R. scottyjamesi sp. nov.*.

R. henrywajswelneri sp. nov. is readily separated from *R. scottyjamesi sp. nov.* and *R. lignarius* by having a creamish background on the dorsum with fairly distinct darker purplish-brown markings including one or more large and irregular shaped spots or blotches, usually seen on the upper or mid back. In terms of colouration both *R. henrywajswelneri sp. nov.* and *R. scottyjamesi sp. nov.* are similar, but the two can be readily separated by the fact that *R. henrywajswelneri sp. nov.* has weakly marked or defined pattern on the dorsal surfaces of the hind limbs, versus well marked and a well defined pattern of light blotches on a dark surface in *R. scottyjamesi sp. nov.*.

R. lignarius divergens subsp. nov. from the Gregory National Park, in north-west Northern Territory, Australia is similar in most respects to *R. lignarius* in colouration, as in having a yellowish background colour on the dorsum, but unlike the nominate subspecies, the darker dorsal markings do not show as well defined spots across the entire dorsum, but instead have a more-or-less marbled appearance, but unlike that marbled appearance seen in *R. scottyjamesi sp. nov.* the demarcation between light and dark in this subspecies is well defined.

R. lignarius divergens subsp. nov. is further separated from the nominate subspecies of *R. lignarius* by having small yellow spots on purplish forelimbs, versus large irregular yellow blotches of irregular shape and similar markings, including large spots on the forelimbs.

R. lignarius in life is depicted in Anstis (2013) on page 406, top right and page 407, bottom right and Eipper and Rowland (2018) on page 32 at bottom.

R. scottyjamesi sp. nov. in life is depicted in Cogger (2014) on page 50 at top left, Eipper and Rowland (2018) on page 32 at top and in Anstis (2013), on page 406 second down on right.

An image of *R. henrywajswelneri sp. nov.* in life can be found online at: https://www.mediastorehouse.com/australian-views/animals/frogs/woodworker-frog-limnodynastes-lignarius-10848498.html

Distribution: *R. scottyjamesi sp. nov.* is confined to Arnhemland and nearby hilly parts of the Northern Territory.

R. henrywajswelneri sp. nov. is confined to the West Kimberley region of Western Australia, Australia.

R. lignarius (of the nominate subspecies) is confined to the East Kimberley region, centred on the Ord River basin.

The subspecies *R. lignarius divergens subsp. nov.* is found in the Gregory National Park, north-west Northern Territory, Australia.

Etymology: Named in reflection of the fact that this form is divergent from the nominate subspecies in terms of morphology, distribution and historical divergence.

CONSERVATION THREATS TO THE RELEVANT SPECIES

There are no known significant immediate conservation threats to any species discussed within this paper.

However, if the Australian government persists with its “Big Australia Policy”, (see for example Saunders 2019 or Zaczek 2019), that being a long-term aim to increase the human population in Australia to over 100 million people by year 2150 (from the present 25 million as of 2019), all sorts of unforseen threats to the survival of these species may emerge.

Due to unforseen potential threats I recommend further research to identify likely potential threats including arising from land clearing for homes or farming activities, changed vegetation regimes, introduced pests and potential pathogens, including those introduced via the legal importation of non-native amphibians by government-owned zoos.

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Australasian Journal of Herpetology **43:15-26.**
Published 25 April 2020.

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

The inevitable reassessment of the Australasian frog genera *Mixophyes* Günther, 1864 and *Taudactylus* Straughan and Lee, 1966, resulting in the formal descriptions of two new families, new subfamilies and tribes, three new genera, 2 new subgenera, 1 new species and 2 new subspecies.

LSID URN:LSID:ZOOBANK.ORG:PUB:1AD72BD3-092C-49F4-9134-86FFE53EFC6F

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Received 21 February 2020, Accepted 12 March 2020, Published 25 April 2020.

ABSTRACT

The higher classification of frogs at the familial level by Bossuyt and Roelants (2009) has been generally accepted by a majority of publishing herpetologists, including in the Australian context, Cogger (2014).

Notwithstanding this, the published phylogeny of Bossuyt and Roelants (2009) and more recently that of Pyron and Weins (2011) have shown some inconsistencies within this classification.

Bossuyt and Roelants (2009) indicated families within the superfamily Myobatrachoidea as defined by them diverging in the Cretaceous (Paleogene) whereas virtually all families within the more speciose Nobleobatrachia diverged in the more recent Neogene.

To rectify this anomaly, two divergent genera within their putative Myobatrachidae have been assessed as being sufficiently divergent as to warrant being placed in separate families, both on the basis of divergence and morphology.

These genera, *Mixophyes* Günther, 1864 and *Taudactylus* Straughan and Lee, 1966 are also split into divergent lineages and new genera formally erected. A well known, but hitherto unnamed species previously confused with *Mixophyes balbus* Straughan, 1968 is also formally named for the first time.

Two endangered or recently extinct subspecies within newly two named genera are also formally named.

In total this paper formally names two new families including new subfamilies and tribes with the same diagnostic characters, three new genera, 2 new subgenera, 1 new species and 2 new subspecies.

A previously named subgenus *Paramixophyes* Hoser, 2016 is formally elevated to a full genus.

Keywords: Taxonomy; nomenclature; Anura; frogs; Australia; New Guinea; Australasia; Australia; Queensland; New South Wales; Myobatrachidae; Limnodynastidae; Rheobatrachidae; Cycloranidae; *Mixophyes*; *Taudactylus*; *Rheobatrachus*; *Paramixophyes*; New Genus; *Oxyslop*; *Hoserranae*; *Scottyjamesus*; new subgenus *Feremixophyes*; *Quasimixophyes*; new species; *hoserae*; New subspecies; *shaunwhitei*; *scottyjamesi*; New family; Oxyslopidae; Hoserranidae; New subfamily; Oxyslopinae; Hoserraninae; New tribe; Oxyslopini; Hoserranini; Scottyjamesini; *acutirostris*; *liemi*, *pleione*; *rheophilus*; *diurnis*; *eungellaensis*; *balbus*; *iteratus*; *fleayi*; *fasciolatus*; *schevilli*; *coggeri*; *carbinensis*; *hihihorlo*; *couperi*; *shireenae*.

INTRODUCTION

As part of an audit of the classification of Australian frogs, the two divergent putative genera *Mixophyes* Günther, 1864 and *Taudactylus* Straughan and Lee, 1966 were assessed.

Hoser (2016) named two previously unnamed species in the *M. fasciolatus* Günther, 1864 group and also erected a subgenus for the most divergent Australian species, *M. iteratus* Straughan, 1968.

Evidence suggested further unnamed forms, but due to severe population declines in the period from 1970 to present, access to living specimens has been difficult and compounded by a general lack of museum specimens.

Not withstanding this an audit of available literature and specimens yielded further candidate taxa with the best known of these unnamed forms being formally named herein.

This is the so-called southern population of putative *Mixophyes balbus* Straughan, 1968.

While the higher classification of frogs at the familial level by Bossuyt and Roelants (2009) has been generally accepted by a majority of publishing herpetologists, including in the Australian

context, Cogger (2014), this audit also found conflict with regards to this taxonomy.

The published phylogeny of Bossuyt and Roelants (2009) and more recently that of Pyron and Weins (2011) have shown some inconsistencies within this classification.

Bossuyt and Roelants (2009) indicated families within the superfamily Myobatrachoidea as defined by them diverging in the Cretaceous (Paleogene) whereas virtually all families within the more speciose Nobleobatrachia diverged in the more recent Neogene.

Three genera within their putative Myobatrachidae were shown by both Bossuyt and Roelants (2009) Pyron and Weins (2011) to be sufficiently divergent to warrant being separated at the family level of classification.

These putative genera were *Rheobatrachus* Liem, 1973, *Mixophyes* Günther, 1864 and *Taudactylus* Straughan and Lee, 1966.

Rheobatrachus Liem, 1973 (including as defined by Hoser 1991) was placed in a separate family Rheobatrachidae by Bossuyt and Roelants (2009), after earlier being placed in the subfamily Rheobatrachinae Heyer and Liem, 1976 and for the purposes of this paper the relevant genus is herein ignored.

However neither genus *Mixophyes* Günther, 1864 and *Taudactylus* Straughan and Lee, 1966 have available family names and so both genera are formally placed within newly erected families along with other genera created resulting from divisions of these ancient genera.

These divisions are based on divergence and morphological differences and the subgenus *Paramixophyes* Hoser, 2016 is also formally elevated to full genus status.

A well known, but hitherto unnamed species previously confused with *Mixophyes balbus* Straughan, 1968 is also formally named for the first time.

A northern regional population of the endangered or extinct species *T. acutirostris* (Andersson, 1916), herein placed in a newly erected genus *Hoserranae gen. nov.* is formally described as a new subspecies *H. acutirostris shaunwhitei subsp. nov.*.

Also a southern regional population of the endangered or extinct species *T. rheophilus* Liem and Hosmer, 1973, placed in a newly erected genus *Scottyjamesus gen. nov.* is formally described as a new subspecies *S. rheophilus scottyjamesi subsp. nov.*.

In total this paper formally names two new families, as well as new subfamilies and tribes, 3 new genera, 2 new subgenera, 1 new species and 2 new subspecies.

MATERIALS AND METHODS

While this is self evident from both abstract and introduction, I mention that inspection of specimens of relevant species has been over a 30 year period and included specimens in the field, captivity, museums, photos with good locality data and a review of all relevant and available literature.

Relevant references relevant to the taxonomy and nomenclature of species within the putative genera

Mixophyes Günther, 1864 and *Taudactylus* Straughan and Lee, 1966 and the taxonomy and nomenclature presented in this paper include the following: Andersson (1916), Anstis (2013), Barker *et al.* (1995), Berger (2001), Berger *et al.* (1999), Bossuyt and Roelants (2009), Cogger (2014), Cogger *et al.* (1983), Corben and Ingram (1987), Czechura (1986), Czechura and Ingram (1990), Donnellan *et al.* (1990), Eipper and Rowland (2018), Gillespie and Hines (1999), Günther (1864), Heyer and Liem (1976), Hoser (1989, 1991), Ingram (1980), Johnson (1971), Liem (1973), Liem and Hosmer (1973), Loveridge (1933), Lynch (1971), Mahony *et al.* (2006), McDonald (1992), Pyron and Wiens (2011), Ride *et al.* (1999), Schloegel *et al.* (2006), Straughan (1968), Straughan and Lee (1966), Vanderduys (2012), Wells and Wellington (1985), Tyler (1997), Tyler and Davies (1985) and sources cited therein.

An illegal armed raid and theft of materials on 17 Aug 2011 effectively stopped the publication of a variant of this paper being published back then and a significant amount of materials taken in that raid was not returned. This was in spite of court orders telling the relevant State Wildlife officers to do so (Court of Appeal 2014, Victorian Civil and Administrative Tribunal 2015).

Rather than run the risk of taxa becoming threatened or extinct due to non-recognition of them as shown in Hoser (2019a, 2019b), I have instead opted to publish this paper in its current form, even though a significant amount of further data was intended to be published and is not.

Naming of taxa is perhaps the most important step in their ultimate preservation and it is with this motivation in mind (protection of biodiversity) that I have chosen to publish this paper.

RESULTS

As already stated, based on morphological and molecular divergences as cited in the literature above the final taxonomic changes resulting from this audit are as follows;

The genus *Mixophyes* Günther, 1864 is split three ways, with the subgenus *Paramixophyes* Hoser, 2016 being elevated to full genus status.

The divergent New Guinea taxon, known currently as *Mixophyes hihihorlo* Donnellan, Mahony and Davies, 1990 is made type species for the newly named genus *Oxyslop gen. nov.*, with the same genus being used to form the family, subfamily and tribe containing all species placed to date in *Mixophyes*, *Paramixophyes* and *Oxyslop gen. nov.*, including the newly named species within this paper.

In terms of the frog known currently as *Mixophyes hihihorlo* Donnellan, Mahony and Davies, 1990, the original description of that taxon spells out sufficient basis for its placement in a separate genus to all other *Mixophyes.*

Mixophyes (as defined herein) is also divided into three well defined subgenera, two being formally named for the first time.

These subgenera are as follows: The nominate subgenus includes the so-called *M. fasciolatus* Günther, 1864 species group, including *M. fasciolatus* Günther, 1864, *M. shireenae* Hoser, 2016 and *M. couperi* Hoser, 2016.

The subgenus *Feremixophyes subgen. nov.* includes the north Queensland clade of species being *M. coggeri* Mahony, Donnellan, Richards and McDonald, 2016 (type species), *M. carbinensis* Mahony, Donnellan, Richards and McDonald, 2016 and *M. schevelli*, Loveridge, 1933.

The subgenus *Quasimixophyes subgen. nov.* includes members of the so-called *M. balbus* Straughan, 1968 group of species, including *M. hoserae sp. nov.* (type species), *M. balbus* and *M. fleayi* Corben and Ingram, 1987.

Species in each of the three subgenera also have significantly different reproductive biologies, further supporting the subgenus level split.

The species *M. hoserae sp. nov.* was previously regarded as the southern population of *M. balbus*. It has been known as a separate species-level taxon for some time (Anstis 2013) and in line with the recommendations of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999) it is formally named.

The putative genus *Taudactylus* Straughan and Lee, 1966 has long been known to contain various species groups and due to the ancient divergence of each, two new genera are formally erected.

These are *Hoserranae* gen. nov. for the putative species *Crinia acutirostris* Andresson, 1916 from the wet tropics of North Queensland. This genus is also used as the basis to erect a new family, and subfamily for all relevant living species.

At the tribe level, relevant species and genera are split two ways.

The genus *Scottyjamesus gen. nov.* is erected to accommodate a well-defined clade including other north Queensland species, namely *Taudactylus liemi* Ingram, 1980, *Taudactylus pleione*

Czechura, 1986 and *Taudactylus rheophilus* Liem and Hosmer, 1973.

A northern regional population of the endangered or extinct species *T. acutirostris* (Andersson, 1916), herein placed in a newly erected genus *Hoserranae gen. nov.* is formally described as a new subspecies *H. acutirostris shaunwhitei subsp. nov.*.

Also a southern regional population of the endangered or extinct species *T. rheophilus* Liem and Hosmer, 1973, placed in a newly erected genus *Scottyjamesus gen. nov.* is formally described as a new subspecies *S. rheophilus scottyjamesi subsp. nov.*.

The genus *Taudactylus* with the type species of *T. diurnis* Straughan and Lee, 1966 only includes that species and the similar *T. eungellensis* Liem and Hosmer, 1973.

The antiquity of divergence of the three groups makes the argument for creation of three separate genera compelling.

Of these three genera, they are also split into two tribes that are easily defined and separated.

The tribe Hoserranini tribe nov. includes the genus *Hoserranae gen. nov.* only from the wet tropics of far north Queensland, while the new tribe Scottyjamesini tribe nov. includes the two genera *Taudactylus* Straughan and Lee, 1966 and *Scottyjamesus gen. nov.*.

The genus *Mixophyes* has in the recent past been placed in various families or subfamilies, including Myobatrachidae as seen in Cogger *et al.* (1983) or Cogger (2014) or Cycloraninae Parker, 1940, by Lynch (1971), with the molecular results of Pyron and Weins (2011) suggesting a relationship with the Limnodynastidae.

None of these placements actually suit the genus which has a divergence from all nominal groups extending to the Cretaceous. Hence in this paper, I formally erect a new family for the three genera

Oxyslop gen. nov., *Mixophyes* and *Paramixophyes*, with *Oxyslop gen. nov.* as the type genus.

A similar situation occurs for the divergent genus *Taudactylus* Straughan and Lee, 1966, including newly named genera *Hoserranae gen. nov.* and *Scottyjamesus* gen. nov.. Hence in this paper, I formally erect a new family for the three genera, with *Hoserranae gen. nov.* as the type genus.

In the case of the new families Oxyslopidae fam. nov. and Hoserranidae fam. nov., new subfamilies and tribes are formally erected and defined to allow for addition of fossil member species if and when they are found.

INFORMATION RELEVANT TO THE FORMAL DESCRIPTIONS THAT FOLLOW

There is no conflict of interest in terms of this paper or the conclusions arrived at herein.

Several people including anonymous peer reviewers who revised the manuscript prior to publication are also thanked as a relevant staff at museums who made specimens and records available in line with international obligations.

In terms of the following formal descriptions, spellings should not be altered in any way for any purpose unless expressly and exclusively called for by the rules governing Zoological Nomenclature as administered by the International Commission of Zoological Nomenclature.

In the unlikely event two newly named taxa are deemed conspecific by a first reviser, then the name to be used and retained is that which first appears in this paper by way of page priority and as listed in the abstract keywords.

Some material in descriptions for taxa may be repeated for other taxa in this paper and this is necessary to ensure each fully complies with the provisions of the *International Code of Zoological Nomenclature* (Fourth edition) (Ride *et al.* 1999) as amended online since.

Material downloaded from the internet and cited anywhere in this paper was downloaded and checked most recently as of 20 February 2020, unless otherwise stated and were accurate in terms of the context cited herein as of that date.

Unless otherwise stated explicitly, colour descriptions apply to living adult specimens of generally good health and not under any form of stress by means such as excessive cool, heat, dehydration or abnormal skin reaction to chemical or other input.

While numerous texts and references were consulted prior to publication of this paper, the criteria used to separate the relevant species has already been spelt out and/or is done so within each formal description and does not rely on material within publications not cited herein.

Each newly named taxon is readily and consistently separable from their nearest related taxon and that which until now it has been previously treated as.

Delays in recognition of these taxa could jeopardise the long-term survival of these taxa as outlined by Hoser (2019a, 2019b) and sources cited therein, especially noting the devastating effects of fungus and other potential pathogens in terms of declines in all relevant taxa since the 1970's as noted in the references cited above.

Therefore attempts by taxonomic vandals like the Wolfgang Wüster gang (Kaiser *et al.* 2013 as amended frequently) to unlawfully suppress the recognition of these taxa on the basis they have a personal dislike for the person who formally named it should be resisted (Dubois *et al.* 2019).

Claims by the Wüster gang against this paper and the descriptions herein will no doubt be no different to those the gang have made previously.

See the complete discrediting of the Wüster gang claims, cited as Kaiser *et al.* (2013) and Kaiser (2012a, 2012b, 2013. 2014a, 2014b) in the publications of Dubois *et al.* (2019), Hoser (1989, 1991, 2007, 2009, 2012a, 2012b, 2013, 2015a-f, 2019a-b) and sources cited therein.

In terms of conservation prospects, all relevant genera are regarded as being in serious decline and at risk of extinction, with primary blame being placed in the Australian government and State governments, in particular via the actions of the State wildlife departments and their steadfast refusal to enact proper captive breeding programs for the relevant taxa in any meaningful way.

The long term overpopulation of the continent with feral humans (Saunders, 2019) does not auger well for the long term survival of any of the relevant species!

In line with the Australian Federal Government's "Big Australia" policy, that being to increase the human population of 25 million (2020), from 13 million in around 1970, to over 100 million within 100 years "so that we can tell China what to do", as stated by the former Prime Minister, Kevin Rudd in 2019 (Zaczek 2019), the human pressure on the relevant ecosystems has increased in line with the human populations nearby and will clearly continue to do so.

GENUS *MIXOPHYES* GUNTHER, 1864

Type species: *Mixophyes fasciolatus* Günther 1864.

Diagnosis: The genus *Mixophyes* (*sensu lato*) are the so-called Barred Frogs from riverine and rainforest habitats and nearby areas in Eastern Australia. Of Gondawanan origins, they are large muscular frogs with powerful hind limbs, strongly webbed feet and banded legs capable of long jumps. Maxillary teeth are present. Prominent vomerine teeth are in front of the choanae. Pupil is vertical. Tympanum distinct. There is typically a large narrow dark brown or black stripe from the snout to the eye, but interrupted by the nostril and extending behind the eye and over and behind the tympanum, where it tends to broaden, either imperceptibly or significantly, depending mainly on the species.

Females are the larger sex and reproduction is somewhat unusual among frogs in that amplexing pairs produce eggs in water and then using her hind limbs, the female projects newly laid eggs up onto the stream bank where they stick to rocks or vegetation, where they remain until hatching in rain, causing the tadpoles to wash down and return into the stream.

These frogs are separated from all other Australian species by the following characters: having a broadly oval and large tongue

that does not adhere to the floor of the mouth at the rear and the prevomer is well-developed with prominent vomerine teeth (adapted from Cogger, 2014).

The preceding diagnosis also applies to the new genus *Oxyslop gen. nov.*, the single species of which was until now included in this genus.

Oxyslop gen. nov. with a type species of *Mixophyes hihihorlo* Donnellan, Mahony and Davies, 1990 from New Guinea is readily separated from all (other) species in *Mixophyes* (all from Australia), including all species or subspecies of *Paramixophyes* Hoser, 2016 by possessing an uninterrupted narrow vertebral stripe extending from between the eyes to just above the vent and by the absence of a dark triangular patch on the upper lip in front of the nostril with its base along upper lip and apex at nostril. It is further readily separated from all other species in *Mixophyes* (all from Australia) by having longer legs and distinctively smaller eyes and extensive toe webbing.

Additionally *Oxyslop gen. nov.* is distinguished by details of its karyotype and osteology as detailed by Donnellan *et al.* (1990).

Paramixophyes Hoser, 2016, type species *M. iteratus* Straughan, 1968, herein elevated to full genus status, is found along the east coast and ranges of New South Wales from west of Sydney to south-east Queensland and are separated from all (other) species within *Mixophyes* by the fact that the length of the inner metatarsal tubercle is only about half the length of the first toe (versus being nearly of equal length in the other species), and that only two joints of the fourth toe are free of web (versus three joints of the toe being free of web in the other species).

Physically *Paramixophyes* presents as being of different shape to the other species by being more triangular in overall shape and with proportionately larger hind limbs. *M. iteratus* is also of a different size class to the other members of the genus, it attaining up to 115 mm in body length, versus no more than 100 mm (usually 80 mm) in the other species. Straughan (1968) provides detail of other differences between *P. iteratus* and other species in the genus *Mixophyes*.

Distribution: With the formal transfer of *Mixophyes hihihorlo* Donnellan, Mahony and Davies, 1990 to the genus *Oxyslop gen. nov.* all species of *Mixophyes* are now restricted to Australia from Cape York, Queensland, in wetter habitats along the coast south through New South Wales to just into Victoria in the far north-east of the state. Populations in many areas have declined sharply or become extinct since the 1970's, while apparently remaining stable in other areas.

Oxyslop gen. nov. is effectively only known from the type locality of Namosado at an elevation of 900 metres in the Southern Highlands Province of Papua New Guinea.

Content: *Mixophyes fasciolatus* Günther 1864 (type species); *M. balbus* Straughan, 1968; *M. carbinensis* Mahony, Donnellan, Richards and McDonald, 2006; *M. coggeri* Mahony, Donnellan, Richards and McDonald, 2006; *M. couperi* Hoser, 2016; *M. hoserae sp. nov.* (this paper); *M. shireenae* Hoser, 2016; *M. fleayi* Corben and Ingram, 1987; *M. schevelli* Loveridge, 1933.

NEW GENUS *OXYSLOP GEN. NOV.*

LSIDurn:lsid:zoobank.org:act:D763BF5E-63DB-4855-A6F3-BBD46BEBAAF3

Type species: *Mixophyes hihihorlo* Donnellan, Mahony and Davies, 1990.

Diagnosis: The genus *Mixophyes* (*sensu lato*) are the so-called Barred Frogs from riverine and rainforest habitats and nearby areas in Eastern Australia. Of Gondawanan origins, they are large muscular frogs with powerful hind limbs, strongly webbed feet and banded legs capable of long jumps. Maxillary teeth are present. Prominent vomerine teeth are in front of the choanae. Pupil is vertical. Tympanum distinct. There is typically a large narrow dark brown or black stripe from the snout to the eye, but interrupted by the nostril and extending behind the eye and over and behind the tympanum, where it tends to broaden, either imperceptibly or significantly, depending mainly on the species. Females are the larger sex and reproduction is somewhat unusual among frogs in that amplexing pairs produce eggs in water and then using her hind limbs, the female projects newly laid eggs up onto the stream bank where they stick to rocks or vegetation, where they remain until hatching in rain, causing the tadpoles to wash down and return into the stream.

These frogs are separated from all other Australian species by the following characters: having a broadly oval and large tongue that does not adhere to the floor of the mouth at the rear and the prevomer is well-developed with prominent vomerine teeth (adapted from Cogger, 2014). The preceding diagnosis also applies to the new genus *Oxyslop gen. nov.*, the single species of which was until now included in this genus.

Oxyslop gen. nov. with a type species of *Mixophyes hihihorlo* Donnellan, Mahony and Davies, 1990 from New Guinea is readily separated from all (other) species in *Mixophyes* (all from Australia), including all species or subspecies of *Paramixophyes* Hoser, 2016 by possessing an uninterrupted narrow vertebral stripe extending from between the eyes to just above the vent and by the absence of a dark triangular patch on the upper lip in front of the nostril with its base along upper lip and apex at nostril. It is further readily separated from all other species in *Mixophyes* (all from Australia) by having longer legs and distinctively smaller eyes and extensive toe webbing.

Additionally *Oxyslop gen. nov.* is distinguished by details of its karyotype and osteology as detailed by Donnellan *et al.* (1990).

Paramixophyes Hoser, 2016, type species *M. iteratus* Straughan, 1968, herein elevated to full genus status, is found along the east coast and ranges of New South Wales from west of Sydney to south-east Queensland and are separated from all (other) species within *Mixophyes* by the fact that the length of the inner metatarsal tubercle is only about half the length of the first toe (versus being nearly of equal length in the other species), and that only two joints of the fourth toe are free of web (versus three joints of the toe being free of web in the other species).

Physically *Paramixophyes* presents as being of different shape to the other species by being more triangular in overall shape and with proportionately larger hind limbs. *M. iteratus* is also of a different size class to the other members of the genus, it attaining up to 115 mm in body length, versus no more than 100 mm (usually 80 mm) in the other species. Straughan (1968) provides detail of other differences between *M.iteratus* and others in the genus.

Distribution: *Oxyslop gen. nov.* is effectively only known from the type locality of Namosado at an elevation of 900 metres in the Southern Highlands Province of Papua New Guinea.

With the formal transfer of *Mixophyes hihihorlo* Donnellan, Mahony and Davies, 1990 to the genus *Oxyslop gen. nov.* all species of *Mixophyes* are now restricted to Australia from Cape York, Queensland, in wetter habitats along the coast south to just into Victoria in the far north-east of the state. Populations in many areas have declined sharply or become extinct since the 1970's, while apparently remaining stable in other areas.

Etymology: Named in honour of two pet Great Danes the Hoser family and Snakebusters: Australia's best reptiles shows have owned over two dog lifetime's. Both dogs, named Slop and Oxy (short for *Oxyuranus*) guarded the research facility and home for nearly 2 decades and successfully protected all from potential attacks by thieves.

Content: *Oxyslop hihihorlo* (Donnellan, Mahony and Davies, 1990) (monotypic).

SUBGENUS *FEREMIXOPHYES SUBGEN. NOV.*

LSID urn:lsid:zoobank.org:act:6384D119-AB90-4AE5-8F3D-D577D6157285

Type species: *Mixophyes coggeri* Mahony, Donnellan, Richards and McDonald, 2016.

Diagnosis: The subgenus *Feremixophyes subgen. nov.* is readily separated from the other two subgenera within

Mixophyes Günther, 1864 by the following two characters: The length of the inner metatarsal tubercule is approximately half the length of the first toe versus nearly equal to the length in the other two subgenera and the webbing between the toes extends to the second most distal joint of the fourth toe. The web extends to the third most distal joint of the fourth toe in the other two subgenera and to the terminal disc of the fourth toe in *Oxyslop gen. nov.*.

Feremixophyes subgen. nov. can be separated from *Paramixophyes* Hoser, 2016 by having a few or no scattered dark spots on the side versus a broad zone of numerous dark spots on the side.

Feremixophyes subgen. nov. can also be distinguished from *Oxyslop gen. nov.* by the absence of an uninterrupted narrow vertebral stripe extending from between the eyes to just above the vent.

Frogs within the subgenus *Quasimixophyes subgen. nov.* are separated from the nominate subgenus of *Mixophyes* by having a grey (not whitish) upper lip and areas of darker pigment being prominent on the upper lip, versus a pale creamy-white upper lip without obvious darker blotches in *Mixophyes*.

The nominate subgenus of *Mixophyes* includes the so-called *M. fasciolatus* Günther, 1864 species group, including *M. fasciolatus* Günther, 1864, *M. shireenae* Hoser, 2016 and *M. couperi* Hoser, 2016 from wetter forested riverine habitats south of the wet tropics in Queensland along the coast and nearby ranges to southern New South Wales.

The subgenus *Feremixophyes subgen. nov.* includes the north Queensland clade of species being *M. coggeri* Mahony, Donnellan, Richards and McDonald, 2016 (type species), *M. carbinensis* Mahony, Donnellan, Richards and McDonald, 2016 and *M. schevelli*, Loveridge, 1933 and is confined to the wet tropics region of far north Queensland.

The subgenus *Quasimixophyes subgen. nov.* includes members of the so-called *M. balbus* Straughan, 1968 group of species, including *M. hoserae sp. nov.* (type species), *M. balbus* and *M. fleayi* Corben and Ingram, 1987 are found from south-east Queensland south along the coast and nearby ranges to north-east Victoria. Species in each of the three subgenera also have significantly different reproductive biology's further supporting the subgenus level split.

Distribution: *Feremixophyes subgen. nov* is confined to the wet tropics region of far north Queensland.

Etymology: "Fere" in Latin means nearly or not quite, in reflection of the fact that species in this subgenus are not quite the same as nominate *Mixophyes*.

Content: *M.* (*Feremixophyes*) *coggeri* Mahony, Donnellan, Richards and McDonald, 2016 (type species); *M.* (*Feremixophyes*) *carbinensis* Mahony, Donnellan, Richards and McDonald, 2016; *M.* (*Feremixophyes*) *schevelli* Loveridge, 1933.

SUBGENUS *QUASIMIXOPHYES SUBGEN. NOV.*

LSID urn:lsid:zoobank.org:act:8D705124-C4AC-4084-A62C-17EBCF69BE72

Type species: *Mixophyes* (*Quasimixophyes*) *hoserae sp. nov.* (this paper).

Diagnosis: Frogs within the subgenus *Quasimixophyes subgen. nov.* are separated from the nominate subgenus of *Mixophyes* by having a grey (not whitish) upper lip and areas of darker pigment being prominent on the upper lip, versus a pale creamy-white upper lip without obvious darker blotches in *Mixophyes*.

The subgenus *Feremixophyes subgen. nov.* is readily separated from the other two subgenera within *Mixophyes* Günther, 1864 by the following two characters: The length of the inner metatarsal tubercule is approximately half the length of the first toe versus nearly equal to the length in the other two subgenera and the webbing between the toes extends to the second most distal joint of the fourth toe. The web extends to the third most distal joint of the fourth toe in the other two subgenera and to the terminal disc of the fourth toe in *Oxyslop gen. nov.*.

Feremixophyes subgen. nov. can be separated from *Paramixophyes* Hoser, 2016 by having a few or no scattered dark spots on the side versus a broad zone of numerous dark spots on the side.

Feremixophyes subgen. nov. can also be distinguished from *Oxyslop gen. nov.* by the absence of an uninterrupted narrow vertebral stripe extending from between the eyes to just above the vent.

The nominate subgenus of *Mixophyes* includes the so-called *M. fasciolatus* Günther, 1864 species group, including *M. fasciolatus* Günther, 1864, *M. shireenae* Hoser, 2016 and *M. couperi* Hoser, 2016 from wetter forested riverine habitats south of the wet tropics in Queensland along the coast and nearby ranges to southern New South Wales.

The subgenus *Feremixophyes subgen. nov.* includes the north Queensland clade of species being *M. schevelli*, Loveridge, 1933 (type species), *M. coggeri* Mahony, Donnellan, Richards and McDonald, 2016 and *M. carbinensis* Mahony, Donnellan, Richards and McDonald, 2016 and is confined to the wet tropics region of far north Queensland.

The subgenus *Quasimixophyes subgen. nov.* includes members of the so-called *M. balbus* Straughan, 1968 group of species, including *M. hoserae sp. nov.* (type species), *M. balbus* and *M. fleayi* Corben and Ingram, 1987 are found from south-east Queensland south along the coast and nearby ranges to north-east Victoria. Species in each of the three subgenera also have significantly different reproductive biology's further supporting the subgenus level split.

Distribution: *Quasimixophyes subgen. nov* are found from south-east Queensland south along the coast and nearby ranges to north-east Victoria.

Etymology: "Quasi" in Latin means like or similar to, in reflection of the fact that species in this subgenus are similar to those in the nominate subgenus *Mixophyes*.

Content: *Mixophyes* (*Quasimixophyes*). *hoserae sp. nov.* (type species); *M.* (*Quasimixophyes*) *balbus* Straughan, 1968; *M.* (*Quasimixophyes*) *fleayi* Corben and Ingram, 1987.

NEW SPECIES *MIXOPHYES* (*QUASIMIXOPHYES*) *HOSERAE SP. NOV.*

LSIDurn:lsid:zoobank.org:act:78261296-B441-4A75-B17F-0CC0EC76DAFA

Holotype: A preserved specimen in the Australian Museum Herpetology Collection, Sydney, NSW, Australia, specimen number R.118312, collected by Marion Anstis in the Wattagan Ranges, New South Wales, Australia, Latitude -33.0 S., Longitude 151.4 E. This government-owned facility allows access to its holdings.

Paratype: A preserved specimen in the Australian Museum Herpetology Collection, Sydney, NSW, Australia, specimen number R.118306, collected by Marion Anstis in the Wattagan Ranges, New South Wales, Australia, Latitude -33.0 S., Longitude 151.4 E.

Diagnosis: Until now *Mixophyes* (*Quasimixophyes*). *hoserae sp. nov.* has been treated as a southern population of the well-known species *M.* (*Quasimixophyes*) *balbus* Straughan, 1968.

All three species in the subgenus *Quasimixophyes subgen. nov.* are separated from the nominate subgenus of *Mixophyes* by having a grey (not whitish) upper lip and areas of darker pigment being prominent on the upper lip, versus a pale creamy-white upper lip without obvious darker blotches in *Mixophyes*.

The subgenus *Feremixophyes subgen. nov.* is readily separated from the other two subgenera within *Mixophyes* Günther, 1864, namely *Mixophyes* and *Quasimixophyes subgen. nov.* by the following two characters: The length of the inner metatarsal tubercule is approximately half the length of the first toe versus nearly equal to the length in the other two subgenera and the webbing between the toes extends to the second most distal joint of the fourth toe. The web extends to the third most distal joint of the fourth toe in the other two subgenera and to the

terminal disc of the fourth toe in *Oxyslop gen. nov.*.

Feremixophyes subgen. nov. can be separated from *Paramixophyes* Hoser, 2016 by having a few or no scattered dark spots on the side versus a broad zone of numerous dark spots on the side. *Feremixophyes subgen. nov.* can also be distinguished from *Oxyslop gen. nov.* by the absence of an uninterrupted narrow vertebral stripe extending from between the eyes to just above the vent.

Within *Quasimixophyes subgen. nov.* the species *M.* (*Quasimixophyes*) *fleayi* Corben and Ingram, 1987 is separated from the other two species *M.* (*Quasimixophyes*) *balbus* Straughan, 1968 and *M.* (*Quasimixophyes*) *hoserae sp. nov.* by having well-defined dark cross bands on the limbs, which also widen posteriorly to form dark triangles that are visible from below, as well as an evenly spaced series of conspicuous black spots or blotches on the side, versus ill-defined cross bands on the forelimbs and only moderately well-defined on the upper hind limbs in the other two species and dark spots or blotches on the side being either infrequent and irregular (in *M. balbus*) or absent (in *M. hoserae sp. nov.*).
M. balbus is further separated from *M. hoserae sp. nov.* by having a broad, irregular, or broken band or patches forming a band, running down the middle of the back. This is not the case for *M. hoserae sp. nov.*.

Both *M. fleayi* and *M. balbus* have a prominent silvery white to blue crescent on top of the iris, whereas this is either indistinct or absent in *M. hoserae sp. nov.*.

An image of living *M. hoserae sp. nov.* can be found on page 29 of Hoser (1989) in the top image or alternatively in Anstis (2013) on page 425 at top right in amplexus.

An image of living *M. balbus* can be seen in Anstis (2013) on page 425 in the top left image and bottom right image.

Images of living *M. fleayi* in life can be found in Anstis (2013) at page 440 (top three images).

Distribution: *M.* (*Quasimixophyes*) *balbus* Straughan, 1968 is found from Mount Royal Range, west of Barrington Tops, New South Wales, and further north to about the Queensland, New South Wales border. *M.* (*Quasimixophyes*) *hoserae sp. nov.* is found from Barrington Tops south to the far north-east of Victoria. *M. fleayi* Corben and Ingram, 1987 if found in wetter ranges of south-east Queensland from the Conondale Range, south to far north-east New South Wales.

NEW GENUS *HOSERRANAE GEN. NOV.*

LSID urn:lsid:zoobank.org:act:6A621156-B7B3-4A3F-842C-6CBF92858EBA

Type species: *Crinia acutirostris* Andersson, 1916.

Diagnosis: The genera *Hoserranae gen. nov.* and *Scottyjamesus gen. nov.* both include species formerly included within the genus *Taudactylus* Straughan and Lee, 1996 and as a trio can be separated from all other Australian frogs by the following suite of characters:

Tongue small and narrowly oval and does not adhere to the rear of the mouth; maxillary teeth present; prevomer reduced or absent; vomerine teeth absent. No dermal brood pouches on the flanks; Terminal phlanges T-shaped; tips of fingers and toes all normal and with small but distinct discs; toes with at most only having basal webbing or fringes. Outer metatarsal tubercle, if present is much smaller than the inner metatarsal tubercle,

Frogs in the genus *Hoserranae gen. nov.* are readily separated from those in the genera *Taudactylus* as defined herein and *Scottyjamesus gen. nov.* by having a distinct dorsolateral skin fold present; a pointed and overslung snout and nostrils are much nearer the mouth than the tip of the snout, versus no dorsolateral skin fold; rounded snout; normal nostril being about equidistant from the mouth and the tip of the snout in both *Taudactylus* as defined herein and *Scottyjamesus gen. nov.*.
The genus *Scottyjamesus gen. nov.* is in turn separated from the genus *Taudactylus* by having disks on fingers and toes only slightly wider than the penultimate phalanx, versus noticeably wider than the penultimate phalanx in *Taudactylus.*

The only species remaining within *Taudactylus* are the type species, *Taudactylus diurnis* Straughan and Lee, 1966 and the morphologically similar *T. eungellensis* Liem and Hosmer, 1973.

Distribution: *Hoserranae gen. nov.* are generally confined to the wet tropics region of Queensland, Australia in high altitude areas of high rainfall, generally near the coast, between the Cardwell Ranges in the South and Big Tableland in the North. There is a gap in the distribution of the genus in a relatively low-lying area north of Cairns and south of Port Douglas, in a zone sometimes called the Black Mountain Corridor. Most if not all known populations may as of 2020 be extinct.

Etymology: *Hoserranae gen. nov.* is named in honour of my wife, Shireen Hoser, for her numerous sacrifices for wildlife conservation spanning more than 20 years.

Content: *Hoserranae acutirostris* (Andersson, 1916) (including two subspecies).

NEW GENUS *SCOTTYJAMESUS GEN. NOV.*
LSID urn:lsid:zoobank.org:act:745A4F0F-016F-4D05-AA17-E9FF880DF455

Type species: *Taudactylus rheophilus* Liem and Hosmer, 1973.

Diagnosis: The genera *Scottyjamesus gen. nov.* and *Hoserranae gen. nov.* both include species formerly included within the genus *Taudactylus* Straughan and Lee, 1996 and as a trio can be separated from all other Australian frogs by the following suite of characters:

Tongue small and narrowly oval and does not adhere to the rear of the mouth; maxillary teeth present; prevomer reduced or absent; vomerine teeth absent. No dermal brood pouches on the flanks; Terminal phlanges T-shaped; tips of fingers and toes all normal and with small but distinct discs; toes with at most only having basal webbing or fringes. Outer metatarsal tubercle, if present is much smaller than the inner metatarsal tubercle,

Frogs in the genus *Hoserranae gen. nov.* are readily separated from those in the genera *Taudactylus* as defined herein and *Scottyjamesus gen. nov.* by having a distinct dorsolateral skin fold present; a pointed and overslung snout and nostrils are much nearer the mouth than the tip of the snout, versus no dorsolateral skin fold; rounded snout; normal nostril being about equidistant from the mouth and the tip of the snout in both *Taudactylus* as defined herein and *Scottyjamesus gen. nov.*.
The genus *Scottyjamesus gen. nov.* is in turn separated from the genus *Taudactylus* by having disks on fingers and toes only slightly wider than the penultimate phalanx, versus noticeably wider than the penultimate phalanx in *Taudactylus.*

The only species remaining within *Taudactylus* are the type species, *Taudactylus diurnis* Straughan and Lee, 1966 and the morphologically similar *T. eungellensis* Liem and Hosmer, 1973.

Distribution: *Scottyjamesus gen. nov.* species are found from the northern wet tropics region of Queensland, Australia in high altitude areas of high rainfall, generally south of Cape Tribulation and North of Babinda, with a gap in the relatively low dry area north of Cairns and south of Port Douglas (this area sometimes called the Black Mountain Corridor) as well as near Eungella, west of Mackay and Kroombit Tops, all in Queensland, Australia.

Etymology: *Scottyjamesus gen. nov.* is named in honour of world snowboarding champion, Scotty James, of Warrandyte, Victoria, Australia, in recognition of his services to outdoor sports worldwide. He was the flag bearer for Australia at the 2018 Winter Olympics, where he won a bronze medal in halfpipe and has won many snowboarding titles in the two years since.

Content: *Scottyjamesus rheophilus* (Liem and Hosmer, 1973) (type species); *S. liemi* (Ingram, 1980); *S. pleione* (Czechura, 1986).

NEW SUBSPECIES *HOSERRANAE ACUTIROSTRIS SHAUNWHITEI SUBSP. NOV.*

LSID urn:lsid:zoobank.org:act:BCCFC11F-F31D-47B6-B2DE-C76B1FC6D8AB

Holotype: A preserved specimen at the Queensland Museum,

Brisbane, Queensland, Australia, specimen number J27270, collected at Mount Finnigan, Queensland, Australia, Latitude -15.8333 S., Longitude 145.2667 E. This government-owned facility allows access to its holdings.

Paratype: A preserved specimen at the Queensland Museum, Brisbane, Queensland, Australia, specimen number J54163 collected at Thornton Peak National Park, Queensland, Australia, Latitude -16.1667 S., Longitude 145.3667 S.

Diagnosis: The diagnosis for the species *Hoserranae acutirostris* (Andersson, 1916) is the same as for the genus *Hoserranae gen. nov.*. *Hoserranae acutirostris shaunwhitei subsp. nov.* is separated from the type subspecies *Hoserranae acutirostris acutirostris* (Andersson, 1916) by having whiteish, reddish, yellow or orange front feet invariably with some distinct markings on them, versus greyish and generally unmarked in nominate *H. acutirostris acutirostris*.

H. acutirostris shaunwhitei subsp. nov. is further separated from the type subspecies *H. acutirostris acutirostris* by having numerous obvious but tiny white spots or flecks on the mid flanks versus none or very few in *H. acutirostris acutirostris*.

H. acutirostris shaunwhitei subsp. nov. have well banded back legs and feet, versus indistinctly banded in *H. acutirostris acutirostris.*

Frogs in the genus *Hoserranae gen. nov.* (as in the two subspecies *H. acutirostris acutirostris* and *H. acutirostris shaunwhitei subsp. nov.*) are readily separated from those in the genera *Taudactylus* as defined herein and *Scottyjamesus gen. nov.* by having a distinct dorsolateral skin fold present; a pointed and overslung snout and nostrils are much nearer the mouth than the tip of the snout, versus no dorsolateral skin fold; rounded snout; normal nostril being about equidistant from the mouth and the tip of the snout in both *Taudactylus* as defined herein and *Scottyjamesus gen. nov.*.

The genus *Scottyjamesus gen. nov.* is in turn separated from the genus *Taudactylus* by having disks on fingers and toes only slightly wider than the penultimate phalanx, versus noticeably wider than the penultimate phalanx in *Taudactylus.*

The geological and climate history for the wet tropics strongly suggests that the two subspecies *H. acutirostris acutirostris* and *H. acutirostris shaunwhitei subsp. nov.* are sufficiently divergent to be regarded as full species, but this taxonomic designation is deferred pending molecular evidence becoming available.

Due to the fact that one or both species are potentially extinct, or very close to it, the scientific recognition of the two geographically separated populations that are (or were) evolving separately is done herein as a matter of urgency.

H. acutirostris acutirostris in life is depicted in Cogger (2014) on page 144, at top left, with the same image in Eipper and Rowland (2018) on page 89 at top (photo reversed).

H. acutirostris shaunwhitei subsp. nov. in life is depicted in Anstis (2013), in the two top images and Vanderduys (2012) on page160 (bottom).

Distribution: *H. acutirostris shaunwhitei subsp. nov.* is found in a region bounded by Mount Molloy in the south and Big Tableland in the north, north Queensland, Australia.

H. acutirostris acutirostris is found in a region bounded by Cardwell Ranges in the south and Cairns in the north, north Queensland, Australia.

Etymology: Named in honour of Shaun Roger White of the United States of America for services to outdoor sports in his achievements as a world champion at his sport. Shaun White, born September 3, 1986, is an American professional snowboarder, skateboarder and musician. He is a three-time Olympic gold medalist. As of 2020, he held the record for the most X-Games gold medals and most Olympic gold medals by a snowboarder and had won 10 ESPY Awards.

NEW SUBSPECIES *SCOTTYJAMESUS RHEOPHILUS SCOTTYJAMESI SUBSP. NOV.*

LSID urn:lsid:zoobank.org:act:7E5ABBE7-F050-4014-9B20-093C0AC2F455

Holotype: A preserved specimen at the Queensland Museum, Brisbane, Queensland, Australia, specimen number J81652 collected at Bellenden Ker Range, Queensland, Australia, Latitude -17.3 S., Longitude 145.9 E. This government-owned facility allows access to its holdings.

Paratype: A preserved specimen at the Queensland Museum, Brisbane, Queensland, Australia, specimen number J71284 collected at Lamb Range State Forest, Queensland, Australia, Latitude -17.1 S., Longitude 145.6 E.

Diagnosis: The putative species *Scottyjamesus rheophilus* (Liem and Hosmer, 1973) is separated from all other species in the genus *Scottyjamesus gen. nov.* and all species in the genus *Taudactylus* Straughan and Lee, 1966 by having a head that is broad, its width being .38 times the snout-vent length and has fingers with prominent raised subarticular tubercles. By contrast all other species in the genus *Scottyjamesus gen. nov.* and all species in the genus *Taudactylus* have a head that is normal in width being less than .38 times the snout-vent length and has fingers with at most, low rounded subarticular tubercles.

Scottyjamesus rheophilus scottyjamesi subsp. nov. is separated from *Scottyjamesus rheophilus rheophilus* (Liem and Hosmer, 1973) by having relatively indistinct round cream blotches on the belly and lower flanks, versus obvious and distinct in *S. rheophilus rheophilus. S. rheophilus rheophilus* have strongly barred forelimbs versus weak to moderately barred in *S. rheophilus scottyjamesi subsp. nov.*.

The genera *Scottyjamesus gen. nov.* and *Hoserranae gen. nov.* both include species formerly included within the genus *Taudactylus* Straughan and Lee, 1996 and as a trio can be separated from all other Australian frogs by the following suite of characters: Tongue small and narrowly oval and does not adhere to the rear of the mouth; maxillary teeth present; prevomer reduced or absent; vomerine teeth absent. No dermal brood pouches on the flanks; Terminal phlanges T-shaped; tips of fingers and toes all normal and with small but distinct discs; toes with at most only having basal webbing or fringes. Outer metatarsal tubercle, if present is much smaller than the inner metatarsal tubercle.

Frogs in the genus *Hoserranae gen. nov.* are readily separated from those in the genera *Taudactylus* as defined herein and *Scottyjamesus gen. nov.* by having a distinct dorsolateral skin fold present; a pointed and overslung snout and nostrils are much nearer the mouth than the tip of the snout, versus no dorsolateral skin fold; rounded snout; normal nostril being about equidistant from the mouth and the tip of the snout in both *Taudactylus* as defined herein and *Scottyjamesus gen. nov.*.

The genus *Scottyjamesus gen. nov.* is in turn separated from the genus *Taudactylus* by having disks on fingers and toes only slightly wider than the penultimate phalanx, versus noticeably wider than the penultimate phalanx in *Taudactylus.*

The only species remaining within *Taudactylus* are the type species, *Taudactylus diurnis* Straughan and Lee, 1966 and the morphologically similar *T. eungellensis* Liem and Hosmer, 1973.

The geological and climate history for the wet tropics strongly suggests that the two subspecies *S. rheophilus scottyjamesi subsp. nov.* and *S. rheophilus rheophilus* are sufficiently divergent to be regarded as full species, but this taxonomic designation is deferred until molecular evidence is available.

Due to the fact that one or both species are potentially extinct, or very close to it, the scientific recognition of the two geographically separated populations that are (or were) evolving separately is done herein as a matter of urgency.

Anstis (2013), citing other works, reported that no specimens of either subspecies had been found in the wild since year 2000 and that both may already be extinct.

Distribution: *S. rheophilus scottyjamesi subsp. nov.* is known only from the collection localities of the holotype and paratype, being Bellenden Ker Range, Queensland, Australia, Latitude -17.3 S., Longitude 145.9 E. in the south and Lamb Range State Forest, Queensland, Australia, Latitude -17.1 S., Longitude

145.6 E in the north (and north-west), north Queensland, Australia. *S. rheophilus rheophilus* is known only from the northern wet tropics, North Queensland, Australia generally near the type locality of Mount Lewis, also at high altitude.

Etymology: *Scottyjamesus gen. nov.* and the subspecies *S. rheophilus scottyjamesi subsp. nov.* ar both named in honour of world snowboarding champion, Scotty James, of Warrandyte, Victoria, Australia, in recognition of his services to outdoor sports worldwide. He was the flag bearer for Australia at the 2018 Winter Olympics, where he won a bronze medal in halfpipe and has won numerous other titles in the two years since.

NEW FAMILY OXYSLOPIDAE FAM. NOV.

LSID urn:lsid:zoobank.org:act:AFB1C51B-8C4B-4ED9-A601-A64A85058246

Type genus: *Oxyslop gen. nov.* (this paper).

Diagnosis: The family Oxyslopidae fam. nov. as currently understood has the same diagnostic characters as for the genus *Mixophyes* Günther, 1864 (*sensu lato*) as understood previous to the publication of this paper.

Oxyslopidae fam. nov. are the so-called Barred Frogs from riverine and rainforest habitats and nearby areas in Eastern Australia. Being of Gondawanan origins, they are large muscular frogs with powerful hind limbs, strongly webbed feet and banded legs capable of long jumps. Maxillary teeth are present. Prominent vomerine teeth are in front of the choanae. Pupil is vertical. Tympanum distinct. There is typically a large narrow dark brown or black stripe from the snout to the eye, but interrupted by the nostril and extending behind the eye and over and behind the tympanum, where it tends to broaden, either imperceptibly or significantly, depending mainly on the species.

Females are the larger sex and reproduction is somewhat unusual among frogs in that amplexing pairs produce eggs in water and then using her hind limbs, the female projects newly laid eggs up onto the stream bank where they stick to rocks or vegetation, where they remain until hatching in rain, causing the tadpoles to wash down and return into the stream.

These frogs are separated from all other Australian species by the following characters: having a broadly oval and large tongue that does not adhere to the floor of the mouth at the rear and the prevomer is well-developed with prominent vomerine teeth (adapted from Cogger, 2014). The preceding diagnosis also applies to the new genus *Oxyslop gen. nov.*, the single species of which was until now included in the genus *Mixophyes*. *Oxyslop gen. nov.* with a type species of *Mixophyes hihihorlo* Donnellan, Mahony and Davies, 1990 from New Guinea is readily separated from all (other) species in *Mixophyes* (all from Australia), including all species or subspecies of *Paramixophyes* Hoser, 2016 by possessing an uninterrupted narrow vertebral stripe extending from between the eyes to just above the vent and by the absence of a dark triangular patch on the upper lip in front of the nostril with its base along upper lip and apex at nostril. It is further readily separated from all other species in *Mixophyes* (all from Australia) by having longer legs and distinctively smaller eyes and extensive toe webbing.

Additionally *Oxyslop gen. nov.* is distinguished by details of its karyotype and osteology as detailed by Donnellan *et al.* (1990).

Paramixophyes Hoser, 2016, type species *M. iteratus* Straughan, 1968, herein elevated to full genus status being originally described as a subgenus, is found along the east coast and ranges of New South Wales from west of Sydney to south-east Queensland.

They are separated from all (other) species within *Mixophyes* by the fact that the length of the inner metatarsal tubercle is only about half the length of the first toe (versus being nearly of equal length in the other species), and that only two joints of the fourth toe are free of web (versus three joints of the toe being free of web in the other species).

Physically *Paramixophyes* presents as being of different shape to the other species by being more triangular in overall shape and with proportionately larger hind limbs. *M. iteratus* is also of a different size class to the other members of the genus, it attaining up to 115 mm in body length, versus no more than 100 mm (usually 80 mm) in the other species. Straughan (1968) provides detail of other differences between *M.iteratus* and others in the genus.

Distribution: Wetter parts of the east coast and nearby ranges of Australia and also southern New Guinea in one or more similarly elevated and forested areas.

Content: *Oxyslop gen. nov.* (type genus); *Mixophyes* Günther, 1864; *Paramixophyes* Hoser, 2016.

Etymology: The family name is derived from the genus name *Oxyslop gen. nov.*, as outlined elsewhere in this paper.

NEW SUBFAMILY OXYSLOPINAE SUBFAM. NOV.

LSIDurn:lsid:zoobank.org:act:E8D98A10-084D-4F2B-ABC2-4EE7B2E3F281

Type genus: *Oxyslop gen. nov.* (this paper).

Diagnosis: The subfamily Oxyslopinae subfam. nov. is herein formally named to take into account the possibility of either the emergence of newly described forms including divergent fossil material necessitating the erection of another subfamily, or alternatively the relegation of Oxyslopidae fam. nov. to subfamily level, within a greater Myobatrachidae. At the present time the diagnosis for this subfamily is the same as for Oxyslopidae fam. nov., as defined above.
In summary, these frogs are separated from all other Australian species by the following characters: having a broadly oval and large tongue that does not adhere to the floor of the mouth at the rear and the prevomer is well-developed with prominent vomerine teeth (adapted from Cogger, 2014).

Distribution: Wetter parts of the east coast and nearby ranges of Australia and also southern New Guinea in one or more similarly elevated and forested areas.

Content: *Oxyslop gen. nov.* (type genus); *Mixophyes* Günther, 1864; *Paramixophyes* Hoser, 2016.

Etymology: The subfamily name is derived from the genus name *Oxyslop gen. nov.*, as outlined elsewhere in this paper.

NEW TRIBE OXYSLOPINI TRIBE. NOV.
LSID urn:lsid:zoobank.org:act:EFB680E2-3C01-4A34-91C2-898CBDAEB235

Type genus: *Oxyslop gen. nov.* (this paper).

Diagnosis: The tribe Oxyslopini tribe nov. is herein formally named to take into account the possibility of either the emergence of newly described forms including divergent fossil material necessitating the erection of another tribe, or alternatively the relegation of Oxyslopidae fam. nov. to subfamily level or tribe, within a greater Myobatrachidae. At the present time the diagnosis for this tribe is the same as for the subfamily Oxyslopinae subfam. nov., and the same as for the family Oxyslopidae fam. nov., as defined above.
In summary, these frogs are separated from all other Australian species by the following characters: having a broadly oval and large tongue that does not adhere to the floor of the mouth at the rear and the prevomer is well-developed with prominent vomerine teeth (adapted from Cogger, 2014).

Distribution: Wetter parts of the east coast and nearby ranges of Australia and also southern New Guinea in one or more similarly elevated and forested areas.

Content: *Oxyslop gen. nov.* (type genus); *Mixophyes* Günther, 1864; *Paramixophyes* Hoser, 2016.

Etymology: The tribe name is derived from the genus name *Oxyslop gen. nov.*, as outlined elsewhere in this paper.

NEW FAMILY HOSERRANIDAE FAM. NOV.
LSID urn:lsid:zoobank.org:act:0379A096-D081-44F7-9B17-D8D95957AD4A

Type genus: *Hoserranae gen. nov.* (this paper).

Diagnosis: The genera *Hoserranae gen. nov.* and *Scottyjamesus gen. nov.* both include species formerly included

within the genus *Taudactylus* Straughan and Lee, 1996 and as a trio these genera form the entirety of the family Hoserranidae fam. nov. as currently understood. They can be separated from all other Australian frogs by the following suite of characters:

Tongue small and narrowly oval and does not adhere to the rear of the mouth; maxillary teeth present; prevomer reduced or absent; vomerine teeth absent. No dermal brood pouches on the flanks; Terminal phlanges T-shaped; tips of fingers and toes all normal and with small but distinct discs; toes with at most only having basal webbing or fringes. Outer metatarsal tubercle, if present is much smaller than the inner metatarsal tubercle,

Frogs in the genus *Hoserranae gen. nov.* are readily separated from those in the genera *Taudactylus* as defined herein and *Scottyjamesus gen. nov.* by having a distinct dorsolateral skin fold present; a pointed and overslung snout and nostrils are much nearer the mouth than the tip of the snout, versus no dorsolateral skin fold; rounded snout; normal nostril being about equidistant from the mouth and the tip of the snout in both *Taudactylus* as defined herein and *Scottyjamesus gen. nov.*. The genus *Scottyjamesus gen. nov.* is in turn separated from the genus *Taudactylus* by having disks on fingers and toes only slightly wider than the penultimate phalanx, versus noticeably wider than the penultimate phalanx in *Taudactylus.*

The only species remaining within the genus *Taudactylus* are the type species, *Taudactylus diurnis* Straughan and Lee, 1966 and the morphologically similar *T. eungellensis* Liem and Hosmer, 1973.

Distribution: The family is endemic to Queensland being found from the south-east to north east in hilly wet areas only and each species has a very limited distribution both geographically and within areas they occur, where they appear to inhabit fast-flowing streams. All appear to have declined sharply in number since the 1970's.

Etymology: *Hoserranae gen. nov.* as family from genus is named in honour of my wife, Shireen Hoser, for her numerous sacrifices for wildlife conservation spanning more than 20 years.

Content: *Hoserranae gen. nov.* (type genus); *Scottyjamesus gen. nov.*; *Taudactylus* Straughan and Lee, 1996.

NEW SUBFAMILY HOSERRANINAE SUBFAM. NOV.

LSID urn:lsid:zoobank.org:act:0CBF5A5F-3652-43E8-A864-C90767E5E7B9

Type genus: *Hoserranae gen. nov.* (this paper).

Diagnosis: The subfamily Hoserraninae subfam. nov. is herein formally named to take into account the possibility of either the emergence of newly described forms including divergent fossil material necessitating the erection of another subfamily, or alternatively the relegation of Hoserranidae fam. nov. to subfamily level, within a greater Myobatrachidae. At the present time the diagnosis for this subfamily is the same as for Hoserranidae fam. nov., as defined above.

The genera *Hoserranae gen. nov.* and *Scottyjamesus gen. nov.* both include species formerly included within the genus *Taudactylus* Straughan and Lee, 1996 and as a trio these genera form the entirety of the family Hoserranidae fam. nov. as currently understood. They can be separated from all other Australian frogs by the following suite of characters:

Tongue small and narrowly oval and does not adhere to the rear of the mouth; maxillary teeth present; prevomer reduced or absent; vomerine teeth absent. No dermal brood pouches on the flanks; Terminal phlanges T-shaped; tips of fingers and toes all normal and with small but distinct discs; toes with at most only having basal webbing or fringes. Outer metatarsal tubercle, if present is much smaller than the inner metatarsal tubercle,

Frogs in the genus *Hoserranae gen. nov.* are readily separated from those in the genera *Taudactylus* as defined herein and *Scottyjamesus gen. nov.* by having a distinct dorsolateral skin fold present; a pointed and overslung snout and nostrils are much nearer the mouth than the tip of the snout, versus no dorsolateral skin fold; rounded snout; normal nostril being about equidistant from the mouth and the tip of the snout in both *Taudactylus* as defined herein and *Scottyjamesus gen. nov.*. The genus *Scottyjamesus gen. nov.* is in turn separated from the genus *Taudactylus* by having disks on fingers and toes only slightly wider than the penultimate phalanx, versus noticeably wider than the penultimate phalanx in *Taudactylus.*

The only species remaining within the genus *Taudactylus* are the type species, *Taudactylus diurnis* Straughan and Lee, 1966 and the morphologically similar *T. eungellensis* Liem and Hosmer, 1973.

Distribution: The subfamily is endemic to Queensland being found from the south-east to north east in hilly wet areas only and each species has a very limited distribution both geographically and within areas they occur, where they appear to inhabit fast-flowing streams. All appear to have declined sharply in number since the 1970's.

Etymology: *Hoserranae gen. nov.* is named in honour of my wife, Shireen Hoser, for her numerous sacrifices for wildlife conservation spanning more than 20 years and the subfamily name is taken from the genus name.

Content: *Hoserranae gen. nov.* (type genus); *Scottyjamesus gen. nov.*; *Taudactylus* Straughan and Lee, 1996.

NEW TRIBE HOSERRANINI TRIBE. NOV.

LSID urn:lsid:zoobank.org:act:728FDB42-8D16-4E50-9E4B-2DC97321EE83

Type genus: *Hoserranae gen. nov*. (this paper).

Diagnosis: The tribe Hoserranini tribe. nov. includes the genus *Hoserranae gen. nov.* only.

The genera *Hoserranae gen. nov.* and *Scottyjamesus gen. nov.* both include species formerly included within the genus *Taudactylus* Straughan and Lee, 1996 and as a trio these genera form the entirety of the family Hoserranidae fam. nov. as currently understood. They can be separated from all other Australian frogs by the following suite of characters:

Tongue small and narrowly oval and does not adhere to the rear of the mouth; maxillary teeth present; prevomer reduced or absent; vomerine teeth absent. No dermal brood pouches on the flanks; Terminal phlanges T-shaped; tips of fingers and toes all normal and with small but distinct discs; toes with at most only having basal webbing or fringes. Outer metatarsal tubercle, if present is much smaller than the inner metatarsal tubercle,

Frogs in the genus *Hoserranae gen. nov.* and hence in the tribe Hoserraninae tribe. nov., are readily separated from those in the genera *Taudactylus* as defined herein and *Scottyjamesus gen. nov.*, these two genera forming the tribe Scottyjamesini tribe nov., by having a distinct dorsolateral skin fold present; a pointed and overslung snout and nostrils are much nearer the mouth than the tip of the snout, versus no dorsolateral skin fold; rounded snout; normal nostril being about equidistant from the mouth and the tip of the snout in both *Taudactylus* as defined herein and *Scottyjamesus gen. nov.*.

The genus *Scottyjamesus gen. nov.*. is in turn separated from the genus *Taudactylus* (both within the tribe Scottyjamesini tribe nov.) by having disks on fingers and toes only slightly wider than the penultimate phalanx, versus noticeably wider than the penultimate phalanx in *Taudactylus.* The only species remaining within the genus *Taudactylus* are the type species, *Taudactylus diurnis* Straughan and Lee, 1966 and the morphologically similar *T. eungellensis* Liem and Hosmer, 1973.

Distribution: The tribe Hoseranini tribe nov. as far as is known is endemic to the wet tropics of Queensland, Australia.

Etymology: *Hoserranidae gen. nov.* is named after the genus named in honour of my wife, Shireen Hoser, for her numerous sacrifices for wildlife conservation spanning more than 20 years.

Content: *Hoserranae gen. nov.* (monotypic).

NEW TRIBE SCOTTYJAMESINI TRIBE. NOV.

LSID urn:lsid:zoobank.org:act:C1316092-6D25-4898-8B73-4FA57F86B101

Type genus: *Scottyjamesus gen. nov.* (this paper).

Diagnosis: The tribe Hoserranini tribe. nov. includes the genus *Hoserranae gen. nov.* only.

The genera *Hoserranae gen. nov.* and *Scottyjamesus gen. nov.* both include species formerly included within the genus *Taudactylus* Straughan and Lee, 1996 and as a trio these genera form the entirety of the family Hoserranidae fam. nov. as currently understood. They can be separated from all other Australian frogs by the following suite of characters:

Tongue small and narrowly oval and does not adhere to the rear of the mouth; maxillary teeth present; prevomer reduced or absent; vomerine teeth absent. No dermal brood pouches on the flanks; Terminal phlanges T-shaped; tips of fingers and toes all normal and with small but distinct discs; toes with at most only having basal webbing or fringes. Outer metatarsal tubercle, if present is much smaller than the inner metatarsal tubercle,

Frogs in the genus *Hoserranae gen. nov.* and hence in the tribe Hoserraninae tribe. nov., are readily separated from those in the genera *Taudactylus* as defined herein and *Scottyjamesus gen. nov.*, these two genera forming the tribe Scottyjamesini tribe nov., by having a distinct dorsolateral skin fold present; a pointed and overslung snout and nostrils are much nearer the mouth than the tip of the snout, versus no dorsolateral skin fold; rounded snout; normal nostril being about equidistant from the mouth and the tip of the snout in both *Taudactylus* as defined herein and *Scottyjamesus gen. nov..*

The genus *Scottyjamesus gen. nov..* is in turn separated from the genus *Taudactylus* (both within the tribe Scottyjamesini tribe nov.) by having disks on fingers and toes only slightly wider than the penultimate phalanx, versus noticeably wider than the penultimate phalanx in *Taudactylus.* The only species remaining within the genus *Taudactylus* are the type species, *Taudactylus diurnis* Straughan and Lee, 1966 and the morphologically similar *T. eungellensis* Liem and Hosmer, 1973.

Distribution: The tribe Scottyjamesini tribe nov. as far as is known is endemic to Queensland, Australia in scattered locations from the north-east to south east in forested wet habitats, where they usually are found near fast flowing streams.

Etymology: Scottyjamesini tribe nov. is taken from the genus name *Scottyjamesus gen. nov.* (this paper).

Content: *Scottyjamesus gen. nov.* (type genus); *Taudactylus* Straughan and Lee, 1996.

CONSERVATION THREATS TO RELEVANT FROG SPECIES

There are serious ongoing conservation threats to all species discussed within this paper.

All are at serious risk of extinction and some of the cited authors in this paper have stated that some relevant species may already be extinct! That is each and every species within the families Oxyslopidae fam. nov. and Hoserranidae fam. nov. are under potential threat of extinction within a few years should a potentially unforseen threat emerge, similar to what has already cased mass die offs in several relevant species.

From the 1970's through to the 1990's there was a massive die off of frogs, including within all relevant genera in a generally south to north pathway, starting in New South Wales and southern Queensland and eventually extending north to travel throughout the wet tropics region of Cape York in Queensland.

An introduced Chytrid fungus has been blamed for this decline (Berger 2001, Berger et al. 1999) and the apparent cause was legal importation of frogs from Africa or somewhere else already infected, presumably via the same original source.

Many populations are thought to be extinct although it is possible some may persist in small numbers that have evaded the collection efforts of numerous people.

It is noteworthy that many species were abundant and easily found before the mass die offs.

Numerous papers have been published detailing the die offs and rooting out the primary causes and some are cited elsewhere in this paper, with direct reference to the relevant species within the families Oxyslopidae fam. nov. and Hoserranidae fam. nov..

"Zoos Victoria", Taronga Zoo (Sydney, New South Wales), "Zoos South Australia" and other government-owned or backed zoos have effectively used their ability to write and control laws and government wildlife laws to stifle people and NGO's operating in the wildlife space whom they see as competitors of them. This enables the government-owned businesses to gain an effective monopoly on ownership of rare and threatened species with a view to exploiting their plight to make money (see for example Skeratt *et al.* 2016).

In the case of frogs dying from Chytrid fungus, there is absolutely no doubt at all that the government-owned zoo businesses of "Zoos Victoria", Taronga (in Sydney, New South Wales) and "Zoos South Australia" has probably caused extinctions of at least some relevant frog species as can be seen from the account of (Skeratt *et al.* 2016).

The actions of the businesses "Zoos Victoria", Taronga (in Sydney, New South Wales) and "Zoos South Australia" has in effect removed all other potential people or NGO's from being able to breed threatened or endangered species in captivity, or do anything else in any practical way to try to save the threatened species, resulting in some species named in this paper already being potentially extinct.

The "benefit" to Zoos Victoria and other government-backed beneficiaries of the general prohibition on others keeping or breeding most frog species in Australia is that when these government-backed businesses do breed these species, or the few they actually take an interest in, then they can claim to have "world first" breedings and all the financial rewards that brings their business.

One recent such example was the recently touted "world first" breeding of the (listed as) endangered Pygmy Bluetongues *Lazarusus adelaidensis* (Peters, 1863), by the government-owned business "Zoos South Australia".

See for example at:

https://www.monartosafari.com.au/saving-the-pygmy-bluetongue/

(Tucker, 2020b), where the government-owned Zoos South Australia boasted about their "world first" breeding of the species marketing it as a huge conservation victory for their allegedly hard working staff.

or also see for example at:

https://www.monartosafari.com.au/future-not-so-blue-for-rare-reptile/

(Tucker, 2020a).

In an amazing piece of spin doctoring, the author wrote:

"Zoos SA has been involved in the conservation of this species since its rediscovery back in 1992 so this is an amazing success story and a resounding endorsement for our purpose built breeding facility that …"

This so-called success only came after having a 27 year monopoly on ownership of these reptiles, with the prohibition on anyone else on earth daring to keep or breed the species being enforced at gunpoint and with associated threats of jailing any competitors of the government-owned zoo.

Of course breeding Bluetongue lizards is something even a primary school child could have done in one year, but the Zoos South Australia business made a deliberate point of **not breeding** the relatively rare species for decades so as to ensure their monopoly on ownership of the species remained intact and they could milk the threatened species for all they could in terms of making money.

Purpose built breeding facility?

Well a kid can breed this species in a small wooden box!

Note: Breeding Blue-tongue lizards is not rocket science!

Others with an interest in wildlife and their welfare, were effectively criminalized for daring to want to save wildlife in any way that may potentially upset government or otherwise interfere with the government zoo monopoly on exploiting the relevant species for money, in this case the Pygmy Blue-tongue.

The same sort of cynical money making exercises are routinely

embarked upon by government-owned and supported zoos across Australia with a severe and direct negative impact on the conservation of rare and threatened species.

"Zoos Victoria" have operated in a similar manner with *Taudactylus* (*sensu lato*) species as seen in the publications of Gillespie *et al.* (2007) and Skerratt *et al.* (2016), with the same government-owned business failing to save a lizard species found within walking distance of the zoo front gate!
That species was *Tympanocryptis pinguicola* (Mitchell, 1948), as detailed by Hoser (2019a, 2019b) and sources cited therein.

In other words the future prognosis for the Chytrid fungus susceptible frogs of the two families subject of this paper (Oxyslopidae fam. nov. and Hoserranidae fam. nov.) is not good at all!

Added to the preceding negativity in terms of long-term survival of the relevant frog species, I note that if the Australian government persists with its "Big Australia Policy", (see for example Saunders 2019), that being a long-term aim to increase the human population in Australia to over 100 million people by year 2150 (from the present 25 million as of 2019), all sorts of unforseen threats to the survival of these species may emerge.

Due to unforseen potential threats I recommend further research on the relevant species and including means to identify likely potential threats.

These may include direct human activities (e.g. land clearing for homes), as well as potential threats caused by changed vegetation regimes, introduced pests and potential pathogens, including those introduced via the legal importation of foreign reptiles and frogs by government-owned zoos and associated entities.

Laws should be changed with urgency to allow other stakeholders to participate in the actions required to save the relevant species, even if it means the government-owned and backed zoos lose their financially lucrative monopoly on exploiting vulnerable species for their own money-making ulterior motives.

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CONFLICT OF INTEREST - NONE

Australasian Journal of Herpetology **43:27-32.**
Published 25 April 2020.

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

Two new species of fish, previously confused with the Macquarie Perch *Macquaria australasica* Cuvier 1830 (Actinopterygii: Perciformes: Percichthyidae) from east coast drainages in Australia.

LSID URN:LSID:ZOOBANK.ORG:PUB:ACBF94DA-7399-4CFE-AAA8-2F79DA8BD287

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Received 22 December 2019, Accepted 10 January 2020, Published 25 April 2020.

ABSTRACT

The iconic Macquarie Perch *Macquaria australasica* Cuvier, 1830 as currently recognized is a moderate-sized fish growing to 46 cm in length and 3.5 kg, with an elongate-oval body which is laterally compressed. It is regularly taken by recreational fishing enthusiasts wherever it is found. While some populations have arisen in some rivers and reservoirs from specimens translocated by humans (e.g. the Yarra River in Melbourne, Victoria), it is known to naturally occur in the drainages of the Murray Darling Basin (flowing west) and also the Shoalhaven and Hawkesbury/Nepean River systems in coastal New South Wales (flowing east).

Dufty (1986) found that three genetic stocks exist worthy of species-level recognition.

These were those populations naturally occurring west of the Great Dividing Range, the Hawkesbury River specimens and the naturally occurring specimens in the lower Shoalhaven River system.

As the two eastern forms are unnamed, the purpose of this paper is to formally name those species.

Keywords: Fish; taxonomy; nomenclature; Macquarie Perch; *Macquaria*; *australasica*; Murray River; Darling River; Yarra River; Shoalhaven River; Hawkesbury River; Nepean River; Kangaroo River; New South Wales; Australia; new species; *hoserae*; *honlami*.

INTRODUCTION

The iconic Macquarie Perch *Macquaria australasica* Cuvier 1830 as currently recognized is a moderate-sized fish growing to 46 cm in length and 3.5 kg in weight, with an elongate-oval body which is laterally compressed. It is regularly taken by recreational fishing enthusiasts wherever it is found. While some populations have arisen in some rivers and reservoirs from specimens translocated by humans (e.g. the Yarra River in Melbourne, Victoria), it is known to naturally occur in the drainages of the Murray Darling Basin (flowing west) and also the Shoalhaven and Hawkesbury/Nepean River systems in coastal New South Wales (flowing east).

Dufty (1986) found that three genetic stocks exist worthy of species-level recognition.

These were those populations naturally occurring west of the Great Dividing Range, the Hawkesbury River specimens and the naturally occurring specimens in the lower Shoalhaven River system, including specimens taken from the tributary Kangaroo River.

In line with the Australian Federal Government's "Big Australia" policy, that being to increase the human population of 25 million (2020), from 13 million in around 1970, to over 100 million within 100 years "so that we can tell China what to do", as stated by the former Prime Minister, Kevin Rudd in 2019 (Zaczek 2019), the human pressure on the relevant ecosystems has increased in line with the human populations nearby and will clearly continue to do so.

Numbers of fish have declined sharply in many parts of the range of putative *Macquaria australasica*, in particular that population from the Shoalhaven River system.

Local environmentalists, including an organisation called "OzFish Unlimited" in 2019 sought to conserve the sharply declining and potentially extinct Shoalhaven River population, by searching for remaining specimens (Copeland, 2019).

They found difficulties getting public support for their actions as the local population was being treated by government as merely one of many populations of putative *Macquaria australasica.* The Shoalhaven River population had not been formally recognized by science as taxonomically distinct and was therefore being treated as non-existent by the State Wildlife Department.

It was therefore not eligible to be funded by government for any conservation program.

I was approached by a number of people to formally name the Shoalhaven River population as a separate species to enable conservation programs to be enacted to save the species, assuming it was not already too late.

MATERIALS, METHODS AND RESULTS

Before formally naming the Shoalhaven River population of putative *Macquaria australasica* I had to verify and confirm claims that the said fish was in fact sufficiently different from the type form of *M. australasica* with a type locality of the Murray/Darling River system to warrant taxonomic recognition.

To do this, specimens were examined from the Shoalhaven River system and all other parts of the known range of *M. australasica*, to A/ Confirm if any forms warranted taxonomic recognition beyond the single species currently recognized and B/ If so, if there were any available names for those taxa.

Obviously a thorough review of the relevant literature was undertaken to assist in the relevant tasks.

It emerged that genetic work had already been undertaken to confirm that populations in the Shoalhaven River system and the Hawkesbury/Nepean River system were genetically distinct from the main (western) populations from the Murray/Darling River system (Dufty 1986).

It also came as a surprise to find that while there were numerous available names (synonyms) for populations of *M. australasica*, all in fact applied to western populations and none could be applied to either the Shoalhaven River system and the Hawkesbury/Nepean River system populations.

The fish from the Shoalhaven River system and the Hawkesbury/Nepean River system also were significantly different morphologically from the Murray/Darling *M. australasica* and so the fact that until now they had not been taxonomically recognized came as an even greater surprise.

I also note that Anonymous (2018) wrote:

> "Because of morphological and genetic differences between Murray-Darling Basin and eastern Macquarie perch (Hawkesbury-Nepean and Shoalhaven) there were calls for revising the taxonomic status to recognise the Shoalhaven, Hawkesbury-Nepean and Murray-Darling Basin as separate species (Dufty 1986; Faulks *et al*,. 2010; Faulks *et al*,. 2011; Pavlova *et al*,. 2017a; 2017b)."

Anonymous (2018) also noted:

> "The Murray-Darling Basin and Hawkesbury-Nepean lineages diverged approximately 385 000 to 119 000 years ago (Pavlova *et al*,. 2017b). There additionally appears to be divergence within the Hawkesbury-Nepean system, with the southern Hawkesbury-Nepean diverging from the northern Hawkesbury-Nepean approximately 191 000 to 58 000 years ago (Pavlova *et al*,. 2017b).
>
> An individual collected from the Kangaroo River (Shoalhaven system), prior to the presumed extinction of the Shoalhaven River lineage was found to be highly differentiated from both the Hawkesbury-Nepean and Murray-Darling Basin lineages (Pavlova *et al*,. 2017b), supporting a long term evolutionary trajectory of the Shoalhaven lineage. Analysis of mitochondrial lineage divergence showed that the Shoalhaven Basin diverged from the common ancestor of the Murray-Darling Basin and Hawkesbury-Nepean around 1 332 000 to 419 000 years ago (Pavlova *et al*,. 2017b)."

With the clear result being two unnamed forms, sufficiently divergent to be named at the species level (see preceding), the purpose of this paper is to formally name those species in accordance with the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

Of relevance also is that species-level recognition of the coastal forms is in fact parallel to a position already taken with the two still (known to be) living east coast species related to *Maccullochella peelii* (Mitchell, 1838), which according to the evidence of Pavlova *et al.* (2017b) diverged as a result of the same geological event and at the very same time (citing Nock *et al.* 2010).

Literature relevant to the investigation, taxonomic, nomenclatural and wildlife conservation conclusions herein include Anonymous (2018), Allen (1989), Appleford *et al.* (1998), Arthington (1991), Arthington and McKenzie (1997), Arthur Rylah Institute (2017), Australian Capital Territory Government (1999), Battaglene (1998), Broadhurst *et al.* (2012, 2013), Brown and Morgan (2015), Bruce *et al.* (2007), Cadwallader (1978. 1979, 1981, 1984), Cadwallader and Backhouse (1983), Cadwallader and Douglas (1986), Cadwallader and Eden (1979), Cadwallader and Rogan (1977), Copeland (2019), Crowl *et al.* (1992), Cuvier (1830), Dufty (1986), Ebner *et al.* (2007), Ebner and Lintermans (2007), Erskine (2016), Faragher and Harris (1994), Farrington *et al.* (2014), Faulks *et al.* (2010, 2011), Gehrke *et al.* (1999), Gilligan (2005), Gray *et al.* (2000), Günther (1859), Hall *et al.* (2009a, 2009b), Harris and Rowland (1996), Ho and Ingram (2012), Ingram and De Silva (2007), Ingram *et al.* (1994, 2000), Jackson (1981), Knight and Bruce (2010), Koehn and O'Connor (1990), Koster *et al.* (2014), Lake (1959, 1971, 1978), Lintermans (1991a, 1991b, 2002, 2005, 2006a, 2006b, 2007, 2008, 2012, 2013a, 2013b), Lintermans and Ebner (2010), Lintermans *et al.* (2014), Lugg and Copeland (2014), MacDonald *et al.* (2014), McKeown (1934), Nock *et al.* (2010), Pavlova (2017a, 2017b), Pearce *et al.* (2017), Ride *et al.* (1999), Starrs *et al.* (2011), Stead (1913), Todd and Lintermans (2015), Tonkin *et al.* (2006, 2010, 2016, 2017), Trueman (2007), Wharton (1968, 1973) and sources cited therein.

Rather than run the risk of species or subspecies becoming threatened or extinct due to non-recognition of them as has occurred before as shown in Hoser (2019a, 2019b), I have opted to publish this paper in its current form.

Naming of taxa is perhaps the most important step in their ultimate preservation and it is with this motivation in mind (protection of biodiversity) that I have chosen to publish this paper.

INFORMATION RELEVANT TO THE FORMAL DESCRIPTIONS THAT FOLLOW

There is no conflict of interest in terms of this paper or the conclusions arrived at herein.

Several people including anonymous peer reviewers who revised the manuscript prior to publication are also thanked as a relevant staff at museums who made specimens and records available in line with international obligations.

In terms of the following formal descriptions, spellings should not be altered in any way for any purpose unless expressly and exclusively called for by the rules governing Zoological Nomenclature as administered by the International Commission of Zoological Nomenclature.

In the unlikely event two newly named taxa are deemed conspecific by a first reviser, then the name to be used and retained is that which first appears in this paper by way of page priority and as listed in the abstract keywords.

Some material in descriptions for taxa may be repeated for other taxa in this paper and this is necessary to ensure each fully complies with the provisions of the *International Code of Zoological Nomenclature* (Fourth edition) (Ride *et al.* 1999) as amended online since.

Material downloaded from the internet and cited anywhere in this paper was downloaded and checked most recently as of 2 January 2020, unless otherwise stated and were accurate in terms of the context cited herein as of that date.

Unless otherwise stated explicitly, colour and other descriptions apply to living adult specimens of generally good health and not under any form of stress by means such as excessive cool, heat, dehydration or abnormal skin reaction to chemical, abnormal water conditions or other input.

While numerous texts and references were consulted prior to publication of this paper, the criteria used to separate the relevant species or subspecies has already been spelt out and/ or is done so within each formal description and does not rely on material within publications not explicitly cited herein.

MACQUARIA HOSERAE SP. NOV.

LSID urn:lsid:zoobank.org:act:53AC5FDF-308B-4074-9607-4F3748C39C93

Holotype: A preserved specimen at the Australian Museum in Sydney, New South Wales, Australia, Ichthyology Collection, Specimen number IB.7906, collected from the Grose River, immediately below and north of Blackheath, in the Blue Mountains of New South Wales, Australia, Latitude -33.63 S., Longitude 150.28 E. This facility allows access to its holdings.

Paratypes: 1/ A preserved specimen at the National Museum of Victoria, Melbourne, Victoria, Australia, Ichthyology collection, specimen number A31793-2, collected from Bowens Creek, upstream of Mount Irvine/Bilpin Road, Blue Mountains, New South Wales, Australia, Latitude -33.50 S., Longitude 150.47 E.

2/ A preserved specimen at the National Museum of Victoria, Melbourne, Victoria, Australia, Ichthyology collection, specimen number A21325 (Alt field no. PU99 71), collected from the pool just below the Jack Evans walking track crossing at Erskine Creek, approx. 4 km north-west of Warragamba, New South Wales, Australia, Latitude -33.84 S., Longitude 150.58 E.

Diagnosis: The three species *Macquaria australasica* Cuvier 1830, *M. hoserae sp. nov*. and *M. honlami sp. nov.* have until now been treated as one and the same species. They are all separated from all other species within the Percichthyidae by the following suite of characters: Form of the body is more-or-less oblong, vertically compressed; eye moderate; cleft of the mouth nearly horizontal, with the jaws equal. One dorsal, with eleven spines, anal fin with three; all the spines strong. No teeth in the jaws or on the palate. Branchiostegals five. Both limbs of the praeoperculum serrated; operculum with two points. Scales moderate, ctenoid. Air-bladder simple; pyloric appendages in moderate number. Snout scaleless and elongate. The fourth and fifth dorsal spines longest; the second of the anal fin much longer and stronger than the third. D. 11/11, A 3/8, L. LAT. 65-66, Caec. pylor. 3.

Colouration is more-or-less uniform almost black or dark silvery grey to bluish grey or grey-green above (*M. australasica*) or alternatively blotched with grey-brown, buff and dark-greyish over the head and body and otherwise a greyish-silver or brown colour (*M. hoserae sp. nov*. and *M. honlami sp. nov.*).

Nominate *M. australasica* from the Murray Darling Basin, grow to 46 cm long and weigh up to 3.5 kg. Their colouration varies from almost black or dark silvery grey to bluish grey or green-grey above, paler to off-white below, often with a yellowish tinge.

Both *M. hoserae sp. nov*. and *M. honlami sp. nov.* are readily separated from *M. australasica* as described above by having a distinctively smaller size at maturity where they grow to less than 25 cm in length and weigh no more than 1.5 kg. Both species are different to *M. australasica* in that they are blotched with grey-brown, buff and dark-greyish over the head and body and can otherwise be silvery-grey (*M. honlami sp. nov.*) or brownish (*M. hoserae sp. nov.*) in colour on the upper surfaces and upper flanks.

Both *M. hoserae sp. nov*. and *M. honlami sp. nov.* have one less vertebrae than *M. australasica.*

M. hoserae sp. nov. is readily separated from both *M. australasica* and *M. honlami* by being a generally brownish as opposed to greyish or silvery in colour. Blotches on the lower rear flanks are large and well defined, versus ill-defined in *M. australasica* and broken in *M. honlami sp. nov.*.
In side by side comparison, both *M. hoserae sp. nov*. and *M. honlami sp. nov.* have more skin between the upper dorsal spines, making them less prominent than is the case in *M. australasica.* Also see the comparative photos between *M. hoserae sp. nov*. (bottom) and *M. australasica* (top) on page 13 of Anonymous (2018) and *M. honlami sp. nov.* in Copeland (2019).

The three species *M. australasica*, *M. hoserae sp. nov*. and *M. honlami sp. nov.* can also be readily distinguished and separated from one another by the colour of the iris, being silvery white in *M. australasica*, silvery-grey in *M. honlami sp. nov.* and brown in *M. hoserae sp. nov.*.

The dark mid-lateral line is prominent in *M. australasica* and indistinct in both *M. hoserae sp. nov*. and *M. honlami sp. nov.*.
Conservation: Anonymous (2018) gives a detailed account of the conservation history of the three species *M. australasica*, *M. hoserae sp. nov*. and *M. honlami sp. nov.* and ongoing threats they are aware of.

According to Huntsdale (2019) no *M. honlami sp. nov.* had been seen in the wild for 20 years and the taxon may already be extinct.

However the root cause of these problems, the human overpopulation of Australia (see for example Zaczek 2019) is not addressed.
The relevant comments in Hoser (1991) therefore apply.
Pavolva *et al.* (2017) argue for the mixing specimens of populations of putative *M. australasica* including potentially the three species identified herein, which would otherwise be reproductively isolated. The basis of the recommendation is to aid genetic diversity and long-term survival of populations.
This contention is rejected here as no amount of genetic diversity has protected any populations of these fish against the onslaught of human activity since European settlement of Australia and destruction of three unique genetic and biological entities for uncertain short term potential gain in the face of a far greater threat that is not being mediated is simply a waste of time and effort.
Preservation of unique species in the wild state should be a goal of wildlife conservation, as opposed to creating a planet full of mutant mutts still under threat and decline from unabated human population growth!
Distribution: *M. hoserae sp. nov*. is restricted to the Hawkesbury Nepean River system of the central coast of New South Wales, Australia, in particular the upper reaches that flows through the Blue Mountains region of New South Wales as well as southern tributaries of the Nepean River.

Specimens from the Georges River in western Sydney are also tentatively assigned to this species.

Etymology: Named in honour of my mother, Katrina Hoser, of Lane Cove (Sydney), New South Wales in recognition of contributions to wildlife conservation over a period of more than 50 years.

MACQUARIA HONLAMI SP. NOV.

LSID urn:lsid:zoobank.org:act:C437A0BD-31C4-4ACA-833F-2BC3C9620FCC

Holotype: A preserved specimen at the Australian Museum in Sydney, New South Wales, Australia, Ichthyology Collection, Specimen number I.16625-001, collected from the Kangaroo River, New South Wales, Australia, Latitude -34.72 S., Longitude 150.50 E. This facility allows access to its holdings.

Diagnosis: The three species *Macquaria australasica* Cuvier 1830, *M. hoserae sp. nov*. and *M. honlami sp. nov.* have until now been treated as one and the same species. They are all separated from all other species within the Percichthyidae by the following suite of characters: Form of the body is more-or-less oblong, vertically compressed; eye moderate; cleft of the mouth nearly horizontal, with the jaws equal. One dorsal, with eleven spines, anal fin with three; all the spines strong. No teeth in the jaws or on the palate. Branchiostegals five. Both limbs of the praeoperculum serrated; operculum with two points. Scales moderate, ctenoid. Air-bladder simple; pyloric appendages in moderate number. Snout scaleless and elongate. The fourth and fifth dorsal spines longest; the second of the anal fin much longer and stronger than the third. D. 11/11, A 3/8, L. LAT. 65-66, Caec. pylor. 3.

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Nominate *M. australasica* from the Murray Darling Basin, grow to 46 cm long and weigh up to 3.5 kg. Their colouration varies from almost black or dark silvery grey to bluish grey or green-grey above, paler to off-white below, often with a yellowish tinge.

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In side by side comparison, both *M. hoserae sp. nov.* and *M. honlami sp. nov.* have more skin between the upper dorsal spines, making them less prominent than is the case in *M. australasica. Also* see the comparative photos between *M. hoserae sp. nov.* (bottom) and *M. australasica* (top) on page 13 of Anonymous (2018) and *M. honlami sp. nov.* in Copeland (2019).

The three species *M. australasica*, *M. hoserae sp. nov.* and *M. honlami sp. nov.* can also be readily distinguished and separated from one another by the colour of the iris, being silvery white in *M. australasica*, silvery-grey in *M. honlami sp. nov.* and brown in *M. hoserae sp. nov..*

The dark mid-lateral line is prominent in *M. australasica* and indistinct in both *M. hoserae sp. nov.* and *M. honlami sp. nov..*

Conservation: Anonymous (2018) gives a detailed account of the conservation history of the three species *M. australasica*, *M. hoserae sp. nov.* and *M. honlami sp. nov.* and ongoing threats.

According to Huntsdale (2019) no *M. honlami sp. nov.* had been seen in the wild for 20 years and may already be extinct.

However the root cause of these problems, the human overpopulation of Australia (see for example Zaczek 2019) is not addressed.

The relevant comments in Hoser (1991) therefore apply.

Pavolva *et al.* (2017) argue for the mixing of specimens of populations of putative *M. australasica* including potentially the three species identified herein, which would otherwise be reproductively isolated. The basis of the recommendation is to aid genetic diversity and long-term survival of populations.

This contention is rejected here as no amount of genetic diversity has protected any populations of these fish against the onslaught of human activity since European settlement of Australia and destruction of three unique genetic and biological entities for short term potential gain in the face of a far greater threat that is not being mediated is simply a waste of time and effort.

Preservation of unique species in the wild state should be a goal of wildlife conservation, as opposed to creating a planet full of mutant mutts still under threat and decline from unabated human population growth!

Distribution: *M. honlami sp. nov.* is restricted to the Shoalhaven River system on the south coast of New South Wales, Australia, where it is best known from the Kangaroo River system, which is a part of the greater Shoalhaven River system. However none have been seen in the wild for about 20 years (Huntsdale, 2019), since about 1998 (Pavolva *et al.* 2017a) and the species may therefore already be extinct.

Etymology: Named in honour of Hon Lam, originally from China, but more recently of north Ringwood, Victoria, Australia, owner of the Fish Café, Park Orchards, in recognition of his logistical services in feeding the team at Snakebusters: Australia's best reptiles at short notice on countless occasions after the dedicated crew had spent many hours educating others about wildlife and conservation in Australia's best reptiles shows, being the only ones in Australia that are hands-on and let people hold the animals.

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Australasian Journal of Herpetology **43:33-37.**
Published 25 April 2020.

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

Hiding in plain sight! A new species of Water Skink *Eulamprus* Fitzinger, 1843 from north-east Queensland.

LSID URN:LSID:ZOOBANK.ORG:PUB:BAF26B67-A02E-4FF9-9D9D-1CDEE60FE6DA

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Received 10 October 2019, Accepted 12 March 2020, Published 25 April 2020.

ABSTRACT

The Common Water Skink *Eulamprus quoyii* (Duméril and Bibron, 1839), type locality Neutral Bay (Sydney), New South Wales, is a common and familiar species to herpetologists in the Eastern Australian states of New South Wales, Victoria, South Australia and Queensland, where it inhabits well watered areas, usually near streams and watercourses in large numbers.

With the exception of Wells and Wellington (1985) who at page 29 wrote: "We consider that there are several taxa in this species complex awaiting description" and similar comments by Wells (2009), no one has in the last 100 years considered the possibility that there is more one taxon within this putative species.
Pepper *et al.* (2018) published a "Molecular phylogeny of *Eulamprus* water skinks", showing two highly divergent lineages of *E. quoyii*, but failed to make any statements as to the effect that there were two species involved.

An inspection of specimens, preserved and live from across the range has found that each lineage is morphologically divergent and therefore of separate species.

There is no available name for the divergent north Queensland lineage and so it is formally named herein as *Eulamprus paulwoolfi sp. nov*. in accordance with the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

Keywords: Taxonomy; nomenclature; lizards; skinks; water skink; *Eulamprus*; *quoyii*; Paul Woolf; Queensland; North Queensland; Australia; new species; *paulwoolfi.*

INTRODUCTION

The Common Water Skink *Eulamprus quoyii* (Duméril and Bibron, 1839), type locality Neutral Bay (Sydney), New South Wales, is a common and familiar species to herpetologists in the Eastern Australian states of New South Wales, Victoria, South Australia and Queensland, where it inhabits well watered areas, usually near streams and watercourses in large numbers.

With the exception of two experienced herpetologists named Richard Wells and Cliff Ross Wellington who published Wells and Wellington (1985) who at page 29 wrote: "We consider that there are several taxa in this species complex awaiting description" and Wells (2009) who made similar comments, no one has in the last 100 years considered the possibility that there is more one taxon within this putative species.
Pepper *et al.* (2018) published a "Molecular phylogeny of *Eulamprus* water skinks", showing two highly divergent lineages of *E. quoyii*, but failed to make any statements as to the effect that there were two species involved.

However this paper and the earlier ones by Wells and Wellington (1985) and Wells (2009) raised a red-flag to myself and when in Queensland in mid 2019, I revisited this issue and inspected specimens from the entire coastline of that State from the vicinity of Cairns, south to the NSW border, as well as specimens from the coast south to Sydney.

In line with the somewhat vague comments of Pepper *et al.* (2018) in terms of lineages within the putative species *E. quoyii* (they claimed 3), I was able to find consistent differences between those specimens from the wet tropics near Cairns and south to at least Mackay, which separated these lizards from all specimens from south of there. Pepper *et al.* (2018) claimed the lineage went further south to about Gladstone in Queensland. Specimens from Brisbane, were morphologically similar to those south into New South Wales, even though Pepper *et al.* (2018) claimed they were of a different lineage.

Noting that the north Queensland lineage was agreed by Pepper *et al.* (2018) to be the most divergent and that these are the

most divergent morphologically and appear to be reproductively isolated from the others, I have had no hesitation in formally naming this lineage as a new species in accordance with the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

I note that the divergence of this lineage is significantly greater than that between *Eulamprus leuraensis* Wells and Wellington (1984) and *Eulamprus kosciuskoi* (Kinghorn, 1932), both widely recognized in Australia, including by the taxonomically conservative Harold Cogger in Cogger (2014).

Wells (2009) stated that Glenn Shea was allegedly about to describe species within the so-called *E. quoyii* group, or at least planning to consider doing so, causing Wells to defer doing so himself at that time.

However, as of 2019 this had not occurred, nor was there any indication of any likely paper doing so and so this paper is published.

In passing I also note that the molecular data of Pepper *et al.* (2018) confirmed the obvious, in that the two species described as *Costinisauria worrelli* Wells and Wellington, 1985 from Barrington Tops and *Costinisauria couperi* Wells, 2009 from the New England Tableland were confirmed as valid and separate from *E. kosciuskoi* (Kinghorn, 1932) from Mount Kosciusko.

In spite of this finding of the obvious, the Wolfgang Wüster gang of liars and thieves have aggressively harassed other herpetologists and internet databases to pretend that both species do not exist, as part of an unscientific campaign that has run for many years as documented by Hoser (2007).

As recently as 1 March 2020, Wüster's close friend and partner in crime Peter Uetz, controlling a highly influential and professionally "Search Engine Optimized" (SEO) webpage called "The Reptile Database" claimed both *Costinisauria worrelli* Wells and Wellington, 1985 from Barrington Tops and *Costinisauria couperi* Wells, 2009 from the New England Tableland were synonyms and furthermore didn't even refer to the Wells (2009) paper on the webpage at:

http://reptile-database.reptarium.cz/species?genus=Eulamprus&species=kosciuskoi downloaded most recently on 1 March 2020.

This is significant because Uetz markets his site as "The Reptile Database" and as a complete archive of relevant taxonomic and nomenclatural sources.

In reality hundreds of critically important papers are systematically censored from the site to allow the Wolfgang Wüster gang to peddle their perverted warped view of herpetological taxonomy and nomenclature by hiding embarrising truths.

They seek to unlawfully get others to use their later illegally coined names instead of legal ones with International Commission of Zoological Nomenclature (ICZN) date priority.

The gang do this by citing their so called Kaiser *et al.* (2013) doctrine, which as published seeks to ignore and over-ride the established rules of the *International Code of Zoological Nomenclature* and the International Commission of Zoological Nomenclature (ICZN) itself, ultimately aiming for complete anarchy and chaos in science and zoological nomenclature (as detailed in Dubois *et al.* (2019), Hoser, (2007, 2009, 2012a, 2012b, 2013a, 2015a-f, 2019a, 2019b) and sources cited therein.

This is not mere semantics, as the actions of the Wolfgang Wüster gang and the taxonomic confusion they have caused has already resulted in the avoidable extinction of reptile species as detailed by Hoser (2019a and 2019b).

In summary, the Wolfgang Wüster gang simply steal works of others and then repackage these as their own scientific "discovery" (Hoser 2009, 2015a-f, 2019a, 2019b).

MATERIALS, METHODS AND RESULTS

As already stated, an inspection of specimens and live from across the range has found that each lineage is morphologically divergent and therefore of separate species.

A perusal of the relevant scientific literature found that the type form has a type locality of Neutral Bay, Sydney, New South Wales and therefore conforms to the southern lineage.

The available synonym for this taxon, *Hinulia gastrostica* Günther, 1875 is also not applicable to the northern lineage as it is derived from specimens caught on Kangaroo Island, South Australia, "Queensland" and "Australia", the latter two locations being vague.

I have made inquiries as to all the syntypes for the putative species *Hinulia gastrostica* Günther, 1875 and can confirm that none of the specimens are of the northern form named within this paper.

A more detailed explanation follows.

However what is of note is that there are no other available synonyms applicable to these putative taxa.

As there is no available name for the divergent north Queensland lineage it is formally named herein as *Eulamprus paulwoolfi sp. nov.* in accordance with the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

Literature relevant to this species and preceding the decision to formally name this new taxon include the following: Boulenger (1897), Brown (2014), Cogger (2014), Cogger *et al.* (1983), Duméril and Bibron (1839), Fitzinger (1843), Günther (1875), Hoser (1989), Hutchinson and Rawlinson (1995), Pepper *et al.* (2018), Skinner *et al.* (2013), Wells (2009), Wells and Wellington (1984, 1985), Wilson and Knowles (1988), Wilson and Swan (2017) and sources cited therein.

I note in particular, that the diligently prepared and published monograph of Wells (2009), in particular has an exhaustive list of relevant references to that date.

Scandalously Wolfgang Wüster and the gang of thieves via their war cry manifesto called, Kaiser *et al.* (2013) had the audacity to repeatedly label the excellent peer reviewed work of Wells (2009) as "unscientific" and falsely claim it was "taxonomic vandalism", telling people to ignore the entirety of the 96 page work.

Their scandalous claim, repeated to a global audience millions of times should be remembered for the historical record when the relevant publications are revisited.

THE STATUS OF *HINULIA GASTROSTICA* GUNTHER, 1875.

Wells (2009) summed up the relevant status of the name and its potential application to Queensland specimens of putative *E. quoyii.*

It is easiest to simply republish what he wrote as done below:

> "An undescribed member of this species has also been known from mideastern and northern Queensland for nearly 50 years. A proposed Holotype (labelled as such) was even deposited in the Australian Museum by Eric Worrell, but his description was never published, I have examined this specimen and I am convinced that it is indeed a separate species quite distinct from *quoyii*. I have decided however to refrain from formally naming this species as Dr Glenn Shea has informed me that he is currently in the process of revising the *Eulamprus quoyii* complex. It is possible that *Hinulia gastrosticta* Günther, 1875 is applicable to one of these distinctive Queensland populations, and Wells and Wellington (1984) resurrected that species on the basis of the original description. However, I note also that Hutchinson and Rawlinson (1995) resynonymised *Eulamprus gastrostictus* with *quoyii* due to insufficient evidence that its earlier resurrection by Wells and Wellington was warranted. Although I have observed that "*Eulamprus quoyii*" exhibits quite distinct morphological differences in

> Queensland to that present in topotypic specimens from Sydney (the Type Locality of *quoyii*), I am now aware that there are at least two, possibly three distinct forms' of *quoyii* in Queensland. As the Type Locality of *Hinulia gastrosticta* Gunther, 1875 was given merely as 'Queensland', it is premature to assign this name to this or any other population in Queensland without examining the Holotype in the British Museum - which I am unable to do.
>
> The impending revision by Glenn Shea of the *quoyii* complex will hopefully resolve whether or not *Hinulia gastrosticta* is a valid taxon from Queensland, so I have accepted the decision of Hutchinson and Rawlinson and refrain from using the name further until the matter is resolved by Shea."

Nothing in the above account appears to be factually incorrect.

Overlooked so far (at least in terms of the detail), Boulenger (1887) published a detailed account of his inspection of the syntype series of Günther at the British Museum of Natural History.

From this account it is clear that none of the relevant specimens, including the animal labelled as coming from "Queensland" conforms with the north Queensland species until now treated as *E. quoyii.*

Boulenger's description of the relevant specimens identified as "*Lygosoma quoyi*" at pages 230-231 stated:

> "throat and sometimes also belly, with longitudinal series of black dots,".

This conforms wholly with southern specimens, being those found south of Gladstone in Queensland as in not the northern form.

The northern form described below as a new species differs in that diagnostic for it instead has heavy black peppering and dark scales with limited amounts of white on the throat and not just a mere longitudinal series of black dots on a lighter (whitish) background. Hence *Hinulia gastrosticta* is certainly not an available name for the northern taxon.

INFORMATION RELEVANT TO THE FORMAL DESCRIPTION THAT FOLLOWS

There is no conflict of interest in terms of this paper or the conclusions arrived at herein.

Several people including anonymous peer reviewers who revised the manuscript prior to publication are also thanked as a relevant staff at museums who made specimens and records available in line with international obligations.

In terms of the following formal description, spelling should not be altered in any way for any purpose unless expressly and exclusively called for by the rules governing Zoological Nomenclature as administered by the International Commission of Zoological Nomenclature (ICZN).

Material downloaded from the internet and cited anywhere in this paper was downloaded and checked most recently as of 1 March 2020, unless otherwise stated and was accurate in terms of the context cited herein as of that date.

Unless otherwise stated explicitly, colour descriptions apply to living adult male specimens of generally good health and not under any form of stress by means such as excessive cool, heat, dehydration or abnormal skin reaction to chemical or other input.

While numerous texts and references were consulted prior to publication of this paper, the criteria used to separate the relevant species has already been spelt out and/or is done so within the formal description and does not rely on material within publications not explicitly cited herein.

The newly named species is readily and consistently separable from their nearest congener and that which until now it has been previously treated as.

EULAMPRUS PAULWOOLFI SP. NOV.

LSID urn:lsid:zoobank.org:act:D564C4F7-B8B7-4739-8A4C-4D0BA4EFC8DE

Holotype: A preserved specimen at the Australian Museum in Sydney, New South Wales, Australia, specimen number R.16135 collected from Innisfail, north Queensland, Australia, Latitude -17.53 S., Longitude 146.02 E. This government-owned facility allows access to its holdings.

Paratype: A preserved specimen at the Queensland Museum in Brisbane, Queensland, Australia, collected at the foot of Mt Bartle-Frere, south of Cairns, north Queensland, Australia, Latitude -17.4 S. Longitude 145.8 E.

Diagnosis: Until now *Eulamprus paulwoolfi sp. nov*. has been treated as a northern population of the well-known species *E. quoyii* (Duméril and Bibron, 1839).

However it is readily separated from that taxon by the following characters

1/ The original tail of *E. quoyii* is dominantly brown in colour with a series of black flecks and/or spots running mainly along the sides. By contrast the original tail of *E. paulwoolfi sp. nov.* is dominantly brown in colour on top and blackish on the sides and most notably has a series of white flecks or spots running mainly along the sides.

2/ The throat of *E. quoyii* is dominantly whitish, cream or light yellow in colour with limited black pigment or spots and never more than small spots either scattered or forming longitudinal lines.

By contrast the throat of *E. paulwoolfi sp. nov.* is heavily peppered and marked with black or very dark pigment, with white being limited to flecks, spots or otherwise limited areas.

3/ The upper labials of *E. paulwoolfi sp. nov.* have dark brown bars on them which is not the case in *E. quoyii.*

The two species *E. paulwoolfi sp. nov.* and *E. quoyii* are separated from other similar Australian species (and all other species in the same genus) as follows: They are defined as a large Australian water skink (adults reaching over 110 mm snout-vent) with sharply-defined narrow pale yellow dorsolateral stripes but without a black vertebral stripe and a top of head that is either immaculate (one colour) or with only limited spots or flecks.

The diagnosis for the genus *Eulamprus* Fitzinger, 1843 is a genus of largish, fast moving, diurnally active skinks, characterised by pentadactyle limbs; smooth scales; anterior ear lobules absent; lower eyelid moveable and scaly; parietal scales in contact behind the interparietal; fourth toe much longer than the third; base of fourth toe is broad with three or more granules or lamellae between the lateral scales and all or some of the lamellae including the distal ones divided; surfaces of the tail and the rump are not flushed with red, pink or blue; hindlimb is long being at least 40 per cent of snout-vent length; live bearing (derived and modified from Cogger, 2014).

E. paulwoolfi sp. nov. in life in a photograph can be seen on page 525 in Brown (2014) at page 525, top right and second from bottom on left and a photo by Robert Valentic can be seen online at:
https://flickr.com/photos/gondwanareptileproductions/48369508457/

(last downloaded on 1 March 2020)

The type form of *E. quoyii* from Sydney, NSW, in a photo by Andy Burton is online at:

https://flickr.com/photos/burtonandy/4407753711

(last downloaded on 1 March 2020)

The type form of *E. quoyii* is also depicted in life in Cogger (2014) at page 562 (top right), Hoser (1989) at page 96 (middle), Wilson and Swan (2017) on page 305, being both images at top of page, Wilson (2015) at bottom of page and in Brown (2014) page 525 at second row from top (both images).

Distribution: *Eulamprus paulwoolfi sp. nov.* is found in North Queensland along the coast, generally from at least Mackay in

the south and Cairns in the north, including nearby coastal ranges, but usually at lower elevations, noting the species is usually associated with watercourses or sometimes in man-made gardens with watering points, where they often occur in large numbers.

Pepper *et al.* (2018) give Gladstone in Queensland as the apparent approximate southern limit for this taxon.

Etymology: *C. paulwoolfi sp. nov.* is named in honour of Paul Woolf of Walloon in Queensland, Australia, foundation president of the Herpetological Society of Queensland Incorporated in recognition of some decades of important contributions to herpetology in Australia, including important logistical support for regular field trips in Queensland and New South Wales, Australia spanning a period in excess of 20 years.
He has also provided assistance in sourcing potential type material of various species for inspection and assisted curators at the Queensland Museum.

CONSERVATION

Delays in recognition of this species could jeopardise the long-term survival of this taxon as outlined by Hoser (2019a, 2019b) and sources cited therein.

Therefore attempts by taxonomic vandals like the Wolfgang Wüster gang via Kaiser (2012a, 2012b, 2013, 2014a, 2014b) and Kaiser *et al.* (2013) (as frequently amended) to unlawfully suppress the recognition of these taxa on the basis they have a personal dislike for the person who formally named it should be resisted (Dubois *et al.* 2019).
Claims by the Wüster gang against this paper and the descriptions herein will no doubt be no different to those the gang have made previously, all of which were discredited long ago as outlined by Dubois *et al.* (2019), Hoser, (2007, 2009, 2012a, 2012b, 2013a, 2015a-f, 2019a, 2019b) and sources cited therein.

Information relevant to conservation of Australian reptiles in Hoser (1989, 1991, 1993 and 1996) and relevant comments in Hoser (2019a, 2019b) applies to the newly named taxon herein, noting that at present populations seem to be abundant and secure.

I note that this apparently secure status, could change suddenly as has done so for other Australian species, including several detailed in Hoser (1991).

If the Australian government persists with its “Big Australia Policy”, (see for example Saunders 2019 or Zaczek 2019), that being a long-term aim to increase the human population in Australia to over 100 million people by year 2150 (from the present 25 million as of 2019), all sorts of unforseen threats to the survival of this species may emerge.

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CONFLICTS OF INTEREST

None.

Australasian Journal of Herpetology 43:38-40.
Published 25 April 2020.

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

A new species of Water Dragon from North Queensland, Australia (Reptilia: Squamata: Sauria: Agamidae: *Intellagama* Wells and Wellington, 1985).

LSID URN:LSID:ZOOBANK.ORG:PUB:2F191CE1-6974-44EE-9B15-9DEE10F10EDD

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Received 19 November 2018, Accepted 4 January 2020, Published 25 April 2020.

ABSTRACT

A new species of Australian Water Dragon, genus *Intellagama*, Wells and Wellington, 1985 is formally identified for the first time.

It is named according to the rules of the *International Code of Zoological Nomenclature* (Ride *et al*. 1999) as amended *Intellagama wellsandwellingtonorum sp. nov*. in recognition of the monumental contributions to Australian herpetology by two men, Richard Wells and Cliff Ross Wellington.

This contribution includes via some significant taxonomy publications in the 1980's and other important herpetological works since then.

Their contributions included the first formal diagnosis of the genus *Intellagama*.

Keywords: Taxonomy; reptilia; squamata; nomenclature; Australia; Queensland; *Intellagama*; *Physignathus*; *lesueurii*; *howitti*; new species; *wellsandwellingtonorum*.

INTRODUCTION

The iconic Australian Agamid, the "Eastern Water Dragon" has been treated by most herpetologists as consisting a single species, *Intellagama leueurii* Gray, 1831 (e.g. Amey *et al*. 2012). As recognized to date, the taxon has been recorded as naturally occurring from lower Cape York in north Queensland along coastal and near coastal regions into eastern Victoria. Feral populations have also become established in the suburbs of Melbourne and Adelaide, where they are expanding in size (land area found) and number (population of individuals) exponentially.

This is particularly the case near the Yarra River in Hawthorn and Kew in inner Melbourne, where many hundreds if not thousands occur along the river and nearby homes and gardens, with populations noticeably increasing year on year at many sites.

The morphologically distinct form, naturally occurring from the southern third of New South Wales and nearby Victoria, originally described as *Physignathus lesueurii howittii* McCoy, 1884 has been regarded by most publishing authors since as synonymous with *Intellagama leueurii* (Gray, 1831).

Most publishing authors have treated the species *Intellagama leueurii* as being monotypic for the genus.

The genus *Intellagama* was erected by Wells and Wellington in 1985 to accommodate Australian species formerly included in the genus *Physignathus* Cuvier, 1829, since restricted to the Asian bioregion.

Contrary to this prevailing view in terms of "*Physignathus lesueurii howittii* McCoy, 1884" has been Wells and Wellington (1985) and Hoser (1989) who published independently from one another and steadfastly maintained the qualified opinion that the two forms were very different species. Hoser (1989) even published comparative photos of adult specimens of both forms on the same page to further demonstrate the obvious morphological differences between each species, noting allopatry, which should have settled any doubts as to the differences, once and for all.

It should also be mentioned that among relevant publishing authors, Wells, Wellington and Hoser were unique in that they had actually inspected specimens of both putative taxa, as opposed to merely relying on printed descriptions in lieu of hands-on inspection of living animals.

In the era of the internet and online "experts" proliferating, it is alarming that non-experts can easily publish taxonomic declarations and questionable nomenclature without a shred of evidence on sites like Peter Uetz's, search engine optimized website called "The Reptile Database" where evidence-free taxonomy and false and defamatory claims against competent herpetologists are common.

Significantly in 1985, Wells and Wellington at page 17 wrote of *Intellagama leueurii* (Gray, 1831), "A number of undescribed species await investigation".

Because of evil and noisy people masquerading as herpetologists, literally shouting down anyone who refers to or

cites the relevant Wells and Wellington (1985) paper and other works by these authors, including going so far as censoring scientific journals that do so, the Wells and Wellington works have been largely ignored by herpetologists in Australia.

In fact most practicing herpetologists in Australia, while offering opinions on the relevant Wells and Wellington paper, have not in fact even read it!

This ridiculous state of affairs is due to the original cohort of money grabbing ego-freaks seeking to rename taxa named by these authors and seek self-gratification for having "discovered" the same taxa along with their ability to convince other more naïve people that the Wells and Wellington works are "non-science" and should therefore be ignored.
This is manifested in the numerous publications of Wolfgang Wüster and his gang of thieves, known as the Wüster gang or Kaiser *et al.* as cited by Hoser (2007, 2009, 2012a, 2012b, 2013, 2015a-f, 2019a-b) and sources cited therein.

See also the very negative comments about these people (e.g. Kaiser *et al.*) by Dubois *et al.* (2019).

Over five decades of intensive fieldwork throughout the known range of the genus *Intellagama*, including inspection of thousands of specimens, I have been acutely aware of there being significant regional variation within the putative species *Intellagama leueurii* (Gray, 1831), most notably being that of the until now unnamed North Queensland specimens.

These lizards (both sexes as adults) are morphologically divergent from specimens further south (south of Rockhampton in Queensland), and are also geographically dijunct, based on museum collection records.
This disjunction is not as a result of non-collection in the relevant region, as it is a heavily collected part of Queensland with numerous other reptiles lodged in State museums from the relevant area.

On the basis of significant morphological divergence, distributional disjunction, not created by modern human settlement and the fact that the north Queensland specimens are clearly evolving as a separate ecological unit, I have no hesitation whatsoever in formally describing them as a new species in accordance with the provisions of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999) as amended online by the ICZN since.
I note that Cogger *et al.* (1983) list several synonyms for the species they describe as *Physignathus lesueurii* (Gray, 1831), however all are referrable to specimens from New South Wales or Brisbane, in south-east Queensland, except for the single specimen referred to as the holotype for *Physignathus lesueurii howitti* McCoy, 1884. That taxon has a type locality in eastern Victoria.

MATERIALS, METHODS AND RESULTS

These are inferred in both the abstract and introduction and self evident in the description that follows.

There is no conflict of interest in terms of this paper or the conclusions arrived at herein.

Several people including anonymous peer reviewers who revised the manuscript prior to publication are also thanked as are relevant museum curators in New South Wales, Queensland and Victoria.

SPECIES *INTELLAGAMA WELLSANDWELLINGTONORUM SP. NOV.*

LSID urn:lsid:zoobank.org:act:28EE37D7-367D-4F04-9136-6D4BAF1E63EC

Holotype: A preserved specimen in the Queensland Museum, Brisbane, Australia, Amphibians and Reptiles Collection, Specimen number J30855, collected from Mulgrave River, via Gordonvale, north Queensland, Australia, Latitude: -17.20 S., Longitude: 145.75 E.

Paratype: A preserved specimen in the Museum and Art Gallery of the Northern Territory, Reptile Collection, specimen number R00935, collected from Mareeba, Atherton Tablelands, Queensland, Australia, Latitude -16.99 S., Longitude 145.43 E.

Diagnosis: Until now *Intellagama wellsandwellingtonorum sp. nov.* has been treated as the north Queensland population of *I. lesueurii* (Gray, 1831).
The diagnosis for all species in the genus (as a genus diagnosis) is given in Wells and Wellington (1985) at page 17.
A diagnosis separating *I. lesueurii* and *I. howitti* is on page 63 of Hoser (1989) and assisted by the comparative photos of each species.

Adult *I. howitti* have significant amounts of grey-blue to grey-green pigment on the sides of the head and flanks. This is especially the case in large adult males as seen in the images on page 63 of Hoser (189) (top two images) or Swan, Shea and Sadlier (2004) at page 76 (top).

This is not the case in either *I. lesueurii* or *I. wellsandwellingtonorum sp. nov.*.

I. howitti lacks a stripe running from the eye to ear as is seen in both *I. lesueurii* and *I. wellsandwellingtonorum sp. nov.*.
Adult males of these species have distinctive red on their belly, not seen in *I. howitti,* as seen in Swan, Shea and Sadlier (2004) at page 77 (top).
Adult male *I. wellsandwellingtonorum sp. nov.* while having brilliant red on their belly like seen in *I. lesueurii*, has a noticeably less intense colouration which also tends not to extend onto the flanks near the rear of the front limbs, as is commonly seen in *I. lesueurii.*

Adult *I. wellsandwellingtonorum sp. nov.* of both sexes are readily separated from *I. lesueurii* by colouration. In adult *I. wellsandwellingtonorum sp. nov.* of both sexes the following colouration occurs. Commencing behind the ear, is a series of 5-7 deep yellow, to yellowish-orange squarish to diamond-shped blotches along the mid flanks, each of which is fairly distinct and well bounded and reducing in size progressively towards the back legs. These distinct blotches are absent in both *I. lesueurii* (and *I. howitti*).

Between these blotches are areas of peppered black and grey, being the lower remnants of semi-distinctive cross bands across the vertebral line.

The black stripe running from the eye to ear and beyond in *I. lesueurii* is thick and unbroken along the entire length from the eye. In *I. wellsandwellingtonorum sp. nov.* this stripe is either thin or broken at the anterior (eye) end, also being bounded by distinctive dark yellow near the eye.

While females have smaller and less distinctive spines on the head and vertebral line than in males of *I. wellsandwellingtonorum sp. nov.*, both sexes have relatively smaller spines than seen in either *I. lesueurii* and *I. howitti* of like gender and age. The exact degree of spine length difference between the species has not been quantified and measured.
Colour photos of *I. wellsandwellingtonorum sp. nov.* in real life can be found on the internet at:

www.flickr.com

on numerous photstreams including at:

https://www.flickr.com/photos/aussiegypsy/15659928254/in/album-72157647965020564/
and

https://www.flickr.com/photos/kristenmartyn/48811355163/in/album-72157711106451122/

and

https://www.flickr.com/photos/gocatters/26393825731/in/album-72157667062499972/

and also at:
https://www.jungledragon.com/image/8916/colorful_lizard.html
(all most recently downloaded on 20 Dec 2019).
Photos of *I. lesueurii* and *I. howitti* are common on the internet and also seen in Hoser (1989).

All three species can be readily separated and identified from

photos or inspection of live animals in the absence of given locality data. Blind tests to this effect scored a 100% success rate (10 of each species in a test of 30 specimens).

Distribution: *I. wellsandwellingtonorum sp. nov.* is known only from north Queensland in the vicinity of Cairns, generally north of Townsville, Queensland and including the general wet-tropics region (Cooktown in the north to just north of Townsville in the south). Specimens of the species *I. lesueurii* occur from Rockhampton and south to New South Wales.

The species *I. howitti*, is found in the southern third of New South Wales (coastal and near zone only), from Kiama (including hills west of there) and south to north-east Victoria. Preferred habitats for the genus are discussed in Hoser (1989) (described in that text as "*Physignathus*").

Etymology: Named in honour of Richard Wells and Cliff Ross Wellington in recognition of significant publications on Australian herpetology, including Wells and Wellington (1985) and numerous other important works in the decades since that time.

Common Name: Northern Water Dragon is an appropriate common name for this species.

It separates this taxon from the already well-known "Eastern Water Dragon" and "Gippsland Water Dragon", both also identified with reference to their general locations of provinence.

Conservation: In spite of the fact that *I. wellsandwellingtonorum sp. nov.* occurs in a reasonably well-populated part of Australia (Queensland's wet tropics region), the number of specimens in museums and recorded sightings on government databases is fairly low, being in the dozens of specimens. While this may in part be due to difficulty in capturing fast-moving dragon lizards, this taxon is both range and habitat restricted. It appears to be most common in rocky riverine habitats in wetter forested regions, the absence of such areas forming a significant biogeographic barrier to connection with *Intellagama* populations further south (S. E. Qld). As an egg-layer, breeding specimens are vulnerable to feral species such as foxes, able to locate and eat freshly laid eggs, which may be causing a potentially terminal decline in the species.
Any such decline may be hard to detect in the absence of targeted research on this taxon due to where these lizards are most common (National Parks).

Delays in recognition of this species could jeopardise the long-term survival of this taxon as outlined by Hoser (2019a, 2019b) and sources cited therein and therefore attempts by taxonomic vandals like the Wüster gang (Kaiser *et al.*) to unlawfully suppress the recognition of this taxon on the basis they have a personal dislike for the person who formally named it should be resisted (Dubois *et al.* 2019).

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CONFLICTS OF INTEREST - NONE.

Australasian Journal of Herpetology **43:41-49.**
Published 25 April 2020.

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

A long overdue refinement of the taxonomy of the Mallee Dragon Complex *Ctenophorus* (*Phthanodon*) *fordi* (Storr, 1965) *sensu lato* with the formal descriptions of four new subspecies.

LSID URN:LSID:ZOOBANK.ORG:PUB:47BB160D-BFEB-436E-AF88-FA820594DFCA

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Received 9 January 2019, Accepted 16 March 2020, Published 25 April 2020.

ABSTRACT

Since the original description of the putative species *Amphibolorus fordi* by Storr in 1965, better known as the Mallee Dragon, based on a specimen from the Goldfields in Western Australia, almost all Australian herpetologists have regarded all populations in arid southern Australia as belonging to a single species.

Exceptional to this were Wells and Wellington (1985) who formally described and named the easternmost population of southern inland New South Wales as *Phthanodon hawkeswoodi*, being placed in the genus they created in 1984 for a group of similar species.

In the 20 years following Wells and Wellington (1985), Hoser in 2015 was the first other author to formally recognized the validity of *Phthanodon hawkeswoodi* as a valid species, which was placed in the genus *Ctenophorus* Fitzinger, 1843, with *Phthanodon* relegated to being an appropriate subgenus.

More recently, Edwards *et al.* (2015) and then Sadlier *et al.* (2019) published papers following on from the work of Houston (1978) in recognizing at least six so-called races of *Ctenophorus fordi.*
Sadlier *et al.* (2019) engaged in taxonomic vandalism by improperly renaming *C. hawkeswoodi* as a new species, namely *C. spinodomus* Sadlier *et al.*, 2019.
However the four other unnamed divergent lineages remain unnamed.

The purpose of this paper is to formally recognize and name these as subspecies according to the rules of *the International Code of Zoological Nomenclature* (Ride *et al.* 1999).
Each lineage has a divergence from nearest common ancestor estimated at around 500,000 YBP (Edwards *et al.* 2015). The relevant populations are formally identified and named in order to aid further research and conservation of the said taxa, noting serious known threats to the long term survival of each subspecies as detailed by Hoser (2019a, 2019b).

Keywords: Taxonomy; nomenclature; lizards; dragons; Agamidae; *Amphibolurus*; *Ctenophorus*; *Phthanodon*; *fordi; hawkeswoodi; spinodomus*; Australia; New South Wales; Victoria; Western Australia; South Australia; new subspecies; *scottgranti*; *danielmani*; *scottyjamesi; maryannmartinekae*.

INTRODUCTION

As part of an ongoing audit of Australia's reptiles and frogs, the lizards within the putative genus *Phthanodon* Wells and Wellington, 1984, (herein treated as a subgenus), better known as the Mallee Dragons were examined with a view to confirming the taxonomy and nomenclature of relevant species or subspecies as being correct, or in the alternative being altered to reflect the biological reality.

Phthanodon was originally erected as a genus by Wells and Wellington (1984) and maintained by Wells and Wellington (1985), but the molecular evidence of Pyron *et al.* (2013) suggested that a more accurate placement of the relevant species was as a subgenus within the better-known *Ctenophorus* Fitzinger, 1843.

Hoser (2015g) was the first publishing herpetologist since Wells and Wellington (1985) to utilize the genus name *Phthanodon*, but in line with the results of Pyron *et al.* (2013) relegated the genus to a subgenus, within the genus *Ctenophorus.*

Hoser (2015g) was also the first publishing herpetologist in 20 years to formally recognize and accept the species *Ctenophorus* (*Phthanodon) hawkeswoodi* Wells and Wellington (1985) as a

valid species, being similar to but distinct from the better-known *C. fordi* (Storr, 1965), with which it had otherwise been confused.

Also in 2015, Edwards *et al.* (2015) provided further evidence to show that *C. hawkeswoodi* was a valid species, and Danielle Edwards also made it known to other herpetologists that she intended naming further species within the *C. fordi* group.

Due to knowledge of this alleged impending publication, Hoser (2015g) abstained from formally naming the four other well-known and obviously unnamed forms within the *C. fordi* group identified at that time, as it was ethical to allow Edwards priority name rights for the taxa.

However, four years have passed since then and the relatively easy task of naming the four unnamed forms has not yet been done, putting a potential bottleneck on research and conservation efforts by third parties.

While the recommendations of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999), suggest a one year time frame to formally name a new taxon once identified, four years is well past that time frame.

Furthermore it is highly unethical for a person working as a zoologist to monopolize one or more species to prevent others from doing legitimate scientific work on those very same species.

As it is urgent for conservation reasons to formally identify and name new species or subspecies, especially dragon lizard species with potential extinction threats as identified by Hoser (2019a, 2019b), I have absolutely no hesitation at all in formally naming the four unnamed forms within the *C. fordi* species complex as new species in accordance with the rules of the *International Code of Zoological Nomenclature.*

Also of relevance is that Sadlier *et al.* (2019) published a paper in an "in house" online journal, formally naming a species within the *C. fordi* complex.

That species *C. spinodomus* Sadlier *et al.*, 2019 is however a subjective junior synonym of *C. hawkeswoodi* Wells and Wellington, 1985 and therefore the earlier name should be used in accordance with the rules of the *International Code of Zoological Nomenclature.*

I note that in their paper, Sadlier *et al.* (2019) wrote:
"Comments. Wells & Wellington described *Phthanodon hawkeswoodi sp. nov.* in 1985. The designated holotype is a specimen (AMS R.116983) from Glenlea central fire trail Yathong Nature Reserve, NSW (collector A. B. Rose and J. Brickhill, 14 March 1981). The diagnosis presented by Wells & Wellington amounts to an extended description of the holotype that failed to provide either a "… definition that states in words characters that are purported to differentiate the taxon" or a "… bibliographic reference to such a published statement… ", as required under Article 13(a)(i–ii) of the Third edition of the Code of Zoological Nomenclature applicable at that time. As such, the description of *Phthanodon hawkeswoodi* Wells & Wellington, 1985 is unavailable for application to the species described here as *C. spinodomus sp. nov.*"

However a reading of the original description of Wells and Wellington finds that the statement of Sadlier *et al.* (2019) is in fact incorrect, which is why this paper uses the correct earlier nomen for that taxon, as did Hoser (2015g).

In terms of application of the "Third edition of the Code of Zoological Nomenclature", Wells and Wellington (1985) did in fact provide evidence of comparative differences between the two relevant species (*C. hawkeswoodi* and *C. fordi*) including by way of referring to photos of specimens of each putative species in various texts, cited by them in the description, which in their own statement showed differences between each. This in effect satisfies the word "purport" and a viewing of the relevant photos of two obviously different taxa confirms this, as explicitly stated again in Hoser (2015g), at which time Hoser (2015g) noted the obvious differences in dorsal colour pattern.

Creative interpretations of the rules of the *International Code of Zoological Nomenclature,* for the purpose of attempting to strike out valid older names is not scientific or ethical and in fact hampers the scientific effort.

Confusion is caused by the creation of an unnecessary dual nomenclature. Valuable time of other scientists is wasted correcting the mess caused by those who seek to improperly rename species for their own self-gratification and ego-stoking.

The purpose of the preceding is not to defend the Wells and Wellington paper of (1985), or their description of *C. hawkeswoodi.* None of that is relevant!

What is relevant and of critical importance is that the name first placed on the relevant species by Wells and Wellington in 1985 was done wholly within the rules of the ICZN at the time and therefore must be used.

The ICZN also issued a ruling in favour of the Wells and Wellington papers of 1984 and 1985, including making sure that everyone knew that the names proposed within were legal and available in terms of the relevant and in force *International Code of Zoological Nomenclature* as cited in Hoser (2007).

Significantly, both Edwards *et al.* (2015) and Sadlier *et al.* (2019) expanded on the work of Houston (1978) to effectively recognize at least six divergent lineages within putative *C. fordi*, including the allegedly newly named form of Sadlier *et al.* (2019).

With type *C. fordi*, coming from Coolgardie, Western Australia, three unnamed forms became those with a distribution centred on the state of South Australia, the central part of the range for the species complex and all clearly closely associated with *C. fordi.* A fourth unnamed form from north-west Victoria, was in turn clearly associated with the eastern lineage, correctly named as *C. hawkeswoodi.* Specimens of all relevant species or subspecies (named and until now unnamed) were examined both live in the wild and via museum collections and their records, including all State and Territory Museums on mainland Australia over a time frame spanning more than 30 years. Furthermore photos and data with accurate locality data was also assessed, as was all relevant previously published scientific literature and the so-called grey literature in the form of popular mass-market books, internet sites, blogs, photo-sharing sites and the like.

Relevant specimens were examined and confirmed that each of these forms warranted recognition at the species or subspecies level, which is the main basis for publishing this paper. That is to formally name and make available names for the four until now unnamed taxa in the *C. fordi* species complex in accordance with the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

Edwards *et al.* (2015) claimed divergence of eastern and western *C. fordi sensu lato* (including *C. femoralis* (Storr, 1965) as part of the western group) at about 1.75 MYA, confirming the correctness of designating *C. hawkeswoodi* as a full species.

C. femoralis diverged from other western *C. fordi* at about 1.5 MYA, again confirming its recognition as a full species.

In terms of the other four regionally distinct populations, all diverged from their nearest named or unnamed population between 250 and 550 thousand years ago, making subspecies-level recognition appropriate for these populations as done within this paper.

MATERIALS, METHODS AND RESULTS

These are inferred in both the abstract and introduction and self evident in the descriptions that follow.

An audit of relevant species and subspecies within the *C. fordi* group *sensu lato* as defined by Hoser (2015g) confirmed the generic level assignment of species and validity of the relevant named forms as identified by Wells and Wellington (1985) as placed by Hoser (2015g) and/or in line with it.

Specimens of all relevant species (named and until now unnamed) were examined both live in the wild and via museum collections and their records, including all State and Territory Museums on mainland Australia. Furthermore photos and data with accurate locality data was also assessed, as was all

relevant previously published scientific literature and the so-called grey literature in the form of popular mass-market books, internet sites, blogs, photo-sharing sites and the like.

The final results of this audit found that within the so-called *C. fordi* group *sensu lato* as defined by Hoser (2015g), there were at least two putative species, these being *C. fordi*, and *C. hawkeswoodi*.

The four other unnamed regionally distinct forms are all found primarily in South Australia or nearby.

In summary the relevant unnamed subspecies are as follows:

1/ The population from the Eyre Peninsula in South Australia.

2/ The population found generally north-west of the Eyre Peninsula, extending northwest to the north of the Nullabor Plain and into far eastern Western Australia.

3/ The population found east and north of the north part of the Flinders Ranges in South Australia, including nearby parts of far north-west New South Wales and south-west Queensland.

4/ The population found in north-west Victoria, generally south of the Murray River.

The named species, are *C. fordi* (Storr, 1965) with a distribution wholly centred on the Goldfields region of south-east Western Australia and to which the first three forms are associated and made subspecies and *C. hawkeswoodi* (Wells and Wellington, 1985), with a distribution centred on Western New South Wales and nearby parts of south-east South Australia, mainly away from the coast and east of the Flinders Ranges, to which the fourth form from Victoria is assigned.

The literature relevant to the taxonomy and nomenclature of the *C. fordi* species group within the

subgenus *Phthanodon* as first defined by Wells and Wellington (1985) and redefined by Hoser (2015g) and herein, including the taxonomic and nomenclatural decisions herein include the following: Cogger (2014), Cogger *et al.* (1983), Edwards *et al.* (2015), Fitzinger (1843), Gray (1845), Günther (1875), Hoser (2015g), Houston (1978), Pianka (1969), Pyron *et al.* (2013), Ride *et al.* (1999), Sadlier *et al.* (2019), Storr (1965), Swan *et al.* (2017), Wells and Wellington (1984, 1985), Wilson (2015), Wilson and Knowles (1988), Wilson and Swan (2017) and sources cited therein.

FURTHER DISCUSSION RELEVANT TO THIS PUBLICATION

An illegal armed raid and theft of materials on 17 Aug 2011 effectively stopped the publication of a variant of this paper being published back then and a significant amount of materials taken in that raid was not returned. This was in spite of court orders telling the relevant State Wildlife officers to do so (Court of Appeal 2014, Victorian Civil and Administrative Tribunal 2015).

Rather than run the risk of species or subspecies becoming threatened or extinct due to non-recognition of them as shown in Hoser (2019a, 2019b), I have instead opted to publish this paper in its current form, even though a significant amount of further data was intended to be published and is not.

Naming of taxa is perhaps the most important step in their ultimate preservation and it is with this motivation in mind (protection of biodiversity) that I have chosen to publish this paper.

Until now, no new (and generally recognized) taxa within the so-called *Ctenophorus fordi* (Storr, 1965) complex of species has been formally identified or named since the paper of Wells and Wellington (1985).

In stating this, I am ignoring the taxonomic vandalism of Sadlier *et al.* (2019).

INFORMATION RELEVANT TO THE FORMAL DESCRIPTIONS THAT FOLLOW

There is no conflict of interest in terms of this paper or the conclusions arrived at herein.

Several people including anonymous peer reviewers who revised the manuscript prior to publication are also thanked as are relevant staff at museums who made specimens and records available in line with international obligations.

In terms of the following formal descriptions, spellings should not be altered in any way for any purpose unless expressly and exclusively called for by the rules governing Zoological Nomenclature as administered by the International Commission of Zoological Nomenclature.

In the unlikely event two newly named taxa are deemed conspecific by a first reviser, then the name to be used and retained is that which first appears in this paper by way of page priority and as listed in the abstract keywords.

Some material in descriptions for taxa may be repeated for other taxa in this paper and this is necessary to ensure each fully complies with the provisions of the *International Code of Zoological Nomenclature* (Fourth edition) (Ride *et al.* 1999) as amended online since.

Material downloaded from the internet and cited anywhere in this paper was downloaded and checked most recently as of 1 March 2020, unless otherwise stated and were accurate in terms of the context cited herein as of that date.

Unless otherwise stated explicitly, colour descriptions apply to living adult male specimens of generally good health and not under any form of stress by means such as excessive cool, heat, dehydration or abnormal skin reaction to chemical or other input.

While numerous texts and references were consulted prior to publication of this paper, the criteria used to separate the relevant species or subspecies has already been spelt out and/or is done so within each formal description and does not rely on material within publications not explicitly cited herein.

Each newly named subspecies is readily and consistently separable from their nearest congener and that which until now it has been previously treated as.

Delays in recognition of these subspecies could jeopardise the long-term survival of these taxa as outlined by Hoser (2019a, 2019b) and sources cited therein.

Therefore attempts by taxonomic vandals like the Wolfgang Wüster gang via Kaiser (2012a, 2012b, 2013, 2014a, 2014b) and Kaiser *et al.* (2013) (as frequently amended) to unlawfully suppress the recognition of these taxa on the basis they have a personal dislike for the person who formally named it/them should be resisted (Dubois *et al.* 2019).

Claims by the Wüster gang against this paper and the descriptions herein will no doubt be no different to those the gang have made previously, all of which were discredited long ago as outlined by Dubois *et al.* (2019), Hoser, (2007, 2009, 2012a, 2012b, 2013a, 2015a-f, 2019a, 2019b) and sources cited therein.

Formal descriptions of the four relevant subspecies follow.

Information relevant to conservation of Australian reptiles in Hoser (1989, 1991, 1993 and 1996) applies to the newly named taxa herein as do the relevant comments of Hoser (2019a, 2019b).

In line with the Australian Federal Government's "Big Australia" policy, that being to increase the human population of 25 million (2020), from 13 million in around 1970, to over 100 million within 100 years "so that we can tell China what to do", as stated by the former Prime Minister, Kevin Rudd in 2019 (Zaczek 2019), the human pressure on the relevant ecosystems has increased in line with the human populations nearby and will clearly continue to do so.

CTENOPHORUS* (*PHTHANODON*) *FORDI SCOTTGRANTI SUBSP. NOV.

LSIDurn:lsid:zoobank.org:act:CACB2D11-13F4-4DFA-B21F-75FD2F586081

Holotype: A preserved specimen at the South Australian Museum, Adelaide, South Australia, Australia, specimen number R36493 collected 4.5 km north-west of Courtabie, South Australia, Australia, Latitude -33.1791 S., Longitude 134.8222 E.

This facility allows access to its holdings.

Paratype: A preserved specimen at the South Australian Museum, Adelaide, South Australia, Australia, specimen number R36494 collected 4.5 km north-west of Courtabie, South Australia, Australia, Latitude -33.1791 S., Longitude 134.8222 E.

Diagnosis: *Ctenophorus fordi* (Storri, 1965), is herein regarded as a complex of two species and a total of six subspecies, including nominate subspecies and excluding the associated Western Australian species *C. maculatus* (Gray, 1831) and the four associated subspecies as identified on page 713 of Cogger (2014), one of which *C. dualis* (Storr, 1965) is treated herein as a full species based on divergence as shown by Edwards *et al.* (2015) and the species *C. femoralis* (Storr, 1965) of Western Australia, associated with the western species *C. fordi*, being more closely related to that taxon than the eastern species *C. hawkeswoodi* Wells and Wellington, 1985 and the associated subspecies.

The diagnosis of *Ctenophorus spinodomus* Sadlier, Colgan, Beatson and Cogger, 2019 is vastly superior to that of *C. hawkeswoodi* Wells and Wellington, probably due to the significantly greater available resources for the later authors.

While the name *C. spinodomus* is a junior subjective synonym of *C. hawkeswoodi* Wells and Wellington, 1985, this in effect means that the diagnosis of Sadlier *et al.* (2019) can be formally adopted for *C. hawkeswoodi* and this is done herein.

The subgenus *Phthanodon* Wells and Wellington is diagnosed in Hoser (2015g) on pages 47-48 and this is wholly adopted herein.

C. fordi and *C. hawkeswoodi* including all subspecies are separated from all other species within *Phthanodon* by the following unique set of characters: more than 32 pores and extending more than halfway along the thigh, but not as far as the knee (versus to the knee in *C. maculatus*); males at least have black on the throat (versus none in *C. femoralis*), but it is not in the form of a solid black chevron (as in *C. maculatus*).

The diagnosis for *C. dualis* (Storr, 1965) as a subspecies of *C. maculatus* is in Storr (1965).

All subspecies of *C. hawkeswoodi* and *C. fordi* are of similar colouration and markings, although these vary between species and sex and can be used to diagnose and define each species. A full colour description effectively incorporating all subspecies under the name *Ctenophorus fordi* (Storr, 1965) is in Cogger (2014) at page 711, or alternatively in Houston (1978) at pages 34-35.

The species *C. hawkeswoodi* is readily separated from all forms of *C. fordi* by the spotted gular pattern in males.

The nominate subspecies *C. hawkeswoodi hawkeswoodi* is separated from *C. hawkeswoodi maryannmartinekae subsp. nov.* by having a strongly reddish-brown colouration in adult females, versus rich chocolate brown in *C. hawkeswoodi maryannmartinekae subsp. nov.,* thereby being a means to separate the newly recognized Victorian subspecies.

Adult male *C. hawkeswoodi maryannmartinekae subsp. nov.* are separated from adult male *C. hawkeswoodi hawkeswoodi* by having a dorsal pattern incorporating well-defined and thick dorsolateral stripes and well defined yellow spots on grey background on the upper flanks, versus thinner dorsolateral stripes and ill-defined white flecks on the upper flanks.

Adult male *C. hawkeswoodi maryannmartinekae subsp. nov.* have significant whitening on the upper labials and snout, versus little on *C. hawkeswoodi hawkeswoodi.* Sadlier *et al.* (2019) give further statistical differences between the two subspecies.

C. hawkeswoodi (both subspecies) and *C. fordi scottgranti subsp. nov.* are separated from all other subspecies of *C. fordi* by having 34-40 pores extending about three quarters the length of the thigh, versus 24-32 and extending about two thirds the length of the thigh in the other subspecies.

C. fordi scottgranti subsp. nov. are separated from all other subspecies of *C. fordi* by colouration in that all (both sexes) are generally dull grey-brown dorsally with well-developed black spots which often fuse and the gular lines and chest band of males is boldly developed. The flanks are generally greyish black with numerous white flecks. Upper limbs are also grey and heavily flecked with white.

C. fordi danielmani subsp. nov. are separated from all other subspecies of *C. fordi* by having an orangeish dorsal colouration (both sexes), with only small and discrete black spots on the body and only a feebly developed gular and chest pattern. White spots on the upper back between the dorsolateral lines merge to form a reticulated pattern of semi-distinct irregularly-shaped lines, running across the back.

C. fordi scottyjamesi subsp. nov. of both sexes are separated from all other subspecies of *C. fordi* by having a strongly reddish dorsal surface without any black spots. These have instead become blurred patches of indistinct darker patches formed by peppering, rather than as a coloured spot or blotch. Gular and chest pattern is usually absent, or rarely apparent in a feeble way. The dorsolateral stripes are present and distinct, but on the back between these lines are widely scattered tiny yellow spots and these do not in any way merge to form lines.

C. fordi fordi of both sexes are readily separated from all other subspecies by having an orange dorsal colouration incorporating a pattern including the dorsolateral stripes and between these and on the flanks a series of elongate bright yellow spots and patches giving the appearance of yellow bars also running across the body.

This unique patterning also continues onto the anterior upper surface of the tail. The pattern of this species therefore appears to be somewhat reticulated. *C. fordi fordi* is further separated from all other subspecies by having dark brown and light or white scales on the upper and lower labials giving them a barred appearance.

C. fordi fordi (Storr, 1965) in life is seen in Brown (2014) on page 751 at bottom right and Storr *et al.* (1983) at plate 5, top right.
C. fordi scottgranti subsp. nov. in life is seen online at:
http://www.wildherps.com/travels/Australia2015/8_Southern_Eyre.html
(online as of 1 March 2020).
C. fordi danielmani subsp. nov. in life is seen online at:
https://www.flickr.com/photos/shaneblackfnq/23938445988/in/album-72157646539084048/
(online as of 1 March 2020), and
https://www.flickr.com/photos/nieminski/34364042180/in/album-72157680859542984/
(online as of 1 March 2020).

C. fordi scottyjamesi subsp. nov. in life is seen in Brown (2014) on page 751 on bottom left and Wilson (2015) on page 193 bottom right.

C. hawkeswoodi hawkeswoodi (Wells and Wellington, 1985) in life is seen in Cogger (2014) on page 711 top right and Sadlier *et al.* (2019) at page 209 (identified as "*Ctenophorus spinodomus sp. nov.*").

C. hawkeswoodi maryannmartinekae subsp.nov. in life is seen in Brown (2014) on page 751 third row down (2 images) or online at:
http://www.arod.com.au/arod/reptilia/Squamata/Agamidae/Ctenophorus/fordi
(online as of 1 March 2020), or:
http://www.gondwanareptileproductions.com/agamidarticle.html
(online as of 1 March 2020).

Distribution: *C. fordi scottgranti subsp. nov*. is confined to the Eyre Peninsula of South Australia.

Etymology: *C. fordi scottgranti subsp. nov*. is named in honour of Scott Grant who as of 2020 was living in Whyalla, South Australia, Australia and was owner and manager of the Whyalla Fauna Park, in recognition of various contributions to wildlife conservation in Australia.

CTENOPHORUS* (*PHTHANODON*) *FORDI DANIELMANI SUBSP. NOV.

LSID urn:lsid:zoobank.org:act:48C1AF23-E8FB-4B75-BABE-DAF73B0C9759

Holotype: A preserved specimen in the South Australian Museum, Adelaide, South Australia, Australia, specimen number R32225, collected from 44 km south-west of Halinor Lake, South Australia, Australia, Latitude -29.49 S. Longitude 130.16 E. This government-owned facility allows access to its holdings.

Paratypes: Four preserved specimens in the South Australian Museum, Adelaide, South Australia, Australia, specimen numbers R32226, R32229, R32231 and R32238 all collected from 44 km south-west of Halinor Lake, South Australia, Australia, Latitude -29.49 S. Longitude 130.16 E.

Diagnosis: *Ctenophorus fordi* (Storri, 1965), is herein regarded as a complex of two species and a total of six subspecies, including nominate subspecies and excluding the associated Western Australian species *C. maculatus* (Gray, 1831) and the four associated subspecies as identified on page 713 of Cogger (2014), one of which *C. dualis* (Storr, 1965) is treated herein as a full species based on divergence as shown by Edwards *et al.* (2015) and the species *C. femoralis* (Storr, 1965) of Western Australia, associated with the western species *C. fordi*, being more closely related to that taxon than the eastern species *C. hawkeswoodi* Wells and Wellington, 1985 and the associated subspecies.

The diagnosis of *Ctenophorus spinodomus* Sadlier, Colgan, Beatson and Cogger, 2019 is vastly superior to that of *C. hawkeswoodi* Wells and Wellington, probably due to the significantly greater available resources for the later authors.

While the name *C. spinodomus* is a junior subjective synonym of *C. hawkeswoodi* Wells and Wellington, 1985, this in effect means that the diagnosis of Sadlier *et al.* (2019) can be formally adopted for *C. hawkeswoodi* and this is done herein.

The subgenus *Phthanodon* Wells and Wellington is diagnosed in Hoser (2015g) on pages 47-48 and this is wholly adopted herein.

C. fordi and *C. hawkeswoodi* including all subspecies are separated from all other species within *Phthanodon* by the following unique set of characters: more than 32 pores and extending more than halfway along the thigh, but not as far as the knee (versus to the knee in *C. maculatus*); males at least have black on the throat (versus none in *C. femoralis*), but it is not in the form of a solid black chevron (as in *C. maculatus*).

The diagnosis for *C. dualis* (Storr, 1965) as subspecies of *C. maculatus* is in Storr (1965).

All subspecies of *C. hawkeswoodi* and *C. fordi* are of similar colouration and markings, although these vary between species and sex and can be used to diagnose and define each species. A full colour description effectively incorporating all subspecies under the name *Ctenophorus fordi* (Storr, 1965) is in Cogger (2014) at page 711, or alternatively in Houston (1978) at pages 34-35.

The species *C. hawkeswoodi* is readily separated from all forms of *C. fordi* by the spotted gular pattern in males.

The nominate subspecies *C. hawkeswoodi hawkeswoodi* is separated from *C. hawkeswoodi maryannmartinekae subsp. nov.* by having a strongly reddish-brown colouration in adult females, versus rich chocolate brown in *C. hawkeswoodi maryannmartinekae subsp. nov.,* thereby being a means to separate the newly recognized Victorian subspecies.

Adult male *C. hawkeswoodi maryannmartinekae subsp. nov.* are separated from adult male *C. hawkeswoodi hawkeswoodi* by having a dorsal pattern incorporating well-defined and thick dorsolateral stripes and well defined yellow spots on grey background on the upper flanks, versus thinner dorsolateral stripes and ill-defined white flecks on the upper flanks.

Adult male *C. hawkeswoodi maryannmartinekae subsp. nov.* have significant whitening on the upper labials and snout, versus little on *C. hawkeswoodi hawkeswoodi.* Sadlier *et al.* (2019) give further statistical differences between the two subspecies.

C. hawkeswoodi (both subspecies) and *C. fordi scottgranti subsp. nov.* are separated from all other subspecies of *C. fordi* by having 34-40 pores extending about three quarters the length of the thigh, versus 24-32 and extending about two thirds the length of the thigh in the other subspecies.

C. fordi scottgranti subsp. nov. are separated from all other subspecies of *C. fordi* by colouration in that all (both sexes) are generally dull grey-brown dorsally with well-developed black spots which often fuse and the gular lines and chest band of males is boldly developed. The flanks are generally greyish black with numerous white flecks. Upper limbs are also grey and heavily flecked with white.

C. fordi danielmani subsp. nov. are separated from all other subspecies of *C. fordi* by having an orangeish dorsal colouration (both sexes), with only small and discrete black spots on the body and only a feebly developed gular and chest pattern. White spots on the upper back between the dorsolateral lines merge to form a reticulated pattern of semi-distinct irregularly-shaped lines, running across the back.

C. fordi scottyjamesi subsp. nov. of both sexes are separated from all other subspecies of *C. fordi* by having a strongly reddish dorsal surface without any black spots. These have instead become blurred patches of indistinct darker patches formed by peppering, rather than as a coloured spot or blotch. Gular and chest pattern is usually absent, or rarely apparent in a feeble way. The dorsolateral stripes are present and distinct, but on the back between these lines are widely scattered tiny yellow spots and these do not in any way merge to form lines.

C. fordi fordi of both sexes are readily separated from all other subspecies by having an orange dorsal colouration incorporating a pattern including the dorsolateral stripes and between these and on the flanks a series of elongate bright yellow spots and patches giving the appearance of yellow bars also running across the body. This unique patterning also continues onto the anterior upper surface of the tail. The pattern of this species therefore appears to be somewhat reticulated. *C. fordi fordi* is further separated from all other subspecies by having dark brown and light or white scales on the upper and lower labials giving them a barred appearance.

C. fordi fordi (Storr, 1965) in life is seen in Brown (2014) on page 751 at bottom right and Storr *et al.* (1983) at plate 5, top right.
C. fordi scottgranti subsp. nov. in life is seen online at:
http://www.wildherps.com/travels/Australia2015/8_Southern_Eyre.html
(online as of 1 March 2020).
C. fordi danielmani subsp. nov. in life is seen online at:
https://www.flickr.com/photos/shaneblackfnq/23938445988/in/album-72157646539084048/
(online as of 1 March 2020), and
https://www.flickr.com/photos/nieminski/34364042180/in/album-72157680859542984/
(online as of 1 March 2020).

C. fordi scottyjamesi subsp. nov. in life is seen in Brown (2014) on page 751 on bottom left and Wilson (2015) on page 193 bottom right.

C. hawkeswoodi hawkeswoodi (Wells and Wellington, 1985) in life is seen in Cogger (2014) on page 711 top right and Sadlier *et al.* (2019) at page 209 (identified as "*Ctenophorus spinodomus sp. nov.*").

C. hawkeswoodi maryannmartinekae subsp.nov. in life is seen in Brown (2014) on page 751 third row down (2 images) or online at:
http://www.arod.com.au/arod/reptilia/Squamata/Agamidae/Ctenophorus/fordi
(online as of 1 March 2020), or:
http://www.gondwanareptileproductions.com/agamidarticle.html
(online as of 1 March 2020).

Distribution: *C. fordi danielmani subsp. nov.* is found generally north-west of the Eyre Peninsula, extending northwest to the north of the Nullabor Plain and into far eastern Western Australia, being the region of the Great Victoria Desert.

Etymology: *C. fordi danielmani subsp. nov.* is named in honour of Daniel Man, an accountant from Mitcham, Victoria, Australia in recognition for his services to wildlife conservation spanning three decades, including by managing the financial affairs of Snakebusters: Australia's best reptiles wildlife displays and snake catcher services.

CTENOPHORUS* (*PHTHANODON*) *FORDI SCOTTYJAMESI SUBSP. NOV.

LSID urn:lsid:zoobank.org:act:91E0C45F-1995-41BD-A63D-984434C35407

Holotype: A preserved specimen at the Australian Museum, Sydney, New South Wales, Australia, specimen number R.158938, collected 5.7 km west (by road) along Whitecatch Gate road, Sturt National Park, New South Wales, Australia, Latitude -29.13 S., Longitude 141.15 E. This government-owned facility allows access to its holdings.

Paratype: A preserved specimen at the Australian Museum, Sydney, New South Wales, Australia, specimen number R.155491, collected at 21.7 km (by road) west of Binerah Downs Homestead on Middle Road, Sturt National Park, New South Wales, Australia, Latitude 29.03 S., Longitude 141.37 E.

Diagnosis: *Ctenophorus fordi* (Storri, 1965), is herein regarded as a complex of two species and a total of six subspecies, including nominate subspecies and excluding the associated Western Australian species *C. maculatus* (Gray, 1831) and the four associated subspecies as identified on page 713 of Cogger (2014), one of which *C. dualis* (Storr, 1965) is treated herein as a full species based on divergence as shown by Edwards *et al.* (2015) and the species *C. femoralis* (Storr, 1965) of Western Australia, associated with the western species *C. fordi*, being more closely related to that taxon than the eastern species *C. hawkeswoodi* Wells and Wellington, 1985 and the associated subspecies.

The diagnosis of *Ctenophorus spinodomus* Sadlier, Colgan, Beatson and Cogger, 2019 is vastly superior to that of *C. hawkeswoodi* Wells and Wellington, probably due to the significantly greater available resources for the later authors.

While the name *C. spinodomus* is a junior subjective synonym of *C. hawkeswoodi* Wells and Wellington, 1985, this in effect means that the diagnosis of Sadlier *et al.* (2019) can be formally adopted for *C. hawkeswoodi* and this is done herein.

The subgenus *Phthanodon* Wells and Wellington is diagnosed in Hoser (2015g) on pages 47-48 and this is wholly adopted herein.

C. fordi and *C. hawkeswoodi* including all subspecies are separated from all other species within *Phthanodon* by the following unique set of characters: more than 32 pores and extending more than halfway along the thigh, but not as far as the knee (versus to the knee in *C. maculatus*); males at least have black on the throat (versus none in *C. femoralis*), but it is not in the form of a solid black chevron (as in *C. maculatus*).

The diagnosis for *C. dualis* (Storr, 1965) as subspecies of *C. maculatus* is in Storr (1965).

All subspecies of *C. hawkeswoodi* and *C. fordi* are of similar colouration and markings, although these vary between species and sex and can be used to diagnose and define each species. A full colour description effectively incorporating all subspecies under the name *Ctenophorus fordi* (Storr, 1965) is in Cogger (2014) at page 711, or alternatively in Houston (1978) at pages 34-35.

The species *C. hawkeswoodi* is readily separated from all forms of *C. fordi* by the spotted gular pattern in males.

The nominate subspecies *C. hawkeswoodi hawkeswoodi* is separated from *C. hawkeswoodi maryannmartinekae subsp. nov.* by having a strongly reddish-brown colouration in adult females, versus rich chocolate brown in *C. hawkeswoodi maryannmartinekae subsp. nov.,* thereby being a means to separate the newly recognized Victorian subspecies.

Adult male *C. hawkeswoodi maryannmartinekae subsp. nov.* are separated from adult male *C. hawkeswoodi hawkeswoodi* by having a dorsal pattern incorporating well-defined and thick dorsolateral stripes and well defined yellow spots on grey background on the upper flanks, versus thinner dorsolateral stripes and ill-defined white flecks on the upper flanks.

Adult male *C. hawkeswoodi maryannmartinekae subsp. nov.* have significant whitening on the upper labials and snout, versus little on *C. hawkeswoodi hawkeswoodi.* Sadlier *et al.* (2019) give further statistical differences between the two subspecies.

C. hawkeswoodi (both subspecies) and *C. fordi scottgranti subsp. nov.* are separated from all other subspecies of *C. fordi* by having 34-40 pores extending about three quarters the length of the thigh, versus 24-32 and extending about two thirds the length of the thigh in the other subspecies.

C. fordi scottgranti subsp. nov. are separated from all other subspecies of *C. fordi* by colouration in that all (both sexes) are generally dull grey-brown dorsally with well-developed black spots which often fuse and the gular lines and chest band of males is boldly developed. The flanks are generally greyish black with numerous white flecks. Upper limbs are also grey and heavily flecked with white.

C. fordi danielmani subsp. nov. are separated from all other subspecies of *C. fordi* by having an orangeish dorsal colouration (both sexes), with only small and discrete black spots on the body and only a feebly developed gular and chest pattern. White spots on the upper back between the dorsolateral lines merge to form a reticulated pattern of semi-distinct irregularly-shaped lines, running across the back.

C. fordi scottyjamesi subsp. nov. of both sexes are separated from all other subspecies of *C. fordi* by having a strongly reddish dorsal surface without any black spots. These have instead become blurred patches of indistinct darker patches formed by peppering, rather than as a coloured spot or blotch. Gular and chest pattern is usually absent, or rarely apparent in a feeble way. The dorsolateral stripes are present and distinct, but on the back between these lines are widely scattered tiny yellow spots and these do not in any way merge to form lines.

C. fordi fordi of both sexes are readily separated from all other subspecies by having an orange dorsal colouration incorporating a pattern including the dorsolateral stripes and between these and on the flanks a series of elongate bright yellow spots and patches giving the appearance of yellow bars also running across the body. This unique patterning also continues onto the anterior upper surface of the tail. The pattern of this species therefore appears to be somewhat reticulated. *C. fordi fordi* is further separated from all other subspecies by having dark brown and light or white scales on the upper and lower labials giving them a barred appearance.

C. fordi fordi (Storr, 1965) in life is seen in Brown (2014) on page 751 at bottom right and Storr *et al.* (1983) at plate 5, top right.

C. fordi scottgranti subsp. nov. in life is seen online at: http://www.wildherps.com/travels/Australia2015/8_Southern_Eyre.html

(online as of 1 March 2020).

C. fordi danielmani subsp. nov. in life is seen online at: https://www.flickr.com/photos/shaneblackfnq/23938445988/in/album-72157646539084048/

(online as of 1 March 2020), and

https://www.flickr.com/photos/nieminski/34364042180/in/album-72157680859542984/

(online as of 1 March 2020).

C. fordi scottyjamesi subsp. nov. in life is seen in Brown (2014) on page 751 on bottom left and Wilson (2015) on page 193 bottom right.

C. hawkeswoodi hawkeswoodi (Wells and Wellington, 1985) in life is seen in Cogger (2014) on page 711 top right and Sadlier *et*

al. (2019) at page 209 (identified as "*Ctenophorus spinodomus sp. nov*.").

C. hawkeswoodi maryannmartinekae subsp.nov. in life is seen in Brown (2014) on page 751 third row down (2 images) or online at:
http://www.arod.com.au/arod/reptilia/Squamata/Agamidae/Ctenophorus/fordi
(online as of 1 March 2020), or:
http://www.gondwanareptileproductions.com/agamidarticle.html
(online as of 1 March 2020).

Distribution: *C. fordi scottyjamesi subsp. nov*. is found east and north of the north part of the Flinders Ranges in South Australia, including nearby parts of far north-west New South Wales and south-west Queensland.

Etymology: *C. fordi scottyjamesi subsp. nov*. is named in honour of Scotty James of Warrandyte, Victoria, Australia, in recognition for his services for snowboarding worldwide. He was the flag bearer for Australia at the 2018 Winter Olympics, where he won a bronze medal in halfpipe. He has won numerous titles since and has inspired countless young people to get out of their homes and to enjoy the outdoor environment in sport, which in turn encourages people to want to do what is needed to preserve and enhance the world's natural assets.

CTENOPHORUS* (*PHTHANODON*) *HAWKESWOODI MARYANNMARTINEKAE SUBSP. NOV.

LSID urn:lsid:zoobank.org:act:A2B76FDF-075C-45C6-8AE8-C5CE21C500A0

Holotype: A preserved specimen in the Australian Museum, Sydney, New South Wales, Australia, specimen number R.53878 collected from 15 miles west of Annuello, Victoria, Australia, Latitude -34.78 S., Longitude 142.57 E. This government-owned facility allows access to its holdings.

Paratypes: Six preserved specimens in the Australian Museum, Sydney, New South Wales, Australia, specimen numbers R.68785-90 collected at Hattah, Victoria, Australia, Latitude -34.77 S., Longitude 142.27 E.

Diagnosis: *Ctenophorus fordi* (Storri, 1965), is herein regarded as a complex of two species and a total of six subspecies, including nominate subspecies and excluding the associated Western Australian species *C. maculatus* (Gray, 1831) and the four associated subspecies as identified on page 713 of Cogger (2014), one of which *C. dualis* (Storr, 1965) is treated herein as a full species based on divergence as shown by Edwards *et al.* (2015) and the species *C. femoralis* (Storr, 1965) of Western Australia, associated with the western species *C. fordi*, being more closely related to that taxon than the eastern species *C. hawkeswoodi* Wells and Wellington, 1985 and the associated subspecies.

The diagnosis of *Ctenophorus spinodomus* Sadlier, Colgan, Beatson and Cogger, 2019 is vastly superior to that of *C. hawkeswoodi* Wells and Wellington, probably due to the significantly greater available resources for the later authors.

While the name *C. spinodomus* is a junior subjective synonym of *C. hawkeswoodi* Wells and Wellington, 1985, this in effect means that the diagnosis of Sadlier *et al.* (2019) can be formally adopted for *C. hawkeswoodi* and this is done herein.

The subgenus *Phthanodon* Wells and Wellington is diagnosed in Hoser (2015g) on pages 47-48 and this is wholly adopted herein.

C. fordi and *C. hawkeswoodi* including all subspecies are separated from all other species within *Phthanodon* by the following unique set of characters: more than 32 pores and extending more than halfway along the thigh, but not as far as the knee (versus to the knee in *C. maculatus*); males at least have black on the throat (versus none in *C. femoralis*), but it is not in the form of a solid black chevron (as in *C. maculatus*).

The diagnosis for *C. dualis* (Storr, 1965) as subspecies of *C. maculatus* is in Storr (1965).

All subspecies of *C. hawkeswoodi* and *C. fordi* are of similar colouration and markings, although these vary between species and sex and can be used to diagnose and define each species. A full colour description effectively incorporating all subspecies under the name *Ctenophorus fordi* (Storr, 1965) is in Cogger (2014) at page 711, or in Houston (1978) at pages 34-35.
The species *C. hawkeswoodi* is readily separated from all forms of *C. fordi* by the spotted gular pattern in males.

The nominate subspecies *C. hawkeswoodi hawkeswoodi* is separated from *C. hawkeswoodi maryannmartinekae subsp. nov.* by having a strongly reddish-brown colouration in adult females, versus rich chocolate brown in *C. hawkeswoodi maryannmartinekae subsp. nov.,* thereby being a means to separate the newly recognized Victorian subspecies.

Adult male *C. hawkeswoodi maryannmartinekae subsp. nov.* are separated from adult male *C. hawkeswoodi hawkeswoodi* by having a dorsal pattern incorporating well-defined and thick dorsolateral stripes and well defined yellow spots on grey background on the upper flanks, versus thinner dorsolateral stripes and ill-defined white flecks on the upper flanks.

Adult male *C. hawkeswoodi maryannmartinekae subsp. nov.* have significant whitening on the upper labials and snout, versus little on *C. hawkeswoodi hawkeswoodi.* Sadlier *et al.* (2019) give further statistical differences between the two subspecies.

C. hawkeswoodi (both subspecies) and *C. fordi scottgranti subsp. nov*. are separated from all other subspecies of *C. fordi* by having 34-40 pores extending about three quarters the length of the thigh, versus 24-32 and extending about two thirds the length of the thigh in the other subspecies.
C. fordi scottgranti subsp. nov. are separated from all other subspecies of *C. fordi* by colouration in that all (both sexes) are generally dull grey-brown dorsally with well-developed black spots which often fuse and the gular lines and chest band of males is boldly developed. The flanks are generally greyish black with numerous white flecks. Upper limbs are also grey and heavily flecked with white.

C. fordi danielmani subsp. nov. are separated from all other subspecies of *C. fordi* by having an orangeish dorsal colouration (both sexes), with only small and discrete black spots on the body and only a feebly developed gular and chest pattern. White spots on the upper back between the dorsolateral lines merge to form a reticulated pattern of semi-distinct irregularly-shaped lines, running across the back.

C. fordi scottyjamesi subsp. nov. of both sexes are separated from all other subspecies of *C. fordi* by having a strongly reddish dorsal surface without any black spots. These have instead become blurred patches of indistinct darker patches formed by peppering, rather than as a coloured spot or blotch. Gular and chest pattern is usually absent, or rarely apparent in a feeble way. The dorsolateral stripes are present and distinct, but on the back between these lines are widely scattered tiny yellow spots and these do not in any way merge to form lines.

C. fordi fordi of both sexes are readily separated from all other subspecies by having an orange dorsal colouration incorporating a pattern including the dorsolateral stripes and between these and on the flanks a series of elongate bright yellow spots and patches giving the appearance of yellow bars also running across the body. This unique patterning also continues onto the anterior upper surface of the tail. The pattern of this species thus appears to be somewhat reticulated. *C. fordi fordi* is further separated from all other subspecies by having dark brown and light or white scales on the upper and lower labials giving them a barred appearance.

C. fordi fordi (Storr, 1965) in life is seen in Brown (2014) on page 751 at bottom right and Storr *et al.* (1983) at plate 5, top right.
C. fordi scottgranti subsp. nov. in life is seen online at:
http://www.wildherps.com/travels/Australia2015/8_Southern_Eyre.html
(online as of 1 March 2020).
C. fordi danielmani subsp. nov. in life is seen online at:
https://www.flickr.com/photos/shaneblackfnq/23938445988/in/

album-72157646539084048/

(online as of 1 March 2020), and

https://www.flickr.com/photos/nieminski/34364042180/in/album-72157680859542984/

(online as of 1 March 2020).

C. fordi scottyjamesi subsp. nov. in life is seen in Brown (2014) on page 751 on bottom left and Wilson (2015) on page 193 bottom right.

C. hawkeswoodi hawkeswoodi (Wells and Wellington, 1985) in life is seen in Cogger (2014) on page 711 top right and Sadlier *et al.* (2019) at page 209 (identified as "*Ctenophorus spinodomus sp. nov.*").

C. hawkeswoodi maryannmartinekae subsp.nov. in life is seen in Brown (2014) on page 751 third row down (2 images) or online at:

http://www.arod.com.au/arod/reptilia/Squamata/Agamidae/Ctenophorus/fordi

(online as of 1 March 2020), or:

http://www.gondwanareptileproductions.com/agamidarticle.html

(online as of 1 March 2020).

Distribution: Based on the publications of Edwards *et al.* (2015) and Sadlier *et al.* (2019) *C. hawkeswoodi maryannmartinekae subsp.nov.* is restricted to a region in Victoria in the north-west of that State where suitable habitat in the form of sand dunes occur, being bound in the North by the Murray River and in the south by unsuitable wetter or hilly habitats, extending to immediately adjacent parts of south-east South Australia.

Etymology: Named in honour of Maryann Martinek of Bendigo, Victoria, Australia, formerly of Richmond, Victoria, Australia in recognition of her services to wildlife conservation over a 20 year period. She also played a critically important role in exposing the fraud involving a water drinking Koala, marketed to the world as "Sam the Koala". "Sam the Koala" was used a Trojan horse to run an effectively fake wildlife charity and scam hundreds of thousands of dollars from well-meaning people as detailed by Hoser (2010).

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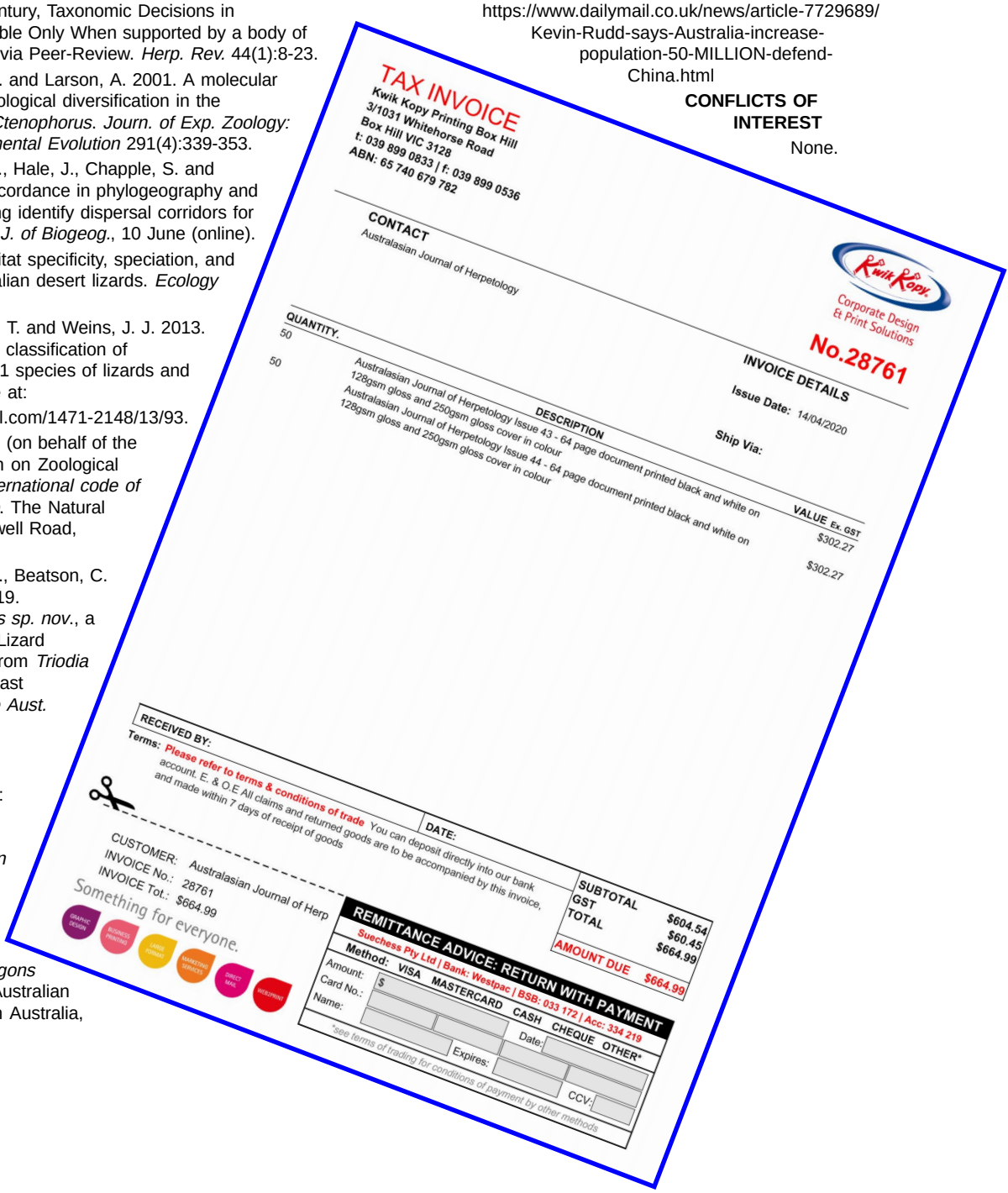
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CONFLICTS OF INTEREST

None.

Australasian Journal of Herpetology **43:50-56.**
Published 25 April 2020.

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

Five new species of Australian venomous snake, within the Australian genus *Brachyurophis* Günther, 1863 (Serpentes: Elapidae).

LSID URN:LSID:ZOOBANK.ORG:PUB:7005007C-035E-4193-8CBA-791AE37A3B05

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Received 22 February 2020, Accepted 21 March 2020, Published 25 April 2020.

ABSTRACT

As part of an ongoing audit of Australian reptiles, specimens of the fossorial snake *Brachyurophis* Günther, 1863 from across all the known range of the putative species were examined.

Twelve formally described and named species were recognized.

In accordance with the rules of the *International Code of Zoological Nomenclature* (Ride *et al*. 1999) as amended, this paper formally describes as new species, five well recognized forms previously treated as races of other species.

One species was formally regarded as a variant of *Brachyurophis campbelli* (Kinghorn, 1929), two as variants of *Brachyurophis incinctus* (Storr, 1967) and another two as variants of *Brachyurophis roperi* (Kinghorn, 1931). All are consistently morphologically divergent from their closest congener and also geographically divergent with no known gene flow between populations.

Any later name coined by Wolfgang Wüster and his gang of thieves (as sought in Kaiser *et al*. 2013 as amended frequently) should therefore be ignored.

Keywords: Snakes; taxonomy; nomenclature; Elapidae; Australia; Western Australia; Northern Territory, Queensland; *Brachyurophis*; *approximans*; *australis*; *campbelli*; *fasciatus*; *fasciolatus*; *incinctus*; *morrisi*; *murrayi*; *pulchella*; *roperi*; *semifasciatus*; *woodjonesi*; new species; *alexantenori*; *paultamisi*; *paulwoolfi*; *lesshearimi*; *richardshearimi*.

INTRODUCTION

An audit of Australian reptiles spanning more than 40 years included inspection of all species of snake within the putative genus *Brachyurophis* Günther, 1863 as well as a review of existing and available literature of relevance.

Current taxonomic arrangements were inspected and included assignment of relevant specimens from all relevant regions to previously described and named species.

All available names as listed by Cogger *et al.* (1983) were scrutinized in terms of whether or not they were for valid species taxa, or merely synonyms of others.

Two more recently described forms, namely *Brachyurophis morrisi* (Horner, 1998) and *Brachyurophis murrayi* (Wells and Wellington, 1985) were also looked at and in my considered view almost certainly include two species-level taxa, albeit closely allied forms and so both also recognized herein.

The purpose of this exercise was to formulate a robust taxonomy for the genus, including resurrection of names as appropriate or synonymising names as needed, as well as to name any potentially unnamed forms.

The results follow.

A NOTE ON THE NOMENCLATURE OF *BRACHYUROPHIS MURRAYI* WELLS AND WELLINGTON, 1985.

The putative taxon *Brachyurophis murrayi* (Wells and Wellington, 1985) is from the top end of the Northern Territory, Australia.

It is tentatively here treated as a valid species based on the diagnosis in the original description.

I note that *Brachyurophis murrayi* (Wells and Wellington, 1985) has been recklessly overlooked by most, if not all publishing herpetologists in Australia since 1985, due no doubt to the reckless and deliberate misinformation of the Wolfgang Wüster gang of thieves, who have tried to have their gang dishonestly over-write and rename species of people they choose to dislike (including Wells and Wellington) as detailed in their various manifestos, Kaiser *et al.* (2013) and Kaiser (2012a, 2012b, 2013. 2014a, 2014b).

Wüster and his gang of thieves, in acts of extreme taxonomic vandalism then attempt to get others to use their illegally coined names. The names are illegal under the CITES Treaty and other international agreements that most countries, including Australia, the UK, USA, and European Union have signed.

The various illegal actions of the Wüster gang and their extreme damage to science as well as wildlife conservation have been detailed elsewhere. All arguments presented by the gang have been shown to be invalid or based on lies. See for example Dubois *et al.* (2019), Hoser (2007, 2009, 2012a, 2012b, 2013, 2015a-f, 2019a-b).

Having read the relevant description of Wells and Wellington (1985) at pages 44 and 45 of the relevant publication, the description is particularly detailed and goes far beyond what any valid scientific description requires under the rules of the *International Code of Zoological Nomenclature* (editions 2-4).

In the process of auditing specimens and available names for species, I found that with a few exceptions, all specimens conformed with the following list of named species, with a few exceptions.

The list of recognized and already known species in this list differs from those presented in recent texts including Cogger (2014), Wilson and Swan (2017), Eipper and Eipper (2019) and Allen and Vogel (2019) because quite simply those authors have failed to properly review the primary literature, let alone inspect any reasonable number of the relevant taxa.

I do take issue with certain people who write books on snakes, largely by cutting and pasting information gleaned from "Google", each of whom then chooses prostitute their book as a definitive work based on years of non-existent research and then present themselves as experts, when the defects in their works may in fact outweigh any good within them.

See for example the accounts of Allen and Vogel (2019), which appear to have their factual information based on little more than a few telephone conversations with serial trouble maker and thief, Wolfgang Wüster, or from Wüster's steady stream of "Facebook" posts, the end product being a complete abortion of a text with a smattering of a reasonable quantity of fine photographs also presumably or quite likely sourced from "Google Images".

Incorrect information on numerous species and genera, non-stop bootlegging of works of others without attribution, which also happens to be in breach of copyright laws, wrong scientific names and wrong information like "*Brachyurophis incinctus* (Storr, 1868)" (sic) are repeated throughout the book.

So in terms of some of these recent herpetological texts, it really is a case of "buyer beware".

On the basis of the preceding summary, there is no doubt that the classification system presented in this paper, is the most correct one for the genus as of 2020 on the basis of all available information.

MATERIALS, METHODS AND RESULTS

Besides inspecting live specimens, museum specimens and quality photos with accurate location data, I also reviewed all relevant available literature, including the primary literature for each relevant species and not just third hand comments from persons who have not. This included the following:

Allen and Vogel (2019), Boulenger (1896), Cogger (2014), Cogger *et al.* (1983), Duméril *et al.* (1854), Eipper and Eipper (2019), Glauert (1954), Gow (1977), Günther (1858, 1863, 1872), Horner (1998), Hoser (1989), Houston (1976), Kinghorn (1929, 1931), Krefft (1864, 1865, 1869), Lee *et al.* (2016), Longman (1916), Lucas and Frost (1896), Mackay (1949), Mengden (1983), Ride *et al.* (1999), Sanders *et al.* (2008), Schembri and Jolly (2017), Stirling and Zietz (1893), Storr (1967, 1979), Storr *et al.* (2002), Thomson (1934), Wells and Wellington (1984, 1985), Wilson (2015), Wilson and Swan (2017) including sources cited therein.

Material relevant to this paper was stolen during an illegal armed raid by government wildlife officers on our research facility on 17 Aug 2011 and this was not returned in spite of orders by courts to do so (Court of Appeal Victoria 2014, Victorian Civil and Administrative Tribunal 2015).

The destructive illegal armed raid was initiated by false complaints made by associates of the Wüster gang.

The actions of the raid and the numerous bogus criminal charges arising from it, all of which were defended in court and won by myself (i.e. all claims by the wildlife department were found to be false) (Court of Appeal Victoria 2014, Victorian Civil and Administrative Tribunal 2015), delayed the publication of this paper and others in any form indefinitely.

In terms of the formal descriptions below, the spelling of the new names should not be changed unless absolutely mandated by the *International Code of Zoological Nomenclature* (Ride *et al.* 1999) as amended, or superseding publication.

Sections of descriptions below may be duplicated in order to ensure compliance with the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

There is no conflict of interest in terms of this paper and assistances of many people including Museum curators and the like are acknowledged, as are the assistance's of peer reviewers in this and all other papers I have published in the past 40 years of a taxonomic or nomenclatural nature.

Unless otherwise stated, all material downloaded from the internet and cited as such was last downloaded and checked on 7 February 2020.

FINAL RESULTS

The complete list of valid species based on morphology and divergence based on all available evidence as of 2020 and using all available names is given below. New names are assigned to previously unnamed forms and those descriptions follow this list.

Diagnostic information for each of the previously named taxa can be obtained from the primary literature as cited herein.

Currently recognized and well defined species within the genus are as follows:

***Brachyurophis approximans* (Glauert, 1954)**
***Brachyurophis australis* (Krefft, 1864)**
***Brachyurophis campbelli* (Kinghorn, 1929)**
***Brachyurophis fasciatus* (Stirling and Zietz, 1893)**
***Brachyurophis fasciolatus* (Günther, 1872)**
***Brachyurophis incinctus* (Storr, 1967)**
***Brachyurophis morrisi* (Horner, 1998)**
***Brachyurophis murrayi* Wells and Wellington, 1985**
***Brachyurophis pulchella* (Lucas and Frost, 1896)**
***Brachyurophis roperi* (Kinghorn, 1931)**
***Brachyurophis semifasciatus* Günther, 1863**
***Brachyurophis woodjonesi* (Thomson, 1934)**

The twelve species recognized here is contrary to the eight recognized species (both by name and number) seen in Cogger (2014) and most other texts in the period since.

The names used in the above list are the correct ones using the correct application of the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

Five new species are formally named below in this paper.

One species was formerly treated as a southern race of *Brachyurophis campbelli* (Kinghorn, 1929), two were formerly treated as eastern populations of *B. incinctus* (Storr, 1967) and two others as southern and western populations of *B. roperi* (Kinghorn, 1931).

BRACHYUROPHIS ALEXANTENORI SP. NOV.

LSID urn:lsid:zoobank.org:act:0ECF73EE-172C-4294-AA83-D2A05B94414D

Holotype: A preserved specimen at the Queensland Museum, Brisbane, Queensland, Australia, specimen number: J90210 collected at Bexley station, 25 km North-west of Longreach in Queensland, Australia, Latitude 23.20 S., Longitude 144.3167 E. This government-owned facility allows access to its holdings.

Paratype: A preserved specimen at the Queensland Museum, Brisbane, Queensland, Australia, specimen number: J90211 collected at Bexley station, 25 km North-west of Longreach in Queensland, Australia, Latitude 23.20 S., Longitude 144.3167 E.

Diagnosis: *Brachyurophis alexantenori sp. nov*. has until now been treated as a southern population of *Brachyurophis campbelli* (Kinghorn, 1929). The same situation has existed for

another similar taxon *B. woodjonesi* (Thomson, 1934).

Both *B. alexantenori sp. nov*. and *B. woodjonesi* are readily separated from *B. campbelli* by having 15 instead of 17 mid-body scale rows.

B. alexantenori sp. nov. is readily separated from *B. woodjonesi* and *B. campbelli* by colouration. *B. alexantenori sp. nov*. and *B. campbelli* has an absence of any prominent dark or black marking on the rostral, versus one in *B. woodjonesi.* Dorsally, *B. alexantenori sp. nov*. is reddish in colour with narrow and indistinct purplish-brown crossbands, including on the flanks.

The indistinctness of the markings in this taxon is caused by significant amounts of white at the anterior end of most of the dorsal scales.

By contrast the dorsal pattern of both *B. woodjonesi* and *B. campbelli* is a pattern of distinct and well defined alternating dark red and dark blackish bands usually running across the body and flanks, or occasionally the darker bands not being fully formed on the flanks. There is a general lack of white at the anterior end of each dorsal scale, which accounts for the very distinctive dorsal pattern in these two species.

B. campbelli in life is depicted on page 250 of Wilson (2015), lower image.

B. woodjonesi in life is depicted on page 250 of Wilson (2015) upper image and page 39 of Allen and Vogel (2019) top right and middle left images.

B. alexantenori sp. nov. in life is depicted on page 39 of Allen and Vogel (2019), middle right image.

Distribution: *B. campbelli* is found in the lower Cape York region, including Almeda and Mungana.

B. woodjonesi is found in the upper region of Cape York, including Archer River, Weipa, Laura and Wenlock River.

B. alexantenori sp. nov. is found in the region between Barcaldine and Winton in mid-central Queensland.

The three species *B. alexantenori sp. nov*., *B. woodjonesi* and *B. campbelli* are readily separated from all others in the genus *Brachyurophis* by the following suite of characters: Nasal in contact with pre-ocular; frontal about as broad as long and about three times as long as a supraocular; dark dorsal body bands, less than 60, 3 scales wide at widest point for *B. woodjonesi* and *B. campbelli*, or far less than that and indistinct for *B. alexantenori sp. nov*..

Etymology: Named in honour of Alex Antenor, originally from Sydney, New South Wales, Australia, for his many contributions to herpetology in Australia, including through his work with famous frog and tadpole expert Marion Anstis at the Australian Herpetological Society and Australian Museum in the 1970's and 1980's and ongoing into the year 2020.

BRACHYUROPHIS PAULTAMISI SP. NOV.

LSID urn:lsid:zoobank.org:act:B9A074CC-3581-4488-ADC0-58234A4C1AD3

Holotype: A preserved specimen at the Queensland Museum, Brisbane, Australia, specimen number: J39033 collected 27.3 km west of Mount Isa in Queensland on the Barkly Highway, Australia. Latitude 20.5167 S., Longitude 139.4333 S.

This government-owned facility allows access to its holdings.

Paratype: A preserved specimen at the Australian Museum in Sydney, New South Wales, Australia, specimen number: R.64336 collected from Mount Isa in Queensland, Australia, Latitude -20.733 S., Longitude 139.483 E.

Diagnosis: *Brachyurophis paultamisi sp. nov.* and *B. paulwoolfi sp. nov.* have until now been treated as regional populations of the well-known taxon *B. incinctus* (Storr, 1967). The two species are geographically divergent and morphologically distinct.

B. paultamisi sp. nov. and *B. paulwoolfi sp. nov*. are characterised by a lack of a black spot or marking on the anterior of the rostral as seen in *B. incinctus. B. paultamisi sp. nov.* further lacks the dark purple or blackish etching of dorsal scales as seen in *B. incinctus.* When there is etching of dorsal scales on *B. paultamisi sp. nov.* it is light in colour.

B. paulwoolfi sp. nov. is separated from both *B. incinctus* and *B. paultamisi sp. nov.* by having a significantly widened rostral, as opposed to strongly triangular in the other two species.

Furthermore *B. paulwoolfi sp. nov*. is separated from the other two species by the size and shape of scales between the eyes. The supraocular in *B. paulwoolfi sp. nov*. is large and squarish, versus small and narrow and somewhat triangular in shape in both *B. incinctus* and *B. paultamisi sp. nov.*.

In turn this alters the shape of the frontal shield, which is reduced in size in *B. paulwoolfi sp. nov*. as compared to the other two species. The front line of the suture of this scale is somewhat forward, giving it a diamond head appearance as it intersects the prefrontals, whereas at the same juncture in both *B. incinctus* and *B. paultamisi sp. nov.* the same point is relatively flat, giving the scale a straightish line at the anterior edge. The frontal shield is wide in both *B. incinctus* and *B. paultamisi sp. nov.* versus somewhat squarish in *B. paulwoolfi sp. nov*..

B. paulwoolfi sp. nov. is separated further from *B. paultamisi sp. nov.* by the width of the light band across the nape in between two areas of black on the head and upper neck.

Counting straight line (not diagonal), this is 5 scales in depth in *B. paulwoolfi sp. nov*., versus 3-4 in *B. paultamisi sp. nov.*. The width of the light band across the nape in between two areas of black on the head and upper neck is variable within *B. incinctus.*

B. paultamisi sp. nov., *B. paulwoolfi sp. nov*. (both treated as *B. incinctus*), *B. incinctus* and *B. morrisi* (Horner, 1998) in most recent texts are separated from all other species in the genus by having a body that is uniform and without cross-bands of any sort, except for a dark collar and associated markings.

B. morrisi is separated from all of *B. paultamisi sp. nov*., *B. paulwoolfi sp. nov*. (both treated as *B. incinctus*) and *B. incinctus* by having 15 midbody scale rows combined with a ventral and subcaudal count of less than 165 and only the lower postocular scale is in broad contact with the anterior temporal scale. By contrast both *B. paultamisi sp. nov.*, *B. paulwoolfi sp. nov*. (both treated as *B. incinctus*) and *B. incinctus* have 17 midbody scale rows combined with a ventral and subcaudal count of more than 165 and both postocular scales are in broad contact with the anterior temporal scale.

B. paulwoolfi sp. nov. in life can be seen Schembri and Jolly (2017) on page 114.

B. incinctus in life can be seen in Cogger (2014) on page 867 at bottom right.

B. paultamisi sp. nov. in life can be seen in Wilson (2015) at page 250 bottom.

Distribution: *B. paultamisi sp. nov.* is generally found in inland parts of Queensland from the Mount Isa area south-west through the western Brigalow belt.

B. paulwoolfi sp. nov. is known only from the type locality and holotype specimen collected from the Einasleigh Uplands Bioregion of north-eastern Queensland and is believed to be confined to this general area.

B. incinctus is a central Australian endemic, with a distribution centred on the MacDonnell Ranges region, being a separate biogeographical realm for relevant hill dwelling forms.

Etymology: Named in honour of Paul Tamis, originally of Moolap, Geelong, Victoria, Australia in recognition of his many contributions to herpetology in Australia, including through a lot of difficult work organising and running the Victorian Association of Amateur Herpetologists with Mick Pugh, Mip Pugh, Neil Davie, and the Bigmore Family, including Stewy and James over many years and including in the 1990's a time of turbulence in Australian herpetology, when as a result of the publications of the books *Smuggled: The Underground Trade in Australia's Wildlife* (Hoser, 1993) and *Smuggled-2: Wildlife trafficking, crime and corruption in Australia* (Hoser, 1996), wildlife laws in Australia were rewritten to allow private individuals and hobbyists to keep live reptiles as pets for the first time in decades.

BRACHYUROPHIS PAULWOOLFI SP. NOV.

LSID urn:lsid:zoobank.org:act:F3858859-A5F0-4D55-AA59-E033020AC438

Holotype: A preserved specimen at the Queensland Museum, Brisbane, Australia, specimen number: J95750, collected at Talaroo Station, 55.6 km west-northwest of Mount Surprise, Queensland, Australia, Latitude 18.0232 S., Longitude 143.4851 E. This government-owned facility allows access to its holdings.

A more detailed description of the holotype and photos of the specimen in life can be found in Schembri and Jolly (2017).

Diagnosis: *Brachyurophis paultamisi sp. nov.* and *B. paulwoolfi sp. nov*. have until now been treated as regional populations of the well-known taxon *B. incinctus* (Storr, 1967). The two species are geographically divergent and morphologically distinct.

B. paultamisi sp. nov. and *B. paulwoolfi sp. nov*. are characterised by a lack of a black spot or marking on the anterior of the rostral as seen in *B. incinctus. B. paultamisi sp. nov.* further lacks the dark purple or blackish etching of dorsal scales as seen in *B. incinctus.* When there is etching of dorsal scales on *B. paultamisi sp. nov.* it is light in colour.

B. paulwoolfi sp. nov. is separated from both *B. incinctus* and *B. paultamisi sp. nov.* by having a significantly widened rostral, as opposed to strongly triangular in the other two species.

Furthermore *B. paulwoolfi sp. nov*. is separated from the other two species by the size and shape of scales between the eyes. The supraocular in *B. paulwoolfi sp. nov*. is large and squarish, versus small and narrow and somewhat triangular in shape in both *B. incinctus* and *B. paultamisi sp. nov.*.

In turn this alters the shape of the frontal shield, which is reduced in size in *B. paulwoolfi sp. nov*. as compared to the other two species. The front line of the suture of this scale is somewhat forward, giving it a diamond head appearance as it intersects the prefrontals, whereas at the same juncture in both *B. incinctus* and *B. paultamisi sp. nov.* the same point is relatively flat, giving the scale a straightish line at the anterior edge. The frontal shield is wide in both *B. incinctus* and *B. paultamisi sp. nov.* versus somewhat squarish in *B. paulwoolfi sp. nov.*.

B. paulwoolfi sp. nov. is separated further from *B. paultamisi sp. nov.* by the width of the light band across the nape in between two areas of black on the head and upper neck.

Counting straight line (not diagonal), this is 5 scales in depth in *B. paulwoolfi sp. nov*., versus 3-4 in *B. paultamisi sp. nov.*. The width of the light band across the nape in between two areas of black on the head and upper neck is variable within *B. incinctus.*

B. paultamisi sp. nov., *B. paulwoolfi sp. nov.* (both treated as *B. incinctus*), *B. incinctus* and *B. morrisi* (Horner, 1998) in most recent texts are separated from all other species in the genus by having a body that is uniform and without cross-bands of any sort, except for a dark collar and associated markings.

B. morrisi is separated from all of *B. paultamisi sp. nov.*, *B. paulwoolfi sp. nov*. (both treated as *B. incinctus*) and *B. incinctus* by having 15 midbody scale rows combined with a ventral and subcaudal count of less than 165 and only the lower postocular scale is in broad contact with the anterior temporal scale. By contrast both *B. paultamisi sp. nov.*, *B. paulwoolfi sp. nov.* (treated as *B. incinctus*) and *B. incinctus* have 17 midbody scale rows combined with a ventral and subcaudal count of more than 165 and both postocular scales are in broad contact with the anterior temporal scale.

B. paulwoolfi sp. nov. in life can be seen Schembri and Jolly (2017) on page 114.

B. incinctus in life can be seen in Cogger (2014) on page 867 at bottom right.

B. paultamisi sp. nov. in life can be seen in Wilson (2015) at page 250 bottom.

Schembri and Jolly (2017) speculated that the range of *B. incinctus* as defined by them was continuous from the main population in central Australia to that of the Einasleigh Uplands Bioregion of northeastern Queensland. This contention is generally rejected on the basis that most of the intervening area (over 400 km in a straight line measurement) is not of suitable habitat for all relevant species *B. paultamisi sp. nov.*, *B. paulwoolfi sp. nov*. (both treated as *B. incinctus*) and *B. incinctus*, noting that all have a known preference to hilly rocky areas or sites immediately proximal to such places.

It is because the populations of *B. paultamisi sp. nov.*, *B. paulwoolfi sp. nov*. (both until now treated as *B. incinctus*) and *B. incinctus* are reproductively isolated from one another and believed to have been for a long period, that I had no hesitation in naming these two unnamed forms at the species level.

Distribution: *B. paulwoolfi sp. nov*. is known only from the type locality and holotype specimen collected from Einasleigh Uplands Bioregion of north-eastern Queensland and is believed to be confined to this general area.

B. paultamisi sp. nov. is generally found in inland parts of Queensland from the Mount Isa area south-west through the western Brigalow belt.

B. incinctus is a central Australian endemic, with a distribution centred on the MacDonnell Ranges region, being a separate biogeographical realm for relevant hill dwelling forms.

Etymology: Named in honour of Paul Woolf of Walloon, Queensland, Australia for services to herpetology spanning some decades, including as foundation president of the Herpetological Society of Queensland Incorporated and countless other important actions and often behind the scenes logistical work in terms of numerous fieldwork projects across Australia, for which other scientists often get the credit.

BRACHYUROPHIS LESSHEARIMI SP. NOV.

LSID urn:lsid:zoobank.org:act:B9D408E7-4307-4CCB-BEE1-3D00E42707BF

Holotype: A preserved specimen at the Western Australian Museum, Perth, Western Australia, specimen number: R21506, collected at Tenant Creek, Northern Territory, Australia, Latitude 19.6484 S., Longitude 134.1900 E.

This government-owned facility allows access to its holdings.

Paratypes: Three preserved specimens at the Western Australian Museum, Perth, Western Australia, specimen numbers: R21507, R21508 and R21509, collected at Tenant Ck., NT, Australia, Latitude 19.6484 S., Longitude 134.1900 E.

Diagnosis: That the putative species *Brachyurophis roperi* (Kinghorn, 1931) is in fact a species complex has been known or speculated by numerous authors including Storr (1967), Wells and Wellington (1985), who formally named a form of this putative species and even the taxonomically conservative Harold Cogger in Cogger (2014) agreed there was other species.

The allied putative species *B. campbelli* (Kinghorn, 1929) is formally split three ways in this paper and all are readily separated from the other species remaining in the *B. roperi* complex.

The species *B. roperi* (Kinghorn, 1929) has a type locality of the Roper River, in the Northern Territory and was identified by Storr (1967) and again Wells and Wellington (1985) as being a form with 15 midbody rows. *B. murrayi* Wells and Wellington, 1985, *B. lesshearimi sp. nov.* and *B. richardshearimi sp. nov.* all have 17 midbody rows and are easily separated from this species on the basis of this character alone.

Both *B. murrayi* and *B. roperi* have a small and not upturned or at best only marginally upturned rostral, versus a large and significantly upturned rostral in *B. lesshearimi sp. nov.* and *B. richardshearimi sp. nov.*.

B. lesshearimi sp. nov. and *B. richardshearimi sp. nov.* have a short-wide frontal, not seen in both *B. murrayi* and *B. roperi.*

Both *B. murrayi* and *B. roperi* are characterised by a dorsal pattern incorporating broad and well defined alternating dark and light bands, typically purple-black and orange-brown in colour, the lighter cross-bands being narrower, but at least two scales wide. By contrast both *B. lesshearimi sp. nov.* and *B. richardshearimi sp. nov.* have a dorsal pattern of more numerous

bands (more than 35 versus less than 35), caused primarily by a narrowing of the lighter bands to less than 2 scales wide.

B. lesshearimi sp. nov. has a dorsal colouration of deep orange with dark purple and dark orange crossbands, whereas *B. richardshearimi sp. nov.* has a similar dorsal pattern but with blackish purple and creamish yellow cross bands.

There is a narrow orange band across the nape of *B. lesshearimi sp. nov.* versus a narrow yellow band in *B. richardshearimi sp. nov.*.

The nuchal blotch is 14 or more scales long (down the body) in *B. murrayi* and *B. roperi* versus 13 scales or less in *B. lesshearimi sp. nov.* and *B. richardshearimi sp. nov.*.

B. murrayi, *B. roperi*, *B. lesshearimi sp. nov.* and *B. richardshearimi sp. nov.* are readily separated from all others in the genus *Brachyurophis* by the following suite of characters: Nasal in contact with pre-ocular; frontal about as broad as long and about three times as long as a supraocular; dark dorsal body bands, less than 60, 4-5 scales wide at widest point for *B. murrayi* and *B. roperi* or far less than that and indistinct for *B. lesshearimi sp. nov.* and *B. richardshearimi sp. nov.* these two species of which are in turn are separated from the otherwise similar *B. alexantenori sp. nov*. (of Queensland) by having 17 instead of 15 midbody rows.

B. roperi in life is depicted in life in Cogger (2014) at page 869, bottom left.

B. murrayi in life is depicted in Gow (1977).

B. lesshearimi sp. nov. in life is depicted in Allen and Vogel (2019) on page 43, top left image.

B. richardshearimi sp. nov. in life is depicted in Allen and Vogel (2019) on page 43, middle left image, or Hoser (1989) on page 171 bottom right image.

Distribution: *B. lesshearimi sp. nov.* is known only from the Tenant Creek region of the Northern Territory.

B. richardshearimi sp. nov. is found in the drier parts of the Kimberley District in Western Australia.

B. roperi is herein restricted to the type locality and areas of suitable habitat west and into northern parts of the Kimberley District of Western Australia.

B. murrayi is only known from the type locality as in the environs of Darwin, Northern Territory, Australia.

Etymology: Named in honour of Les Shearim, of Sydney, New South Wales, Australia in recognition of his wildlife conservation work, including as a government licensed snake handler.

BRACHYUROPHIS RICHARDSHEARIMI SP. NOV.

LSID urn:lsid:zoobank.org:act:61D1C640-D6BC-4A0B-9124-9AC5B9CF1736

Holotype: A preserved specimen at the Western Australian Museum, Perth, Western Australia, specimen number: R17127, collected at King Leopold Range, Western Australia, Australia, Latitude 17.5000 S., Longitude125.7500 E. This government-owned facility allows access to its holdings.

Paratypes: Four preserved specimens at the Western Australian Museum, Perth, Western Australia, specimen numbers: R13823, R 14187, R20349 and R13822 collected at Derby, WA., Australia, Latitude 17.44 S., Longitude 123.744 E.

Diagnosis: That the putative species *Brachyurophis roperi* (Kinghorn, 1931) is in fact a species complex has been known or speculated by numerous authors including Storr (1967), Wells and Wellington (1985), who formally named a form of this putative species, and the taxonomically conservative Harold Cogger in Cogger (2014).

The allied putative species *B. campbelli* (Kinghorn, 1929) is formally split three ways in this paper and all are readily separated from the remaining species in the *B. roperi* complex.

The species *B. roperi* (Kinghorn, 1929) has a type locality of the Roper River, in the Northern Territory and was identified by Storr (1967) and again Wells and Wellington (1985) as being a form with 15 midbody rows.

B. murrayi Wells and Wellington, 1985, *B. lesshearimi sp. nov.* and *B. richardshearimi sp. nov.* all have 17 midbody rows and are easily separated from the other species on the basis of this character alone.

Both *B. murrayi* and *B. roperi* have a small and not upturned or at best only marginally upturned rostral, versus a large and significantly upturned rostral in *B. lesshearimi sp. nov.* and *B. richardshearimi sp. nov.*.

B. lesshearimi sp. nov. and *B. richardshearimi sp. nov.* have a short-wide frontal, not seen in both *B. murrayi* and *B. roperi.*

Both *B. murrayi* and *B. roperi* are characterised by a dorsal pattern incorporating broad and well defined alternating dark and light bands, typically purple-black and orange-brown in colour, the lighter cross-bands being narrower, but at least two scales wide.

By contrast both *B. lesshearimi sp. nov.* and *B. richardshearimi sp. nov.* have a dorsal pattern of more numerous bands (more than 35 versus less than 35), caused primarily by a narrowing of the lighter bands to less than 2 scales wide.

B. lesshearimi sp. nov. has a dorsal colouration of deep orange with dark purple and dark orange crossbands, whereas *B. richardshearimi sp. nov.* has a similar dorsal pattern but with blackish purple and creamish yellow cross bands.

There is a narrow orange band across the nape of *B. lesshearimi sp. nov.* versus a narrow yellow band in *B. richardshearimi sp. nov.*.

The nuchal blotch is 14 or more scales long (down the body) in *B. murrayi* and *B. roperi* versus 13 scales or less in *B. lesshearimi sp. nov.* and *B. richardshearimi sp. nov.*.

B. murrayi, *B. roperi*, *B. lesshearimi sp. nov.* and *B. richardshearimi sp. nov.* are readily separated from all others in the genus *Brachyurophis* by the following suite of characters: Nasal in contact with pre-ocular; frontal about as broad as long and about three times as long as a supraocular; dark dorsal body bands, less than 60, 4-5 scales wide at widest point for *B. murrayi* and *B. roperi* or far less than that and indistinct for *B. lesshearimi sp. nov.* and *B. richardshearimi sp. nov.* these two species of which are in turn are separated from the otherwise similar *B. alexantenori sp. nov*. (of Queensland) by having 17 instead of 15 midbody rows.

B. roperi in life is depicted in life in Cogger (2014) at page 869, bottom left.

B. murrayi in life is depicted in Gow (1977).

B. lesshearimi sp. nov. in life is depicted in Allen and Vogel (2019) on page 43, top left image.

B. richardshearimi sp. nov. in life is depicted in Allen and Vogel (2019) on page 43, middle left image, or Hoser (1989) on page 171 bottom right image.

Distribution: *B. lesshearimi sp. nov.* is known only from the Tenant Creek region of the Northern Territory.

B. richardshearimi sp. nov. is found in the drier parts of the Kimberley District in Western Australia.

B. roperi is herein restricted to the type locality and areas of suitable habitat west and into northern parts of the Kimberley District of Western Australia.

B. murrayi is only known from the type locality as in the environs of Darwin, Northern Territory, Australia.

Etymology: Named in honour of Richard (Dick) Shearim, of Green Valley, Western Sydney, New South Wales, Australia, now deceased, in recognition of his wildlife conservation work, including as a government licensed snake handler.

CONSERVATION STATUS OF THE NEWLY DESCRIBED SPECIES

No known threats exist at present, save for the fact that wildlife laws in Western Australia prevent private individuals from keeping, breeding, or studying this taxon, as noted in Hoser (1989, 1991, 1993, 1996, 2019a, 2019b),
The dysfunctional government-owned Zoo businesses in most States and government-backed zoos in the same or other states, have zero interest in these species or their long-term

survival due to their lack of "wow" factor for paying visitors, or as a means to attract them. Hence there is no captive population to ensure against calamity in the wild.

If the Australian government persists with its "Big Australia Policy", (see for example Saunders 2019), that being a long-term aim to increase the human population in Australia to over 100 million people by year 2150 (from the present 25 million as of 2019), all sorts of unforseen threats to the survival of these species may emerge.

These are relatively little-known species as compared to many other Australian elapid species and due to this I recommend further research on the taxa and potential future conservation threats in line with the previous paragraph, including by direct human activities as well as potential threats caused by changed vegetation regimes, introduced pests and potential pathogens, including those introduced via the legal importation of foreign reptiles by government-owned zoos and associated entities.

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END NOTE

When looking at the extant species list for the genus *Brachyurophis* Günther, 1863 as published previously in this paper, conspicuous by lacking brackets around the name authority, author's names were just two named species.

One was the taxon *Brachyurophis semifasciatus* Günther, 1863, type for the genus and formally named at a time when many newly named species were so new to science, that erection of a new genus was commonplace and justified.
This in itself is not unusual.

The other taxon, was none other than *Brachyurophis murrayi* Wells and Wellington, 1985, formally named by Richard Wells and Ross Wellington as recently as 1985.

Not one other herpetologist who named relevant species had the scientific nous to assign their newly named species to the correct genus, based on published and available names, which is exactly why only the Wells and Wellington and Günther named species are written with the name authority names placed outside brackets. The rest are not in their original configuration.

Significant is that in the 150 years since the original erection of the genus *Brachyurophis*, the two men, Richard Wells and Ross Wellington were the only two herpetologists in Australia naming relevant species to have anything like a realistic grip on this genus of snakes and the assemblage of species within them, including how many there in fact were and to correctly assign them.

Looking at the more recent description of Horner in 1998, in which he named the species *Brachyurophis morrisi* (Horner, 1998), incorrectly placed in the genus *Simoselaps* Jan, 1859, one can see that Horner and too many other herpetologists have believed the lies and smear of the Wolfgang Wüster gang of thieves since they tried unsuccessfully to have the Wells and Wellington paper of 1985 formally suppressed by the ICZN for nomenclatural purposes.

As mentioned in the paper above, recent authors including Cogger (2014), Wilson and Swan (2017), Eipper and Eipper (2019) and Allen and Vogel (2019), have by ignoring the Wells and Wellington works and furthermore failing to even inspect relevant primary literature for the relevant species, and worse still in some cases, without even viewing specimens, they have been wholly unable to get a realistic view as to the species composition or diversity in the relevant genus *Brachyurophis.*
From their own publications, it is self evident that no one before or since the much lampooned and derided paper of Wells and Wellington (1985) has had a more accurate and realistic grasp as to the form and content of the genus *Brachyurophis* in terms of component species.

I note that based on the description itself, the taxon *Brachyurophis murrayi* Wells and Wellington, 1985 is clearly valid as is *Brachyurophis woodjonesi* (Thomson, 1934), formally (and sensibly) resurrected by Wells and Wellington (1985).

Both have unfortunately been synonymised by all authors since and I note that not one has provided a shred of evidence to contradict the Wells and Wellington position.
In combination with previously published keys for species of this genus including the material of Storr (1967), Cogger (2014) and this paper (within the relevant descriptions), all 17 species identified by name herein can be readily identified and separated on the basis of robust morphological characters.
The take home message of this end note is that before joining a chorus of hate and lies as peddled by the Wolfgang Wüster gang of thieves, all publishing herpetologists should check all primary literature and specimens themselves before accepting or making any taxonomic judgements.
Contrary to the practices of the Wolfgang Wüster gang of thieves, herpetology depends on science based on evidence and sound scientific practices which should be published after formal and hands off (by the author) peer review by relevant experts. Furthermore any overlooked errors, or changes that may be required with the emergence of new evidence, must be corrected and repaired as soon as possible and before any further potential damage is caused, either by author, publisher or both and not just before publication, but also after if this is the requirement arising after an error is found.

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Australasian Journal of Herpetology **43:57-61.**
Published 25 April 2020.

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

Two new species of Australian venomous snake, previously identified as *Narophis bimaculata* (Duméril, Bibron and Duméril, 1854) from Southern Australia.

LSID URN:LSID:ZOOBANK.ORG:PUB:0663D230-D753-4431-AF6C-F3305CD09B12

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Received 10 February 2020, Accepted 1 March 2020, Published 25 April 2020.

ABSTRACT

As part of an ongoing audit of Australian reptiles, specimens of the little-known South-west Australian Snake species *Narophis bimaculata* (Duméril, Bibron and Duméril, 1854) from across the known range of the putative species were examined.

It was found to comprise three allopatric and geographically distinct forms, worthy of taxonomic recognition. The two unnamed forms are herein formally described as species in accordance with the rules of the *International Code of Zoological Nomenclature* (Ride *et al*. 1999) as amended.

Narophis richardwellsei sp. nov. is the species from the Eyre Peninsula and nearby parts of South Australia.

Narophis cliffrosswellingtoni sp. nov. is the form found in most parts of southern Western Australia, except for the lower west coast and coastal plain from Green Head south to Bunbury (including Perth and environs), being the area inhabited by the nominate form *Narophis bimaculata.*

The genus *Narophis* was erected by Worrell in 1961 as monotypic for the species *Furina bimaculata* Duméril, Bibron and Duméril, 1854, however the name has not been used since in Australian herpetology on the basis that the original publication of Worrell was not peer reviewed (see Kaiser *et al.* 2013). However no edition of the *International Code of Zoological Nomenclature* (editions 1, 2, 3 and 4) as applicable have ever mandated that peer review is a requirement for a nomen to be used.

Therefore *Narophis* is used as the appropriate and correct name for this genus of snakes not closely related to any others in Australia on the basis it is the first available name. Any later name coined by Wolfgang Wüster and his gang of thieves (as sought in Kaiser *et al*. 2013 as amended frequently) should therefore be ignored as stated by Dubois *et al*. (2019).

Keywords: Snakes; taxonomy; nomenclature; Worrell; Wells; Wellington; Elapidae; Western Australia; South Australia; *Neelaps*; *Narophis*; *bimaculata*; new species; *richardwellsei*; *cliffrosswellingtoni.*

INTRODUCTION

As stated in the abstract, as part of an ongoing audit of Australian reptiles, specimens of the little-known South-west Australian Snake species *Narophis bimaculata* (Duméril, Bibron and Duméril, 1854) from across the known range of the putative species were examined.

The materials and methods of the examination also included a thorough review of the previously published literature and all other available information including photos of live specimens with good locality data.

MATERIALS AND METHODS

While this is self evident from both abstract and introduction, I mention that inspection of specimens of this species has been over a 30 year period.

Relevant references relevant to the taxonomy and nomenclature of the putative species *Narophis bimaculata* (Duméril, Bibron and Duméril, 1854) and the taxonomy and nomenclature presented in this paper include the following: Cogger (2014), Cogger *et al.* (1983), Duméril *et al.* (1854), Fry (1914), Günther (1863), Lee *et al.* (2016), Ride *et al.* (1999), Sanders *et al.* (2008), Schembri (2017), Storr (1967), Storr and Harold (1978), Storr *et al.* (2002), Strahan *et al.* (1998), Wells and Wellington (1984, 1985), Wilson and Swan (2017), Worrell (1961) and sources cited therein.

RESULTS

Narophis bimaculata (Duméril, Bibron and Duméril, 1854), was found to comprise three allopatric and geographically distinct forms, worthy of taxonomic recognition, as effectively noted by

Storr (1968), although he only identified two putative taxa.

The two unnamed forms are geographically disjunct from the other two forms (3 in total) and morphologically distinct from one another. They are easily identified in the field and also in the absence of known locality information.

They are herein formally described as species in accordance with the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999) as amended.

Narophis richardwellsei sp. nov. is the species from the Eyre Peninsula and nearby parts of South Australia, and *Narophis cliffrosswellingtoni sp. nov.* is the form found in most parts of southern Western Australia, except for the lower west coast and coastal plain from Green Head south to Bunbury (including Perth and environs), being the area inhabited by the nominate form *Narophis bimaculata.*

The genus *Narophis* was erected by Worrell in 1961 as monotypic for the species *Furina bimaculata* Duméril, Bibron and Duméril, 1854.

Since original description of the species by Duméril and Bibron in 1854 the species has been assigned to various genera, but was placed in the genus *Neelaps* Günther, 1863 by Cogger *et al.* (1983), where it has been placed ever since by all publishing herpetologists, including notably Wells and Wellington (1985 and 1985) who chose not to remove the species from *Neelaps*. However the type species for that genus, *Furina calonotus* Duméril and Bibron in 1854 is in fact very different morphologically and genetically and must therefore be placed in a separate genus.

Morphological evidence for divergence of the relevant species can be seen in the diagnosis for each in Cogger (2014), largely repeated in the relevant descriptions herein and the molecular evidence for divergence can also be found in Sanders *et al.* 2008.

The name *Narophis* has not been used since in Australian herpetology, by a number of publishing herpetologists on the basis that the original publication of Worrell was not peer reviewed (see for example Kaiser *et al.* 2013 as amended and Kaiser (2012a, 2012b, 2013. 2014a, 2014b,)).

See the complete discrediting of the claims by Kaiser *et al.* (2013) and Kaiser (2012a, 2012b, 2013. 2014a, 2014b) in the publications of Dubois *et al.* (2019), Hoser (1989, 1991, 2007, 2009, 2012a, 2012b, 2013, 2015a-f, 2019a-b) and sources cited therein.

However of relevant importance here is the fact that no edition of the *International Code of Zoological Nomenclature* (editions 1, 2, 3 and 4) as applicable have ever mandated that peer review is a requirement for a nomen to be used.

Therefore *Narophis* is used as the appropriate and correct name for this genus of snakes not closely related to any others in Australia on the basis it is the first available name. Any later name coined by Wolfgang Wüster and his gang of thieves (as sought in Kaiser *et al.* 2013 as amended frequently) should therefore be ignored, as that document is not within the rules of the ICZN and the demands within it are therefore illegal in most places including Australia, the USA, European Union, UK and all other countries a party to the CITES Treaty.

In terms of the scientific descriptions below, the formal descriptions in accordance with the *International Code of Zoological Nomenclature* (Ride *et al.* 1999) as amended is based on healthy adult specimens in life unless otherwise stated.

It should be noted that unless mandated by the *International Code of Zoological Nomenclature* (fourth edition) or relevant subsequent publication, the spelling of the new scientific names should not be altered.

The spellings within this paper are intentional and this includes for the species nomen *richardwellsei*, which in the absence of this statement may be subject of unwarranted emendation by fools to the nomen "*wellsi*", as was improperly done for the species *Acanthophis wellsei* Hoser, 1998, by the morons Mirtschin *et al.* 2017.

Material in each of the following descriptions is repeated in parts in order to ensure full compliance with the relevant fourth edition of the *International Code of Zoological Nomenclature.*

There are no conflicts of interest in the preparation of this paper. Relevant museum staff, including herpetology curators across Australia are thanked for their assistance's in this and other relevant scientific projects myself and colleagues have engaged in over the last 40 years, most of whom have done an excellent job in this regard.

The conservation significance of timely recognition of potentially threatened taxa is important and best explained via the papers of Hoser (2019a, 2019b) or books of Hoser (1989, 1991), which means I have absolutely no hesitation whatsoever in publishing the scientific descriptions within this paper.

NAROPHIS RICHARDWELLSEI SP. NOV.

LSID urn:lsid:zoobank.org:act:F1E2B499-F1F1-4617-9CD3-F2B8D11A6E47

Holotype: A preserved specimen at the South Australian Museum, Adelaide, South Australia, Australia, specimen number: R 2302 collected at Kingoonya, South Australia, Australia, Latitude 30.9164° S., Longitude 135.3261° E

This government-owned facility allows access to its specimens.

Paratype: A preserved specimen at the South Australian Museum, Adelaide, South Australia, Australia, specimen number: R 1791 collected at Ooldea South Australia, Australia, Latitude 30.2733° S., Longitude 131.5008° E?.

Diagnosis: The putative species *Narophis bimaculata* (Duméril, Bibron and Duméril, 1854), until now included the two species *N. richardwellsei sp. nov.* and *N. cliffrosswellingtoni sp. nov.*.

The three species are all readily separated from all other Australian elapid snakes by the following suite of characters: No paddle shaped tail. No suboculars and no specialized curved spine on the end of the tail. Body has smooth scales. It is without cross-bands, except on head, nape or upper neck, belly being white or cream and immaculate, 15 mid-body rows, 175-235 ventrals, anal divided, 15-35 all divided subcaudals and the rostral is not wedge-shaped and sharp edged.

There is no solid maxillary tooth following the fang, a long slender body and it length is at least 30 times the diameter. No black longitudinal stripe along the body. The dorsal colour is pale reddish-brown, orangeish, purplish or pinkish above, each scale edged with dark-reddish brown. There is a dark, blackish head blotch from about the front edge of the frontal to the hind edge of the parietals, more-or-less forming a band, and behind an area of orange to yellow pigment, there is a black nuchal band about five scales long and starting about three to four scales behind the parietals (and front band).

The genus *Neelaps* Günther, 1863, type species, *Furina calonontus* Duméril and Bibron in 1854 and monotypic for this West Australian species is morphologically similar to the three species in the genus *Narophis* Worrell (1961). However they are readily separated by the following characters: There is a dark vertebral stripe in *Neelaps* (absent in *Narophis*), one maxillary tooth following the fang in *Neelaps* versus none in *Narophis.* The two species *Narophis richardwellsei sp. nov.* and *Narophis cliffrosswellingtoni sp. nov*. are readily separated from the species *Narophis bimaculata* (Duméril, Bibron and Duméril, 1854) by the following suite of characters:

1/ Males have 204-212 ventrals versus 176-192 in *N. bimaculata* and females have 218-228 ventrals versus 197-214 in *N. bimaculata.*

2/ An obvious black spot on the end of the snout in all specimens, versus either absent or tiny in *N. bimaculata.*

3/ The head blotch is large and begins before the frontal or the anterior line of it and finishes behind the parietals, or posterior line or them, versus beginning behind the anterior edge of the frontals and ending before the end of the parietals in *N. bimaculata.*

4/ Nuchal blotch is 3.5-5 scales long, versus 4-6.5 scales long in *N. bimaculata* and separated from the head blotch by 2.5-4 vertebrals versus 3-4.5 in *N. bimaculata.*

5/ Larger size in *N. richardwellsei sp. nov.* and *N. cliffrosswellingtoni sp. nov.* with a maximum length of males being 390 mm, versus 335 mm in *N. bimaculata* and 446 mm in females versus 422 in *N. bimaculata* (Storr 1967).

6/ Shorter tail in *N. richardwellsei sp. nov.* and *N. cliffrosswellingtoni sp. nov.* with it being 8.2-8.8% of total length in males, versus 8.4-10.3 in *N. bimaculata* and 5.6-6.2 % of total length in females, versus 6.2-7.4% in females.

7/ *N. richardwellsei sp. nov.* and *N. cliffrosswellingtoni sp. nov.* not having an increase of scale rows number on the neck, versus 16 or 17 in 85% of *N. bimaculata.*

Narophis cliffrosswellingtoni sp. nov. is separated from both *N. richardwellsei sp. nov.* and *N. bimaculata* by having a dark purplish dorsal colouration owing to wider darker scale margins on both dorsal and lateral scales.

Narophis richardwellsei sp. nov. is separated from both *N. cliffrosswellingtoni sp. nov.* and *N. bimaculata* by having dark anterior margins of each scale on the dorsum, in particular those of the lower flanks, but not along the mid dorsal line and with a well-defined demarcation between the flanks and the whitish-cream venter, with the cream of the venter entering the flanks, giving the appearance of a well defined dark orange (top), creamish white (bottom) line or boundary on the lower sides of the snake along the length of the body.

N. richardwellsei sp. nov. also commonly has an ill-defined or partially formed dark blotch on the dorsal surface of the neck, posterior to the other two anterior dark black or blackish blotches.

Distribution: *Narophis richardwellsei sp. nov.* is found in the arid zone of South Australia generally east of the Nullabor (from about Maralinga in the north-west) and west of the Eyre Peninsula, but including this area, thus having a south eastern range limit of near Whyalla. The species is found more-or-less in a line between these two points with a north-east limit of about Kingoonya, South Australia.

Narophis bimaculata is found in the coastal region of south-west Western Australia in a zone generally bounded by lower west coast and coastal plain from Green Head south to Bunbury and including Perth and environs.

Narophis cliffrosswellingtoni sp. nov. is generally found in the southern third of Western Australia outside of the far south-west and most of the wheat belt and not including the Nullabor region in the far east of the State.

A photo of *Narophis richardwellsei sp. nov.* in life can be found in Schembri (2017) (downloaded from the web on 7 February 2020).

A photo of *Narophis bimaculata* in life from Oakford (Perth), Western Australia in life can be found on page 130 (top) of Storr, Smith and Johnstone (2002), or from Burns Beach (near Perth), Western Australia in Wilson and Swan (2017) at page 565 bottom. Online a photo of this species from Yanchep, Western Australia can be found at: https://images.auscape.com.au/photographer-galleries/rob-mclean/black-naped-snake-neelaps-bimaculatus-14605638.html

(downloaded on 7 February 2020).

A photo of *Narophis cliffrosswellingtoni sp. nov.* in life from Lake Cronin, Western Australia can be seen at:

http://reptile-database.reptarium.cz/species?genus=Simoselaps&species=bimaculatus

(downloaded on 7 February 2020).

Conservation threats: None known at present, but if the Australian government persists with its "Big Australia Policy", (see for example Saunders 2019), that being a long-term aim to increase the human population in Australia to over 100 million people by year 2150 (from the present 25 million as of 2019), all sorts of unforseen threats to the survival of this species may emerge.

Narophis Worrell, 1961 is a divergent lineage as compared to other Australian elapid genera and due to the restricted range of the entire genus I recommend further research on the genus and potential future conservation threats in line with the previous paragraph, including by direct human activities as well as potential threats caused by changed vegetation regimes, introduced pests and potential pathogens, including those introduced via the legal importation of foreign reptiles by government-owned zoos and associated entities.

Etymology: Named in honour of esteemed Australian herpetologist, Richard W. Wells of Lismore in New South Wales, Australia previously of various locations in New South Wales, including Wilberforce and Cowra, in recognition of a lifetime's work in herpetology and notably taxonomy and nomenclature. While his detractors, Wolfgang Wüster and his gang of thieves, have falsely accused Wells and publishing colleague, Cliff Ross Wellington of numerous crimes against humanity, the fact is that the vast majority of the taxonomic and nomenclatural judgements of Wells (and Wellington) have stood the test of time and been largely correct. See Hoser (2007) for more details.

Richard Wells is also often referred to as Wellsey or Wellsei, by his mates, hence the scientific name being spelt "*richardwellsei*", this being a deliberate spelling and not an error in need of unjustified emendation.

NAROPHIS CLIFFROSSWELLINGTONI SP. NOV.

LSID urn:lsid:zoobank.org:act:5ADDF0E6-4C44-4D03-BA55-3A86C3B75743

Holotype: A preserved specimen at the Western Australian Museum, Perth, Western Australia, Australia, specimen number: R 5210 collected at Boolong, Western Australia, Australia, Latitude 30.6878° S., Longitude 121.8249° E. This government-owned facility allows access to its specimens.

Paratypes: 1/ A preserved specimen at the Western Australian Museum, Perth, Western Australia, Australia, specimen number: R 4722 collected from Kurrawang, 8 miles South-west of Kalgoorlie, Western Australia, Australia, Latitude 30.8153° S., Longitude121.3323° E.

2/ A preserved specimen at the Western Australian Museum, Perth, Western Australia, Australia, specimen number: R 4921 collected from Menzies, Western Australia, Australia, Latitude 29.6915° S., Longitude 121.0289° E.

Diagnosis: The putative species *Narophis bimaculata* (Duméril, Bibron and Duméril, 1854), until now included the two species *N. richardwellsei sp. nov.* and *N. cliffrosswellingtoni sp. nov.*.

The three species are all readily separated from all other Australian elapid snakes by the following suite of characters: No paddle shaped tail. No suboculars and no specialized curved spine on the end of the tail. Body has smooth scales. It is without cross-bands, except on head, nape or upper neck, belly being white or cream and immaculate, 15 mid-body rows, 175-235 ventrals, anal divided, 15-35 all divided subcaudals and the rostral is not wedge-shaped and sharp edged.

There is no solid maxillary tooth following the fang, a long slender body and it length is at least 30 times the diameter. No black longitudinal stripe along the body. The dorsal colour is pale rediish-brown, orangeish, purplish or pinkish above, each scale edged with dark-reddish brown. There is a dark, blackish head blotch from about the front edge of the frontal to the hind edge of the parietals, more-or-less forming a band, and behind an area of orange to yellow pigment, there is a black nuchal band about five scales long and starting about three to four scales behind the parietals (and front band).

The genus *Neelaps* Günther, 1863, type species, *Furina calonontus* Duméril and Bibron in 1854 and monotypic for this West Australian species is morphologically similar to the three species in the genus *Narophis* Worrell (1961). However they are

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3/ The head blotch is large and begins before the frontal or the anterior line of it and finishes behind the parietals, or posterior line or them, versus beginning behind the anterior edge of the frontals and ending before the end of the parietals in *N. bimaculata.*

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N. richardwellsei sp. nov. also commonly has an ill-defined or partially formed dark blotch on the dorsal surface of the neck, posterior to the other two anterior dark black or blackish blotches.

Distribution: *Narophis richardwellsei sp. nov.* is found in the arid zone of South Australia generally east of the Nullabor (from about Maralinga in the north-west) and west of the Eyre Peninsula, but including this area, thus having a south eastern range limit of near Whyalla. The species is found more-or-less in a line between these two points with a north-east limit of about Kingoonya, South Australia.

Narophis bimaculata is found in the coastal region of south-west Western Australia in a zone generally bounded by lower west coast and coastal plain from Green Head south to Bunbury and including Perth and environs.

Narophis cliffrosswellingtoni sp. nov. is generally found in the southern third of Western Australia outside of the far south-west and most of the wheat belt and mot including the Nullabor region in the far east of the State.

A photo of *Narophis richardwellsei sp. nov.* in life can be found in Schembri (2017) (downloaded from the web on 7 February 2020).

A photo of *Narophis bimaculata* in life from Oakford (Perth), Western Australia in life can be found on page 130 (top) of Storr, Smith and Johnstone (2002), or from Burns Beach (near Perth), Western Australia in Wilson and Swan (2017) at page 565 bottom. Online a photo of this species from Yanchep, Western Australia can be found at: https://images.auscape.com.au/photographer-galleries/rob-mclean/black-naped-snake-neelaps-bimaculatus-14605638.html

(downloaded on 7 February 2020).

A photo of *Narophis cliffrosswellingtoni sp. nov.* in life from Lake Cronin, Western Australia can be seen at

http://reptile-database.reptarium.cz/species?genus=Simoselaps&species=bimaculatus

(downloaded on 7 February 2020).

Conservation threats: None known at present, but if the Australian government persists with its “Big Australia Policy”, (see for example Saunders 2019), that being a long-term aim to increase the human population in Australia to over 100 million people by year 2150 (from the present 25 million as of 2019), all sorts of unforseen threats to the survival of this species may emerge.

Narophis Worrell, 1961 is a divergent lineage as compared to other Australian elapid genera and due to the restricted range of the entire genus I recommend further research on the genus and potential future conservation threats in line with the previous paragraph, including by direct human activities as well as potential threats caused by changed vegetation regimes, introduced pests and potential pathogens, including those introduced via the legal importation of foreign reptiles by government-owned zoos and associated entities.

Etymology: Named in honour of esteemed Australian herpetologist, Cliff Ross Wellington, better known as Ross Wellington, of near Grafton in New South Wales, Australia previously of various locations in New South Wales, including Woy Woy, in recognition of a lifetime’s work in herpetology and notably taxonomy and nomenclature.
While his detractors, Wolfgang Wüster and his gang of thieves, have falsely accused Cliff Ross Wellington and publishing colleague Richard W. Wells of numerous crimes against humanity, the fact is that the vast majority of the taxonomic and nomenclatural judgements of Wellington and Wells have stood the test of time and been largely correct. See Hoser (2007) for more details.

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CONFLICTS OF INTEREST

None.

Australasian Journal of Herpetology **43:62-64.**
Published 25 April 2020.

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

A new species of Australian venomous snake, previously identified as *Simoselaps littoralis* (Storr, 1968) from Western Australia.

LSID URN:LSID:ZOOBANK.ORG:PUB:E23CEDCF-EAC7-4C24-BCB1-0747FB0F75A6

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Received 9 February 2020, Accepted 2 March 2020, Published 25 April 2020.

ABSTRACT

As part of an ongoing audit of Australian reptiles, specimens of the little-known West Australian endemic Snake species *Simoselaps littoralis* (Storr, 1968) from Western were examined.

It was found to comprise two readily identifiable allopatric and geographically distinct forms, worthy of taxonomic recognition. The unnamed form is herein formally described as species in accordance with the rules of the *International Code of Zoological Nomenclature* (Ride *et al*. 1999) as amended.

Simoselaps littoralis (Storr, 1968) is the species found generally near the West Australian coast from a region spanning the Abrolhos in the north to Jurien Bay in the south.

The new species *Simoselaps fukdat sp. nov*. named in accordance with the rules of the *International Code of Zoological Nomenclature* (Ride *et al*. 1999) as amended is found in the region bounded by the Cape Range in the North to near Shark Bay in the south.

S. fukdat sp. nov. is separated from *S. littoralis* by having 1/ Only 16-23 rings around round the body, against 24-34, 2/ Fewer ventrals and subcaudals.3/ Longer nuchal blotch, 4/ Relatively longer tail, and 5/ Having on average one less caudal ring.

Keywords: Snakes; taxonomy; nomenclature; Storr; Elapidae; Western Australia; Australia; *Simoselaps*; *littoralis*; new species; *fukdat.*

INTRODUCTION

As stated in the abstract, as part of an ongoing audit of Australian reptiles, specimens of the little-known West Australian Snake species *Simoselaps littoralis* (Storr, 1968) from across the known range of the putative species were examined.

The materials and methods of the examination also included a thorough review of the previously published literature and all other available information including photos of live specimens with good locality data.

MATERIALS AND METHODS

While this is self evident from both abstract and introduction, I mention that inspection of specimens of this species has been over a 30 year period.

Relevant references relevant to the taxonomy and nomenclature of the putative species *Simoselaps littoralis* (Storr, 1968) and the taxonomy and nomenclature presented in this paper include the following: Cogger (2014), Cogger *et al*. (1983), Dubois *et al.* (2019), Günther (1858), Jan (1859), Lee *et al.* (2016), Ride *et al.* (1999), Sanders *et al*. (2008), Storr (1967, 1979), Storr and Harold (1978), Storr *et al.* (2002), Wells and Wellington (1984, 1985) and sources cited therein.

Unless otherwise stated, material downloaded from the internet was last downloaded and checked on 7 February 2020.

RESULTS

Simoselaps littoralis (Storr, 1968) was found to comprise two allopatric and geographically distinct morphologically different forms, worthy of taxonomic recognition, as effectively noted by Storr (1968).

The unnamed forms are geographically disjunct from one another and contrary to the assertion of Storr (1978) I did not see any evidence of specimens that were intermediate in form, which is in large part why I have not hesitated to formally name the so-called far northern form of this putative species.

The two species are easily identified and separated from one another in the field and also in the absence of known locality information.

It is herein formally described as a new species in accordance with the rules of the *International Code of Zoological Nomenclature* (Ride *et al*. 1999) as amended.

Simoselaps littoralis (Storr, 1968) is the species found generally near the West Australian coast from a region spanning Shark Bay islands and the Abrolhos in the north to Jurien Bay in the south.

The new species *Simoselaps fukdat sp. nov*. named in accordance with the rules of the *International Code of Zoological Nomenclature* (Ride *et al*. 1999) as amended is found in the region bounded by the Cape Range in the north to near Shark Bay in the south.

S. fukdat sp. nov. is separated from *S. littoralis* by having 1/ Only 16-22 rings around round the body, against 24-34, 2/ Fewer ventrals and subcaudals.3/ Longer nuchal blotch, 4/ A relatively longer tail, and 5/ Having on average one less caudal ring.
The name *Simoselaps* Jan, 1859 is the relevant genus grouping for these snakes based on phylogeny (see for example Lee *et al.* 2016), although Storr (1967) erroneously placed the relevant species in the genus *Vermicella* Günther, 1858.
Storr in fact originally described the taxon as *Vermicella bertholdi littoralis* in 1967 before later elevating it to full species (Storr 1979).

The name *Simoselaps* may in future be overwritten by a name coined by the Wolfgang Wüster gang of thieves in line with their edicts as published in Kaiser *et al.* (2013) and Kaiser (2012a, 2012b, 2013. 2014a, 2014b), even though by their own admission this would be against the rules of the *International Code of Zoological Nomenclature* (Ride *et al*. 1999 as amended).
The alleged basis for their theft of works of others and their "name authority" is that the original publication was not "peer reviewed" by members of their own group.

The lunacy of this gang of thieves and their claims have been completely and comprehensively discredited in the publications of Dubois *et al.* (2019), Hoser (1989, 1991, 2007, 2009, 2012a, 2012b, 2013, 2015a-f, 2019a-b) and sources cited therein.
However of relevant importance here is the fact that no edition of the *International Code of Zoological Nomenclature* (editions 1, 2, 3 and 4) as applicable have ever mandated that peer review (by anyone) is a requirement for a nomen to be used.
Therefore *Simoselaps* is used as the appropriate and correct name for this genus of snakes not closely related to any others in Australia on the basis it is the first available name. Any later name coined by Wolfgang Wüster and his gang of thieves (as sought in Kaiser *et al*. 2013 as amended frequently) should therefore be ignored, as that document is not within the rules of the ICZN and the demands within it are therefore illegal in most places including Australia, the USA, European Union, UK and all other countries being a party to the CITES Treaty.

In terms of the scientific description below, the formal description in accordance with the *International Code of Zoological Nomenclature* (Ride *et al*. 1999) as amended is based on healthy adult specimens in life unless otherwise stated.

It should be noted that unless mandated by the *International Code of Zoological Nomenclature* (fourth edition) or relevant subsequent publication, the spelling of the new scientific name should not be altered.

The spelling within this paper is intentional and this includes for the species nomen *fukdat*, which in the absence of this statement may be subject of unwarranted emendation by fools to some other nomen.
A similar unjustified emendation of the name *Acanthophis wellsei* Hoser, 1998 to the nomen "*wellsi*", was was improperly done by the morons Mirtschin *et al*. 2017.

There are no conflicts of interest in the preparation of this paper. Relevant museum staff, including herpetology curators across Australia are thanked for their assistance's in this and other relevant scientific projects myself and colleagues have engaged in over the last 40 years, most of whom have done an excellent job in this regard.

The conservation significance of timely recognition of potentially threatened taxa is important and best explained via the papers of Hoser (2019a, 2019b) or books of Hoser (1989, 1991), which means I have absolutely no hesitation whatsoever in publishing the scientific description within this paper.

SIMOSELAPS FUKDAT SP. NOV.

LSID urn:lsid:zoobank.org:act:867AC942-5439-4998-9B07-F1F594574496

Holotype: A preserved specimen at the Western Australian Museum, Perth, Western Australia, Australia, specimen number: R 16885 collected from near Point Cloates, Western Australia, Australia, Latitude 22.7212° S, Longitude 113.6775° E.

This government-owned facility allows access to its specimens.

Paratype: A preserved specimen at the Australian Museum, Sydney, New South Wales, Australia, specimen number: R.101773 collected from the Vicinity of Maud Hill, just north of Coral Bay, Western Australia, Australia, Latitude 23.1330° S., Longitude 113.8330° E.

Diagnosis: Until now *Simoselaps fukdat sp. nov*. has been treated as a northern race of *Simoselaps littoralis* (Storr, 1968). The two species are separated from one another by the following suite of characters: 1/ Only 16-23 rings around round the body in *S. fukdat sp. nov*., against 24-34 in *S. littoralis* , 2/ Fewer ventrals and subcaudals, 3/ Longer nuchal blotch, 4/ Relatively longer tail, and 5/ Having on average one less caudal ring (largely adapted from Storr 1967).

By counting body rings alone as stated above, one can easily separate the two species.

Both *Simoselaps fukdat sp. nov*. and *S. littoralis* are readily separated from all other Australian elapid snakes by the following suite of characters:

No paddle shaped tail. No suboculars and no specialized curved spine on the end of the tail. Body has smooth scales. It is with crossbands starting on the neck. There is also a pair of blackish bars on the head, with one between the eyes (including them) and one that is broader across the nape. Internasals are present. 15 mid body rows, 100-125 ventrals, divided anal, 15-25 all divided subcaudals. The rostral is almost as long as broad and the rostral shield is rounded and not noticeably projecting. Nasal in contact with preocular. Three or more solid maxillary teeth follow the fang.

Body shape is slightly rounded and length versus width about normal for Australian elapid snakes, being about 15-25 times diameter.

The dorsal colouration is creamy-yellow to white above and with 20-45 narrow black rings, 1-3 scales wide, on body and tail, with most extending to the lower flanks and belly, being only slightly narrower than the paler interspaces. The head is pale brown on the snout, peppered with blackish or dark brown, being heavily blotched with black posteriorly to about the rear of the parietals, then with a narrow pale band separating the head from a broad, blackish nuchal band 2-5 scales in width. Throat greyish and belly generally white, except where dark crossbands extend over the sides of the belly.

Total length of males is under 200 mm and females under 400 mm. Tail is 11.7-14.2 percent of total length in males and 8.0-10.4 percent of total length in females.

Simoselaps fukdat sp. nov. is depicted in life in Cogger (2014) at page 932 (top right), specimen from Coral Bay, Western Australia.

Simoselaps littoralis (Storr, 1968) is depicted in life in Storr, Smith and Johnstone (2002), on page 147 at bottom.

Distribution: *Simoselaps fukdat sp. nov*. is found in the region bounded by the Cape Range in the North to about Shark Bay in the south.
Simoselaps littoralis (Storr, 1968) is the species found generally near the West Australian coast from a region spanning the Shark Bay islands and Abrolhos in the north to Jurien Bay in the south. It has a type locality of 7 miles south of Geraldton, Western Australia.
Conservation threats: None known at present, but if the Australian government persists with its "Big Australia Policy", (see for example Saunders 2019), that being a long-term aim to increase the human population in Australia to over 100 million people by year 2150 (from the present 25 million as of 2019), all sorts of unforseen threats to the survival of this species may emerge.

This is a restricted range species as compared to many other Australian elapid species and due to this I recommend further research on the taxon and potential future conservation threats in line with the previous paragraph, including by direct human activities as well as potential threats caused by changed vegetation regimes, introduced pests and potential pathogens, including those introduced via the legal importation of foreign reptiles by government-owned zoos and associated entities.

Etymology: The first specimen of this taxon seen by myself was shown to a local West Australian Aboriginal elder from the Jinigudira tribe.
As I pulled the snake out of a bag, he exclaimed "Fukdat" before running off with his hands in the air. Hence the name "fukdat" is adopted as the species nomen as it seems to be the word attached to the species of snake by local native Jinigudira.

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Published in hard copy on 25 April 2020