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A new species of *Ophioscincus* Peters, 1873 (Reptilia: Squamata: Scincidae) from south-east Queensland.

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ABSTRACT

A new species of *Ophioscincus* Peters, 1873 from south-east Queensland, Australia superficially similar to *Ophioscincus ophioscincus* (Boulenger, 1887) is formally described and named for the first time in accordance with the rules of the *International Code of Zoological Nomenclature* (Ride *et al*. 1999).

Keywords: Lizards; reptilia; skink; Queensland; Australia; *Ophioscincus*; Mount Glorious; Brisbane; New species; *paulwoolfi*.

INTRODUCTION

Over some decades of fieldwork in south-east Queensland, Australia, I have caught a number of skinks that were tentatively identified and keyed out as *Ophioscincus ophioscincus* (Boulenger, 1887).

However in the relevant period, noticeable morphological differences between specimens found north of the Bundaberg dry zone and south of the Bundaberg dry zone were self evident, leading to a more detailed line of investigation.

MATERIALS AND METHODS

Revisiting the above situation and viewing more specimens in Queensland during a field trip in mid 2019, led to the inescapable conclusion that more than one species was involved.

A review of the morphology of relevant specimens was conducted as was a survey of regions of likely habitats and potential biogeographical barriers.

RESULTS AND CONCLUSIONS

The species group clearly included at least two species and populations were well separated by dry zones of habitat not occupied by any relevant specimens. These dry zones are not of recent genesis and so I have concluded that the differences are significant and of species level.

The northern form is that which type specimen of *Ophioscincus ophioscincus* (Boulenger, 1887) is.

This means the southern form from the environs of Brisbane, Queensland is that which until now has been undescribed.

It is herein named as a new species, *Ophioscincus paulwoolfi sp. nov.*.

Little has been published to date on the species *Ophioscincus ophioscincus* (Boulenger, 1887). However literature consulted as relevant to the conclusions herein included the following: Boulenger (1897), Cogger (2014), Cogger *et al.* (1983), Peters (1874) and Wells and Wellington (1984, 1985).

In terms of the description herein and this paper, the relevant new species name should not be altered by later authors unless mandated by the *International Code of Zoological Nomenclature* (Ride *et al*. 1999) or later equivalent document. There are no conflicts of interest in terms of this paper.

OPHIOSCINCUS PAULWOOLFI SP. NOV.

LSIDurn:lsid:zoobank.org:act:B49FC950-9207-46C5-865D-178803EC29D8

Holotype: A preserved specimen in the Queensland Museum, Brisbane, Queensland, Australia, Specimen number J85811 collected from Mount Glorious, near Brisbane, Queensland, Australia, Latitude -27.33 S., Longitude 152.77 E. This government-owned facility allows access to its holdings.

Paratypes: 1/ A preserved specimen in the Queensland Museum, Brisbane, Queensland, Australia, Specimen number J76933 from Enoggera Reservoir, near Brisbane, Queensland, Australia, Latitude -27.45 S., Longitude 152.92 E.

2/ A preserved specimen in the Queensland Museum, Brisbane, Queensland, Australia, Specimen number J2831 from Enoggera Reservior, near Brisbane, Queensland, Australia, Latitude -27.45 S., Longitude 152.92 E.

3/ A preserved specimen in the Queensland Museum, Brisbane, Queensland, Australia, Specimen number J18603, collected from Oxley Creek, Acacia Ridge, (Brisbane), Latitude -27.58 S., Longitude 153.03 E.

Diagnosis: The species *Ophioscincus paulwoolfi sp. nov.* is similar in most respects to *Ophioscincus ophioscincus* (Boulenger, 1887) and would key as this species using the diagnostic information in Cogger (2014), in particular the key on page 668.

Ophioscincus paulwoolfi sp. nov. is readily separated from *O. ophioscincus* (Boulenger, 1887) by having a less blunt tail end (original tails). This is well rounded in *O. ophioscincus* versus somewhat pointed (but still blunt) in *O. paulwoolfi sp. nov.*.

O. paulwoolfi sp. nov. is further distinguished from *O. ophioscincus* by colouration in life.

This includes by having indistinct light markings on the upper surfaces of the flanks of the dark coloured tail, versus obvious yellow-spotting on purplish black in *O. ophioscincus.* The light yellowish brown upper surface of the head of *O. paulwoolfi sp.*

nov. is heavily laden with purple markings, especially between the eyes, versus no such markings in *O. ophioscincus.* The upper surface of the neck of *O. paulwoolfi sp. nov.* has large purplish black spots not seen in *O. ophioscincus.* The upper surface of the body of *O. paulwoolfi sp. nov.* has a series of well-defined purplish black spots forming four longitudinal lines down the back. In *O. ophioscincus* these spots are tiny, making the lines similarly indistinct.

Both *O. paulwoolfi sp. nov.* and *O. ophioscincus* are separated from all similar species of skink in eastern Australia by the following unique suite of characters: No limbs, short obtuse snout, very small eye, lower eyelid scaly. Two loreals. Nostril pierced in the anterior part of a large nasal; no supranasal; rostral protrudes between the nasals, forming a suture with the frontonasal, which forms a broad suture with the frontal; prefrontals very small and widely separated; frontal broader than long, forming a suture with the first supraciliary and with the first supraocular; three supraoculars, first largest; five supraciliaries; frontoparietals distinct, a little smaller than the interparietal; parietals forming a suture behind the interparietal; two pairs of nuchals; ear completely hidden. 20-24 smooth midbody scale rows; dorsals being largest. A pair of enlarged preanals. Tail thick, ending obtusely either in a rounded end (*O. ophioscincus*) or a blunt tip (*O. paulwoolfi sp. nov.*), the length of the tail being a little shorter than head and body. Colouration is beige on top; with flanks of body and tail blackish purple in colour. Venter is pinkish-yellow, with the latter half of the tail becoming dark in colour like the flanks. Back has closely placed spots or tiny flecks forming a series of four (usually) or more well-defined lines on the beige background. Adult snout vent length is usually about 75 mm and tail is about 65 mm.

A photo of an adult *O. paulwoolfi sp. nov.* in life is seen in Wilson and Swan (2017) page 383 middle right or Wilson and Knowles (1988), page 308, top left (image 602). A photo of an adult *O. ophioscincus* in life is in Cogger (2014) page 669, top left.

Habits: Both *O. ophioscincus* and *O. paulwoolfi sp. nov.* are known to have a habitat preference for rainforest and adjoining wet sclerophyll forest, where they are most commonly found sheltering under small rocks, logs and other available ground cover. They appear to be crepuscular as in most active at dusk and especially so in the warmer summer months. In mid-winter they appear to hibernate in the true sense of the word in that they hide inside logs or well-embedded rocks, often in the shade, indicating no desire for activity in the relevant season, from which they do not appear to emerge for some weeks or perhaps even months.

Distribution: *O. paulwoolfi sp. nov.* is found in the region bounded by Bundaberg in the north (it is absent from this specific locality) and the Brisbane River Valley in the south. It is a Queensland endemic species. *O. ophioscincus* is found north of Bundaberg in Queensland in suitable habitat to areas slightly north of Rockhampton in Queensland.

Conservation Status: No immediate risks are known as the species is common and found in numerous protected areas and reserves not likely to be destroyed in the near future. There is no known trade in the species, nor is any foreseeable.

Etymology: Named in honour of Paul Woolf, of Walloon, Queensland, Australia, for his services to herpetology in Australian spanning some decades, including as foundation president for the Herpetological Society of Queensland, Incorporated, who incidentally have taken a strong stance against the taxonomic vandalism of Wolfgang Wüster and his gang of thieves as detailed by Hoser (2007, 2009, 2012a-b, 2015, 2015a-f, 2019a-b) and sources cited therein.

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CONFLICTS OF INTEREST - None.

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A new subspecies of *Jackyhosersaur* Hoser, 2013 from north-west Australia.

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ABSTRACT

As part of an ongoing audit of Australian reptiles, specimens of the endemic Western Australian dragon species, *Jackyhosersaur superba* (Storr, 1974), known to most herpetologists as "*Diporiphora superba* Storr, 1974" were inspected from all parts of the known range. A population from the Manning Creek Gorge area of the Kimberley in Western Australia were found to be morphologically divergent and so are formally described herein as a new subspecies.

Keywords: Lizards; taxonomy; nomenclature; Agamidae; Western Australia; *Diporiphora*; *Jackyhosersaur; superba*; *newsubspecies*; *jackyhoserae.*

INTRODUCTION

As stated in the abstract, as part of an ongoing audit of Australian reptiles, specimens of the endemic Western Australian dragon species, *Jackyhosersaur superba* (Storr, 1974) were inspected from all parts of the known range. A population from the Manning Creek Gorge area of the Kimberley in Western Australia were found to be morphologically divergent and so are formally described herein as a new subspecies.

The relevant species was originally described as "*Diporiphora superba* Storr, 1974" and was treated as being of the genus *Diporiphora* Gray, 1842 by most herpetologists until Hoser (2013) showed that the species was sufficiently different to be recognized as a new genus *Jackyhosersaur* Hoser, 2013.

Jackyhosersaur was differentiated both by significant morphological differences and molecular divergence.

Little has been published about "*Diporiphora superba* Storr, 1974" since its original description, save for accounts in field guides on reptiles (e.g. Hoser, 1989, Wilson and Knowles, 1988, Cogger, 2014 and Wilson and Swan 2017) and as a single sample in published molecular phylogenies.

Weigel (1989) published details of his keeping and breeding the taxon in his government-backed privately owned zoo in New South Wales, Australia.

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 20 year period. The holotype (via photos) of "*Diporiphora superba* Storr, 1974" provided to me by the Western Australian Museum has been inspected and carefully matched by myself with specimens from the north-west of the range of the putative species (AKA Mitchell Plateau), which I have inspected on numerous occasions.

In other words it is consistent with that form.

In fact it appears that there may be several distinct forms within *Jackyhosersaur superba* (Storr, 1974) as currently recognized, even though all occur within close geographical proximity, being restricted to the high rainfall parts of the West Kimberley Region. Significant is that the species appears to be reasonably common and different populations are in close proximity to one another without obvious biogeographical barriers stopping gene flow between them.

However within this distribution, the genus has a distinct habitat partition with agamids of similar size of several species stopping spread of population beyond this confined region for many millions of years.

Within this region, populations appear to be in wetter habitats and often proximal to permanent water which while important at the present time, was even more so at times of glacial minima, when the local climate was much drier than at present and presumably vegetation also much less dense.

This means that extant populations may in fact be larger and more widespread than in recent geological time (as in during the height of the last glacial maximum).

The most distinctive form within the species as recognized appears to be within a relative outlier population from Manning Creek Gorge in the west Kimberley region.

While the distribution of this form is proximal to those to the north in the Prince Regent Nature Reserve or the west on the coast in areas near the Charnley River, it is uncertain if the most recent connection was via an overland route (more or less in a direct line), or alternatively via the relevant river basins, which would have meant a far greater distance.

In any event and regardless of the nature of the most recent connection between the populations, on the basis of its differences, the population from Manning Creek Gorge is herein afforded taxonomic recognition at the subspecies level.

In terms of the scientific description below, the formal description in accordance with the *International Code of*

Zoological Nomenclature (Ride *et al.* 1999) is based on healthy adult specimens in life.

It should be noted that unless mandated by the *International Code of Zoological Nomenclature* or relevant subsequent publication, the spelling of the scientific names should not be altered.

There are no conflicts of interest in the preparation of this paper and relevant museum staff 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), which means I have absolutely no hesitation whatsoever in publishing the scientific description within this paper.

Relevant references relevant to the taxonomy and nomenclature adopted in this paper include the following: Cogger (2014), Cogger *et al.* (1983), Gray (1842, 1845), Hoser (1989, 2013, 2019a, 2019b), Ride *et al.* (1999), Storr (1974), Weigel (1989), Wells and Wellington (1984, 1985), Wilson and Knowles (1988) and sources cited therein.

JACKYHOSERSAUR SUPERBA JACKYHOSERAE SUBSP. NOV.

LSIDurn:lsid:zoobank.org:act:1217C5AC-4A71-4000-9925-5BD9FC4CE979

Holotype: A preserved specimen at the Western Australian Museum, Perth, Western Australia, Australia, specimen number: 32066 collected at Manning Creek Gorge, Kimberley Region, Western Australia, Australia, Latitude 16.32 S., Longitude 125.54 E. This facility allows access to its specimens.

Paratype: A preserved specimen at the Western Australian Museum, Perth, Western Australia, Australia, specimen number: R94825 collected at Manning Creek Gorge, Kimberley Region, Western Australia, Australia, Lat. 16.48 S., Long. 125.91 E.

Diagnosis: *Jackyhosersaur superba jackyhoserae subsp. nov.* is similar in most respects to the nominate form except for the presence of obviously whitish upper labials, not seen in the nominate form and also an olive green to brown dorsal colouration with yellowish brown head. While nominate *Jackyhosersaur superba superba* come in a variety of dorsal colours, including yellowish, green or olive-green to brown, those of similar colour to this species have distinctly lighter green or yellow on the lower flanks, which is not the case in this subspecies.

The genus J*ackyhosersaur* Hoser, 2013, monotypic for the species originally described as "*Diporiphora superba* Storr, 1974" is readily separated from all other *Diporiphora* Gray, 1842, the genus it was until 2013 assigned to, on the basis of the following suite of characters: Keels of the dorsal scales are parallel to the vertebral line; gular and ventral scales (excluding chin shields) are weakly to strongly keeled; no gular fold; no indication of spines or a fold behind the ear; usually greenish or greenish yellow above, yellow below and without pale dorsolateral stripes; there is sometimes a brown vertebral stripe present; the adpressed hind limb reaches about the eye; the hindlimb is about 70-100 per cent of the snout-vent length, the tail is about 300 to 400 percent of the snout-vent length; there are four preanal pores.

A photo of *J. superba jackyhoserae subsp. nov.* in life is seen in Wilson and Knowles (1988) at page 215 middle right.

A photo of *J. superba superba* in life is seen in Cogger (2014) page 737 top left and also Hoser (1989) at page 61 (top), incorrectly labelled as being from Kunnanurra. It is in fact from Mitchell Plateau. This subspecies is also seen on the front cover of Wilson and Swan (2017) and in Storr, Smith and Johnstone (1983) plate 9, bottom right.

Distribution: The subspecies *J. superba jackyhoserae subsp. nov.* is known only from the Manning Creek Gorge in the Kimberley Region of Western Australia. Specimens found to the south-west of here may also be of this subspecies. The nominate form occupies the rest of the known range for the species, centred on the Mitchell Plateau, further north, also in the west Kimberley, north-west Western Australia, Australia as well as escarpment areas to the north of there and including one or more offshore islands.

Conservation threats: None known at present, but if the Australian government persists with its "Big Australia Policy", 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 subspecies may emerge.

Jackyhosersaur Hoser (2013) is a divergent lineage as compared to other Australian agamid 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 business entities.

Etymology: As for the genus *Jackyhosersaur* Hoser, 2013, the subspecies *J. superba jackyhoserae subsp. nov.* is named in honour of my younger daughter Jacky Hoser, of Melbourne, Victoria, Australia, aged 18 as of May 2019 in recognition of her excellent work in reptile education, working with Snakebusters, Australia's best reptile shows since shortly after birth.

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A new species of Tree Frog in the genus *Shireenhoserhylea* Hoser, 2020 from north Queensland, Australia.

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ABSTRACT

A new species of Tree Frog closely associated with *Shireenhoserhylea gracilenta* (Peters, 1869) is formally described according to the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999). *Shireenhoserhylea shireenhoserae sp. nov.* from the wet tropics of Queensland, Australia, is separated from the similar *S. gracilenta* from south of the Burdekin Gap, by the possession of numerous tiny, but distinct raised white-tipped tubercles on the upper body and lower limbs. These are not seen in either *S. gracilenta* from the region bound by the Burdekin River in the north and St. Lawrence Gap further south or *S. luteiventris* (Ogilby, 1907), until recently treated as *S. gracilenta*, which is found in south-east Queensland and north-east New South Wales.

The most closely related species to this genus (*Shireenhoserhylea gen. nov.*) are the morphologically divergent species within the genus *Pelodryas* Günther, 1858, type species being *Rana caerulea* White, 1790. According to Duellman *et al.* (2016) the two species groups diverged 24.7 MYA, making genus level division by Hoser (2020), from the even more divergent *Litoria* Tschudi, 1838 a common-sense decision.

Keywords: Tree Frogs; Australia; Queensland; nomenclature; taxonomy; ICZN; *Litoria*; *Shireenhoserhylea*; Burdekin Gap; wet tropics; *gracilenta*; *luteiventris*; new species; *shireenhoserae.*

INTRODUCTION

Hoser (2020) did a family-wide revision of the Australasian frog family Pelodryadidae, including formal descriptions of 12 tribes, 11 subtribes, 34 genera, 26 subgenera, 62 species and 12 subspecies new to science. The single newly named species subject of this paper was inadvertently omitted from this three volume monograph and so it is formally described herein according to the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 2020).

MATERIALS AND METHODS

These are as for Hoser (2020) and general comments about the formal descriptions within that paper also apply herein, including that all relevant details are for normal adult specimens in good health and normal conditions by day unless otherwise stated.

References consulted prior to the publication of both papers (this and Hoser 2020) are cited in full in Hoser (2020).

Specimens of putative "*Litoria gracilenta* (Peters, 1869)" as is generally known and as identified by Anstis (2013), Cogger (2014) or Eipper and Rowland (2018) from their entire range were examined over a thirty year period from all parts of the known range, with a view to ascertaining how many species were in fact within this assemblage.

Live specimens, including tadpoles were examined, as were dead specimens in museums, photographs and all relevant literature.

RESULTS

Duellman *et al.* (2016) found frogs in the so-called *Hyla chloris* Boulenger, 1893 group diverged from nearest named relatives in the genus *Pelodryas* Günther, 1858, type species being *Rana caerulea* White, 1790 some 24.7 MYA. This extensive time line of evolution, coupled with significant morphological divergence led Hoser (2020) to erect the new genus *Shireenhoserhylea* Hoser, 2020 to accommodate the relevant species as listed in Hoser (2020).

The newly named species in this paper, *Shireenhoserhylea shireenhoserae sp. nov.* is a formal addition to the list of species in this genus.

Based on clear morphological differences, Hoser (2020), resurrected *S. luteiventris* (Ogilby, 1907) with a type locality of Brisbane, Queensland from the synonymy of *S. gracilenta* (Peters, 1869) with a type locality of Mackay in mid-northern Queensland, but inadvertently failed to account for those similar frogs within putative *S. gracilenta* from the wet tropics of far north Queensland.

Those frogs are also morphologically divergent and herein formally named.

The formal description of *S. shireenhoserae sp. nov.* in this paper also formally separates the relevant three species from one another to allow for identification of each in the absence of locality data.

Based on collection records in Australian museums, the three species *S. gracilenta*, *S. luteiventris* and *S. shireenhoserae sp. nov.* are all distributed in line with several other wet forest constrained species in Queensland being bound by the established biogeographical barriers of the Burdekin Gap and St. Lawrence Gap in eastern Queensland.

Nominate *S. gracilenta* is found in wetter areas between the

Burdekin Gap just south of the Burdekin River, south of Townsville in far north Queensland and the St. Lawrence Gap further south, near Rockhampton, Queensland, being most common in the ranges near Mackay.

S. luteiventris is found in wetter parts of south-east Queensland and nearby north-east New South Wales.

The newly named species *S. shireenhoserae sp. nov.* is found from Alligator Creek, Bowling Green Bay National Park, Latitude -19.4853 S., Longitude 146.9785 E. in the south along the coast and nearby ranges as far north as Cooktown, Queensland, Latitude -15.3978 S., Longitude 145.0394 E.

Genetic divergence between this taxon and *S. gracilenta* (Peters, 1869) is minimal, but the morphological divergence is significant. As this taxon is geographically disjunct and evolving separately, I have chosen to classify and name it as a species, rather than subspecies.

SHIREENHOSERHYLEA SHIREENHOSERAE SP. NOV.

LSIDurn:lsid:zoobank.org:act:56CCA034-CB87-4028-B349-90C582C8C45C

Holotype: A preserved specimen at the Australian Museum in Sydney, New South Wales, Australia, specimen number R.53924 collected from 3 miles south of Daintree, North Queensland, Australia, Latitude -16.283 S., Longitude 145.316 E. This government-owned facility allows access to its holdings.

Paratype: A preserved specimen at the Queensland Museum, Brisbane, Queensland, Australia, specimen number J29616, collected in the Daintree area, far north Queensland, Australia, Latitude -16.25 S., Longitude 145.3167 E.

Diagnosis: Until 2020, the species *Shireenhoserhylea shireenhoserae sp. nov.* has been treated as a northern population of putative *S. gracilenta* (Peters, 1869). The genus-level placement of both these species and the morphologically similar *S. luteiventris* (Ogilby, 1907) within *Shireenhoserhylea* Hoser, 2020 is explained and justified by Hoser (2020) with a significant divergence from the closest species group, being *Pelodryas* Günther, 1858, type species being *Rana caerulea* White, 1790.

According to Duellman *et al.* (2016) the two species groups diverged 24.7 MYA, making genus level division sensible.

All of *S. gracilenta*, *S. luteiventris* and *S. shireenhoserae sp. nov.* have until 2020 been treated by publishing authors, including Anstis (2013), Cogger (2014) or Eipper and Rowland (2018) as putative "*Litoria gracilenta* (Peters, 1860)", these species now being within *Shireenhoserhylea.*

The three species are separated from one another as follows:

S. luteiventris is identified and separated from the other two species by having a generally lime green dorsum with a densely granular dorsum. The yellow line between the nostril and top of eye is indistinct. The yellow line posterior to the eye and above the tympanum is also only semidistinct. Supratympanic ridge is moderately defined and feet are orange. There is a significant amount of yellow on the upper and lower edges of the iris. Posterior surfaces of thighs are purple.

S. gracilenta is identified and separated from the other two species by having a generally lime green dorsum with a coarsely granular dorsum. There is a thick and extremely well defined yellow line from nostril to eye, running over the eye and along the moderately defined supratympanic fold. Feet are orange. There is a significant amount of yellow on the upper and lower edges of the iris. Posterior surfaces of thighs are purplish brown.

S. shireenhoserae sp. nov. is readily separated from both *S. luteiventris* and *S. gracilenta* by being dark green as opposed to lime green dorsally. The yellow line posterior to the eye and above the tympanum is narrow to medium in width and moderately distinct. The supratympanic fold is moderately well defined. Feet are yellow. There is no obvious yellow pigment in the upper or lower iris. Posterior surfaces of thighs are dark reddish-brown.

S. shireenhoserae sp. nov. is most easily separated from both *S. luteiventris* and *S. gracilenta* by having a dorsum that is not densely granular, but instead with numerous spaced tubercles, usually being white or yellow tipped, these being found mainly on the upper flanks and upper surfaces of the lower fore and hind limbs. These distinctive tubercles in this arrangement are not seen in either of the other two species.

Large pre-metamorphosing tadpoles of both *S. shireenhoserae sp. nov.* and *S. gracilenta* have a mainly light brown iris, with significant amounts of dark venation, versus mainly blackish grey in *S. luteiventris.* While tadpoles of all three species have a thin well-defined brown ring around the pupil, this is prominent and obvious in *S. luteiventris*, but not so in the other species.

S. shireenhoserae sp. nov. in life is depicted on page 209 of Anstis (2013) on left, and page 20 of Tyler (1992).

McDonald *et al*. (2016) indicated limited genetic divergence between populations of putative *S. gracilenta*, however obvious morphological divergence between the disjunct distributions warrants recognition of each of *S. shireenhoserae sp. nov.*, *S. luteiventris* and *S. gracilenta* as separate taxonomic entities.

Photos of the type form of *S. gracilenta* can be found online at: https://www.flickr.com/photos/martin_hadley/8478514505/in/photolist-dVdAYz

uploaded on February 16, 2013 and last viewed on 20 May 2020.

Photos of the type form of *S. luteiventris* can be found in Anstis (2013) on p. 209, right and Cogger (2014) on p. 166, top right.

Distribution: *S. shireenhoserae sp. nov.* is found from Alligator Creek, Bowling Green Bay National Park, Latitude -19.4853 S., Longitude 146.9785 E. in the south along the coast and nearby ranges as far north as Cooktown, Queensland, Latitude -15.3978 S., Longitude 145.0394 E.

Etymology: Named in honour of my long-suffering wife, Shireen Hoser in recognition of her many contributions to herpetology in Australia and wildlife conservation globally. For more detail see the etymology in Hoser (2020).

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CONFLICTS OF INTEREST

None.

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A new subspecies of Green Python (Serpentes: Pythonidae: *Chondropython*) from eastern New Guinea.

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ABSTRACT

Until recently, all Green Pythons (Genus *Chondropython* Meyer, 1874) were treated by herpetologists as a single wide-ranging species, namely *C. viridis* (Schlegel, 1872). Hoser in 2003 formally named an Australian subspecies, *C. viridis shireenae* and Hoser (2009), formally described a second subspecies from Normanby Island, Papua New Guinea, called *C. viridis adelynhoserae.*

Hoser (2009) also resurrected from synonymy the species *Chondropython azureus* Meyer, 1874.

Natusch *et al*. (2020) resurrected *C. pulcher* Sauvage, 1878 from synonymy of *C. azureus*, as a subspecies and formally named another subspecies of *C. azureus*, *C. azureus utaraensis*.

This paper continues the division of *Chondropython* by formally naming as a subspecies of *C. viridis* the divergent population from near Popondetta, Papua New Guinea as *C. viridis jackyhoserae subsp. nov.*.
Keywords: Herpetology; snake; python; green python; New Guinea; Indonesia; PNG; *Morelia*; *Chondropython*; *viridis*; *azureus*; *shireenae*; *pulcher*; *utaraensis*; *adelynhoserae*; new subspecies; *jackyhoserae.*

INTRODUCTION

The Green Pythons, genus *Chondropython*, Meyer, 1874 have been the subject of intensive study by myself, Raymond Hoser, for more than 40 years.

As mentioned in Hoser (2003) a full and comprehensive genus-wide revision was being undertaken.

When the revision was at its terminal phase and just about to be published, it was rudely erased by an illegal armed raid by government wildlife officers and police of our research facility on 17 August 2011.

In this violent home and business invasion, all research materials at our facility were taken. This included research files, museum specimen records, thousands of slides and photos, draft papers, disks, computers, mobile phones and all other relevant things.

In spite of court orders to return all stolen goods intact, this order was not complied with (Court of Appeal 2014, Victorian Civil and Administrative Tribunal 2015).

The unlawful raid was instigated by a gang of criminals known as the Wolfgang Wüster gang of thieves (see Hoser 1995a-f and 2019a-b for details) in order to maliciously disable our successful wildlife conservation business and to sabotage ongoing scientific research projects and publications.

The Wolfgang Wüster gang of thieves have also been at war against the rules of the *International Code of Zoological Nomenclature* (Ride *et al*. 1999) for decades (see Hoser 2007).

Their more recent war cry manifesto known as “Kaiser *et al*. (2013)”, although in fact written by Wolfgang Wüster (see Kaiser 2012a) as frequently amended (see also Kaiser 2012, 2012b, 2013, 2014a and 2014b) and the claims within it, have been discredited numerous times (e.g. Cogger (2014), Dubois (2014), Dubois *et al*. (2019), Eipper (2013), Hoser (2007, 2009, 2012a, 2012b, 2015a-f, 2016, 2019a-b), Mutton (2014a, 2014b), Shea (2013a-d), Thorpe (2013, 2014a, 2014b), Wellington (2013, 2014a, 2014b, 2016), Wells (2013, 2014) and sources cited therein).

Notwithstanding these setbacks the Wolfgang Wüster gang remain undeterred and continue to commit acts of internet trolling, running countless fake accounts online for peddling hatred and lies, as well as engaging in overt scientific fraud, property theft, assault, vandalism, money scams, money laundering, rapes, child sex offences, trafficking of amphetamines, animal abuse and cruelty, wildlife smuggling, shooting people (yes, two of the group have been convicted of this) and other serious crimes (Supreme Court of Western Australia 2009, Hobbs 2010, Goodman 2019).

Some members of the group have been charged and jailed for various crimes, including for example David John Williams, convicted and fined $7,500 for animal cruelty and wildlife smuggling at the Cairns Magistrates Court, Damien Mark Harding jailed for child sex offences, Seth Pywell fined for his role in the shooting of two people, Matthew Gatt fined $8,000 for the theft of a rare snake and Andrew Browne jailed for child sex offences, but the group ring leaders Wolfgang Wüster, Hinrich Kaiser, Mark O’Shea and Wulf Schleip have managed to avoid criminal sanctions to date.

Wolfgang Wüster and Mark O’Shea even post images of themselves committing crimes online, but have somehow managed to avoid criminal charges.

As of 2020, members of the Wolfgang Wüster gang of thieves had plagiarised works of other scientists and in breach of the *International Code of Zoological Nomenclature* illegally renamed nearly 100 species and genera previously formally named by other ethical scientists.

Keeping count of their acts of taxonomic vandalism and theft is an extremely difficult task, but lists of these acts are regularly published!

The gang have then by use of countless false accounts and false identities, created a false veneer online that their illegal names are the correct names and that the earlier proper names should not be used.

Noting that the Wolfgang Wüster gang of thieves have already tried to rename numerous previously named taxa, people should be mindful of almost certain further acts of taxonomic vandalism by this gang of thieves in PRINO journals they control, including the PRINO Online *Zootaxa*, in terms of the new names erected in this paper.

PRINO is an acronym for “Peer reviewed in name only” which is the term best described for the online journals that that Wolfgang Wüster gang of thieves members publish their fraudulent papers in.

The journals such as the predatory PRINO journal “*Zootaxa*” have near zero respect for the principles of science, or ethics and significantly papers published in them are either not peer reviewed in any way, or alternatively the process is so shambolic as to be non-existent in any meaningful way.

See also Oransky (2020).

While peer review is not a mandatory requirement of the *International Code of Zoological Nomenclature*, it is regarded as the gold standard in scientific publishing and is therefore generally expected in such publications.

With the preceding in mind and coupled with the fact that environmental destruction in New Guinea is ongoing at an accelerating pace, it is critically important that any unnamed forms of wildlife there be formally identified and named sooner, rather than later as per Hoser (2019a, 2019b).

The Green Pythons found on the north coast of Papua New Guinea, generally west of Cape Nelson and east of Lae are morphologically most similar to the taxon *C. viridis adelynhoserae* Hoser, 2019, but are sufficiently divergent to be given formal taxonomic recognition as a subspecies.

Populations of each are also separated by a deep sea barrier which combined with molecular divergence indicated by Natusch *et al.* (2020) make a compelling case for the mainland taxon to be formally named as a new subspecies.

It was these well-known facts that led to the inquiry that formed the basis of this paper.

In passing I note that many authors and texts have in recent years placed Green Pythons in the genus *Morelia* Gray, 1842 (type species *M. variegata* Gray, 1842). However Rawlings *et al.* (2008) found a divergence of the two groups (*Morelia* and *Chondropython*) of more than 35 million years, making the case for two separate genera compelling!

Unfortunately, scientific reality is not a part of the Wolfgang Wüster gang of thieves repertoire, and because it was Hoser (2000) who removed *Chondropython* from the synonymy of *Morelia*, the Wolfgang Wüster gang of thieves has ever since tried to get everyone else to call Green Pythons *Morelia*!

Hoser, who actually works with pythons (unlike the Wolfgang Wüster gang of thieves), split *Morelia* and *Chondropython* in 2000 based on clear morphological divergence. It was not unexpected that when Rawlings *et al.* (2008) used new molecular methods to measure timeline divergence that their results matched those of Hoser (2000).

MATERIALS AND METHODS

While these have been inferred already, I shall briefly state what they were.

Specimens of Green Pythons (Genus *Chondropython* Meyer, 1874) were inspected either live or dead over a period spanning more than 40 years as was all relevant and available literature. This included all previous descriptions of taxa, including known synonyms as cited in previous papers of myself including Hoser (Hoser, 2000, 2003a, 2003b, 2004, 2009) and synonyms published in Cogger *et al.* (1983).

Of particular relevance to this review, were phylogenetic and morphological studies of reptiles that helped identify biogeographical barriers for species similarly eco-constrained as Green Pythons as well as geological studies that helped identify potential barriers to dispersion of populations.

Included in the audit were photos of specimens with good locality data and distribution maps from State Museums, based on specimens in their collections.

Where available and applicable, fossil specimens and records were also reviewed.

Past descriptions and synonymies were reviewed with a view to using available names for species groups if they had been properly proposed in the past but in the case of the relevant taxon subject of this paper, no names were available.

Publications relevant to the taxonomic and nomenclatural conclusions in terms of the genus *Chondropython sensu lato* including all descriptions of all known species or subspecies, including all known synonyms, and specifically relevant to the taxonomic decisions in terms of the newly named form include the following: Boulenger (1893), De Rooij (1915), Cogger *et al.* (1983), Hoser (2000, 2003, 2004, 2009), Meyer (1874), Natusch and Lyons (2014), Natusch *et al.* (2020), Rawlings and Donnellan (2003), Rawlings *et al.* (2008), Ride *et al.* (1999), Sauvage (1878), Schlegel (1872), Wells and Wellington (1985), and sources cited therein.

RESULTS

As already stated in the abstract, one hitherto unnamed form had been tentatively identified as an unnamed taxon.

This was confirmed after inspection of specimens and a review of the relevant literature.

Hence the Green Python from the Popondetta/Mount Victory area of south-east New Guinea on the northern coast is formally named as a new subspecies for the first time. This is done in accordance with the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

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 are relevant staff at museums who made specimens and records available in line with international obligations over a period spanning more than 40 years.

All necessary government issued wildlife licenses, permits and authorities were obtained as needed.

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 June 2020 (including if also viewed prior), unless otherwise stated and was accurate in terms of the content 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 or 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.

CONSERVATION

In terms of conservation of this newly described taxon, the relevant comments in Hoser (1989, 1991, 1993, 1995b, 1996, 2019a and 2019b) apply. Wildlife laws as currently enforced in Papua New Guinea are not in a materially significant way enhancing the long-term survival prospects of this species.

Over breeding of humans and the environmental problems associated with this overpopulation are by far the greatest long term threat to the relevant species, noting that already liberated feral pest species continue to cause ongoing stress and decline of similar species as explicitly detailed in Hoser (1991).

CHONDROPYTHON VIRIDIS JACKYHOSERAE SUBSP. NOV.

LSIDURN:LSID:ZOOBANK.ORG:ACT:30D70B35-DA9C-49AB-98F2-843DB6A516AE

Holotype: A preserved specimen at the Australian Museum in Sydney, New South Wales, Australia, specimen number R.9347, collected from Mount Lamington, Oro (formerly Northern District) Province, Papua New Guinea, Latitude -8.933 S., Longitude 148.166 E. This facility allows access to its holdings.

Paratype: A preserved specimen at the Australian Museum in Sydney, New South Wales, Australia, specimen number R.9854, collected from Mount Lamington, Oro (formerly Northern District) Province, Papua New Guinea, Lat. -8.933 S., Long. 148.166 E.

Diagnosis: Natusch *et al.* (2020), separate all three subspecies of *Chondropython azureus* Meyer, 1874 from *C. viridis* (Schlegel, 1872) in their “Table 1” (they erroneously place all species within the putative genus *Morelia* Gray, 1842; see explanation elsewhere in this paper).

In summary *C. viridis* of all subspecies are separated from all forms of *C. azureus* by the following suite of characters: Dark green versus light green dorsal colouration in adults and white scales running down the vertebral line, either broken or unbroken and of varying size in different specimens and locales, versus no such white scales in *C. azureus.*

The newly named subspecies *C. viridis jackyhoserae sp. nov.* is separated from each of the other susbspecies as follows: *C. viridis viridis* (type form from Aru Islands and also including southern New Guinea) and *C. shireenae* Hoser, 2003 are separated from *C. viridis adelynhoserae* Hoser, 2009 and *C. viridis jackyhoserae sp. nov.* by the longer tail and higher subcaudal count (under 85, versus over 85).

C. viridis shireenae Hoser, 2003 is separated from all other subspecies by having an obviously blunted snout and therefore a shorter head.

C. viridis viridis and *C. viridis jackyhoserae sp. nov*. has a slightly pointed snout and therefore appears to have a more triangular-shaped head, but otherwise is similar in most respects to *C. viridis shireenae.* Those two subspecies are separated from one another by tail length (see above).

By contrast *C. viridis adelynhoserae* is separated from both of *C. viridis viridis* and *C. viridis jackyhoserae sp. nov*. by having a distinctively bulbous rear of the head (posterior to the eyes) and a box-shaped (squarish) snout region, somewhat similar to that in *C. azureus* Meyer, 1874.

Both *C. viridis adelynhoserae* and *C. viridis jackyhoserae sp. nov*. are separated from all other *Chondropython* in New Guinea and Australia by its adult dorsal pattern of (smallish) white blotches that in the main do not cover the spinal ridge, as seen in all other Australian and other southern PNG *Chondropython.*

Adult *C. viridis adelynhoserae* have a substantial amount of blue on the dorsum versus limited amounts on *C. viridis jackyhoserae sp. nov.*.

Sometimes *Chondropython viridis* from elsewhere will have similar blotches, but invariably, these snakes either also have a mid-dorsal line or dots (not seen in *C. viridis adelynhoserae* or *C. viridis jackyhoserae sp. nov.*), or the blotches run well over the spinal (mid dorsal) mid-line.

MtDNA for the holotype of *C. viridis adelynhoserae* was examined by Rawlings and Donellan 2003 and compared with other *Chondropython* yielding traits broadly in line with *C. viridis viridis* (but a three per cent sequence divergence) (see p. 41 their paper).

The results of Natusch *et al.* (2020) indicates that *C. viridis jackyhoserae sp. nov*. is similarly divergent from other *C. viridis*.

Without strict calibration, the cited divergence would normally be estimated at 1.5 MYA for each form, which could easily be defined as full species-level divergence.

Distribution: The taxon *C. viridis jackyhoserae subsp. nov.* is currently restricted to the Oro (Northern Province) area of Papua New Guinea (PNG) near Popondetta, with a potential maximum range of roughly from west of Cape Nelson and east of Lae, PNG and north of the central cordillera.

Etymology: *C. viridis jackyhoserae subsp. nov*. is named in honour of my youngest daughter Jacky Hoser, of Park Orchards, Victoria, Australia, in recognition of more than 18 years working with reptiles and other wildlife and their long-term conservation.

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CONFLICTS OF INTEREST

None.

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Two new Death Adders (Serpentes: Elapidae: *Acanthophis*) from the New Guinea region.

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ABSTRACT

The Death Adders, genus *Acanthophis* Daudin, 1803 are iconic viperine-like elapid snakes found in the Australasian region.

Two new taxa within the subgenus *Platyelapid* Hoser, 2016 from Northern New Guinea are formally named for the first time.

One species from the Bird's Head region of West Papua (Irian Jaya) is formally named as *Acanthophis oxyi sp. nov.*. Another form from Kar Kar Island, Papua New Guinea is formally named *Acanthophis crotalusei karkarensis subsp. nov.*.

Both taxa are morphologically and reproductively isolated from nearest congeners.

Keywords: Herpetology; snake; death adder; elapid; *Acanthophis*; *Platyelapid*; New Guinea; Indonesia; PNG; venomous; *laevis*; *crotalusei*; *barnetti*; new species; *oxyi*; new subspecies; *karkarensis.*

INTRODUCTION

The Death Adders, genus *Acanthophis* Daudin, 1803 are iconic viperine-like elapid snakes found in the Australasian region.

I, Raymond Hoser, have been working on all aspects of the genus for more than 40 years (see for example earlier papers of Hoser 1981, 1982, 1983, 1984a, 1984b, 1985a, 1985b, 1985c, 1987). This included catching, keeping and breeding most forms, inspection of most forms both live and in the entire collections of this genus in most Museums in Australia and elsewhere that hold any numbers of specimens, this including specimens from all parts of the known range of these species.

Hoser (1998a) published the first full genus-wide revision of the genus.

Prior to that paper, most authors (e.g. Cogger *et al.* 1983) recognized just three species in the genus.

Hoser (1998), extended this number to include no less than 11 species and three additional subspecies for Australia and New Guinea (a position tacitly agreed with by Cogger 2014 as shown below).

While a gang of criminals known as the Wolfgang Wüster gang of thieves have spent most of the 22 years since the publication of Hoser (1998a) trying to tell people not to recognize the species formally named by Hoser (1998a) (as well as all other relevant papers of Hoser, including for example Hoser (2000a, 2000b, 2003 and 2004), their lies, deception and unscientific methods as encapsulated in their non-peer reviewed rant of Wüster *et al.* (2001) can only hide the obvious truths for so long. Also in year 2000, under the directions and harassment of the Wolfgang Wüster gang, Cogger (2000), ignored the taxonomic works of Hoser (1998a, 1998b) and in his major work on Australian reptiles pretended these species did not exist.

This tactic of unscientific denial of the obvious continues even in 2020 as evidenced on the website of

Wüster's good mate Peter Uetz at:
http://reptile-database.reptarium.cz/species?genus=Acanthophis&species=wellsi
where Uetz has written of the Pilbara Death Adder, *Acanthophis* wellsei Hoser, 1998, "Synonymy: Not listed by COGGER 2000. " in order to substantiate their ridiculous claim that the putative species is nothing more than a strange looking Desert Death Adder *Acanthophis pyrrhus* Boulenger, 1898.

However as other scientists independent of Hoser (1998a, 1998b) came to the same obvious conclusions as Hoser (1998a, 1998b), (e.g. Aplin and Donnellan 1989, Kuch *et al.* 2006), the taxa formally named by Hoser (1998a, 1998b) became widely accepted and the names generally used (e.g. Storr *et al.* 1992). So by year 2014, the relevant species appeared in all recently published books (e.g. Storr *et al.* 2002), including by that year's end in Cogger (2014) in Hal Cogger's most recently updated book covering all Australian reptiles.

This is a point that is deliberately ignored by the Wolfgang Wüster gang of thieves, who even as of year 2020, were still claiming on the websites they control that , "Synonymy: Not listed by COGGER 2000.", (e.g. at http://reptile-database.reptarium.cz/species?genus=Acanthophis&species=wellsi and numerous duplicate and mirror sites) and refused to concede that in Cogger's more recent work he did in fact recognize and include the relevant Hoser species.

Further papers formally naming species of *Acanthophis* were published by Hoser (2002) and Hoser (2014). Hoser (2016) also erected a subgenus for the main New Guinea lineage of the genus.

Other papers of significance were Wells and Wellington (1985), that named three putative species level taxa as well as Wells (2002), that erected a putative genus for the *Acanthophis pyrrhus* Boulenger, 1898 species complex.

While largely agreeing with the papers of Wells (2002) and that of Wells and Wellington (1985), my papers Hoser (1998a, 2002, 2014 and 2016a), in summary agreed with two of their species, relegated two others to subspecies and accepted but downgraded their genus-level division to that of subgenus.

By 2013, after failing to raise enough lies and deception to discourage herpetologists from accepting the validity of species discovered and named by Hoser (e.g. Hoser 1998a, 1998b, 2000a, 2000b, 2003, 2004 and many other papers) or the names of Wells and Wellington (1985), the Wolfgang Wüster gang via Wolfgang Wüster himself wrote a blog in 2012, cited here as Kaiser (2002b), later published as Kaiser *et al.* (2013).

That document told their supporters and anyone else who was a like-minded thief, to steal works of Hoser, Wells and several others and to engage in the nefarious practice of taxonomic vandalism to steal these works and illegally rename the same taxa in direct breach of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

As of 2020, the number of species and genera illegally renamed by the Wolfgang Wüster gang of thieves was approaching 100 taxa.

Of relevance to this paper is that in 2015, Wolfgang Wüster and others in his gang, published a so-called paper in an online PRINO (peer reviewed in name only) Journal *Zootaxa* that renamed *Acanthophis lancasteri* Wells and Wellington, 1985 as *Acanthophis cryptamydros* Maddock, Ellis, Doughty, Smith and Wüster, 2015.

As that illegally coined name is a junior synonym of the proper name *Acanthophis lancasteri* Wells and Wellington, 1985, it is the earlier name that must always be used (Hoser, 2016, Wellington 2016).

As far back as 1978 when inspecting Death Adders held at the Australian Museum in Sydney, I was aware that the specimens from Kar Kar Island, Madang Province, Papua New Guinea were morphologically distinct from those on the nearby mainland. However the classification of Hoser (1998) made a specific point of not considering insular island forms on the basis it was uncertain as to how long they had been separated from nearby mainland populations.

Hoser (2016b) formally named a subspecies of skink on Kar Kar Island and Hoser (2019c) formally described and named *Emoia karkarensis* Hoser, 2019 being known only from Kar Kar. Island. That taxon was also deemed a full species, separate from mainland forms on the basis morphological differences and a published molecular divergence indicating separation in excess of 1 MYA.

Hence it is clear that insular reptiles on Kar Kar Island may be sufficiently divergent to warrant taxonomic recognition at either subspecies or species level. Therefore the Death Adders on this island are herein formally named for the first time as a subspecies of their nearest relative. They are therefore described herein as *Acanthophis crotalusei karkarensis subsp. nov.*.

Another species of Death Adder from the Bird's Head region of West Papua (Irian Jaya) was not named previously on the basis of a lack of available specimens.

Similar, but slightly different animals are also found on Biak and across the north of Irian Jaya to near the Papua New Guinea border and are herein tentatively treated as conspecific.

The Bird's head taxon is still only known from a tiny number of specimens, but due to the rate of accelerating habitat destruction in the relevant region, it is important that this species be formally named as soon as possible and before extinction becomes a more immediate threat as identified in the papers of Hoser (2019a, 2019b).

The snake is formally named as *Acanthophis oxyi sp. nov.*.

The two new species fit within the New Guinea subgenus *Platyelapid* Hoser, 2016.

Both taxa are both morphologically and reproductively isolated from nearest congeners.

ZOOTAXA AND THE WOLFGANG WUSTER GANG OF THIEVES

Overuse of illegally coined names of species and self-citation by the Wolfgang Wüster gang of thieves in the online PRINO (Peer reviewed in name only) journal "*Zootaxa*" that they control, led to that journal being blackballed by Clarivate, the company behind the "Impact Factor", widely used by academics to measure credibility of scientific journals (Oransky, 2020).

The Wolfgang Wüster gang of thieves have been at war against the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999) for decades (see Hoser 2007).

Their more recent war cry manifesto known as "Kaiser *et al.* (2013)", although in fact written by Wolfgang Wüster (see Kaiser 2012a) as frequently amended (see also Kaiser 2012, 2012b, 2013, 2014a and 2014b) and the claims within it, have been discredited numerous times (e.g. Cogger (2014), Dubois (2014), Dubois *et al.* (2019), Eipper (2013), Hoser (2007, 2009, 2012a, 2012b, 2015a-f, 2019a-b), Mutton (2014a, 2014b), Shea (2013a-d), Thorpe (2013, 2014a, 2014b), Wellington (2013, 2014a, 2014b), Wells (2013, 2014) and sources cited therein).

Notwithstanding these setbacks the Wolfgang Wüster gang remain undeterred and continue to commit acts of internet trolling, running countless fake accounts online for peddling hatred and lies, as well as engaging in overt scientific fraud, property theft, assault, vandalism, money fraud, money scams, rapes, child sex offences, trafficking of amphetamines, animal abuse and cruelty, wildlife smuggling, shooting people (yes, two of the group have been convicted of this) and other serious crimes (Supreme Court of Western Australia 2009, Hobbs 2010, Goodman 2019).

Some members of the group have been charged and jailed for various crimes, including for example David John Williams, convicted and fined $7,500 for animal cruelty and wildlife smuggling at the Cairns Magistrates Court, Damien Mark Harding jailed for child sex offences, Seth Pywell fined for his role in the shooting two people, Matthew Gatt fined $8,000 for the theft of a rare snake and Andrew Browne jailed for child sex offences, but the group ring leaders Wolfgang Wüster, Mark O'Shea and Wulf Schleip have managed to avoid criminal sanctions to date.

Wolfgang Wüster and Mark O'Shea even post images of themselves committing crimes online, but have somehow managed to avoid criminal charges.

As of 2020, members of the Wolfgang Wüster gang of thieves had plagiarised works of other scientists and in breach of the *International Code of Zoological Nomenclature* illegally renamed nearly 100 species and genera previously formally named by other ethical scientists.

Keeping count of their acts of taxonomic vandalism and theft is an extremely difficult task, but lists of these acts are regularly published!

The gang have then by use of countless false accounts and false identities, created a false veneer online that their illegal names are the correct names and that the earlier proper names should not be used.

Noting that Wolfgang Wüster gang of thieves have already tried to rename at least one species of Death Adder, people should be mindful of almost certain further acts of taxonomic vandalism by this gang of thieves in PRINO journals they control, including the PRINO Online "journal" *Zootaxa*, in terms of the new names erected in this paper.

PRINO is an acronym for "Peer reviewed in name only" which is the term best described for the online journals that that Wolfgang Wüster gang of thieves members publish their fraudulent papers in.

The journals such as the predatory PRINO journal "*Zootaxa*" have near zero respect for the principles of science, or ethics and significantly papers published in them are either not peer reviewed in any way, or alternatively the process is so shambolic as to be non-existent in any meaningful way.

See also Oransky (2020).

While peer review is not a mandatory requirement of the *International Code of Zoological Nomenclature*, it is regarded as the gold standard in scientific publishing and is therefore generally expected in such publications.

MATERIALS AND METHODS

While these have been inferred already, I shall briefly state what they were.

Specimens of all known species Death Adders (Genus *Acanthophis* Daudin, 1803) were inspected either live or dead over a period spanning more than 40 years as was all relevant and available literature. This included all previous descriptions of taxa, including known synonyms as cited in previous papers of myself including Hoser (1998a, 2002, 2014 and 2016) and synonyms published in Cogger *et al.* (1983).

Of particular relevance to this review, were phylogenetic and morphological studies of reptiles that helped identify biogeographical barriers for species similarly eco-constrained as Death Adders as well as geological studies that helped identify potential barriers to dispersion of populations.

Included in the audit were photos of species with good locality data and distribution maps from State Museums, based on specimens in their collections, noting that for relevant species, the historical distributions may be very different to the extant distributions.

Where available and applicable, fossil specimens and records were also reviewed.

Past descriptions and synonymies were reviewed with a view to using available names for species groups if they had been properly proposed in the past but in the case of the two relevant taxa in this paper, no names were available.

Publications relevant to the taxonomic and nomenclatural conclusions in terms of the genus *Acanthophis sensu lato* including all descriptions of all known species, including all known synonyms, and specifically relevant to the taxonomic decisions in terms of the two newly named forms include the following: Aplin and Donnellan (1999), Boulenger (1896, 1898), Cogger (2000, 2014), Cogger *et al.* (1983), Daudin (1803), de Rooij (1917), Günther (1863), Hoser (1989, 1991, 1995a, 1998a, 2002, 2014, 2016a, 2016b, 2019c), Kuch *et al.* (1986), Macleay (1877), Maddock *et al.* (2016), McDowall (1984), Ramsay (1877), Ride *et al.* (1999), Shaw and Nodder (1802), Storr (1981), Wellington (2016), Wells (2002), Wells and Wellington (1985), and sources cited therein.

RESULTS

As already stated in the abstract, two hitherto unnamed forms have been identified, these being that from the Bird's Head region of Indonesian New Guinea and other from Kar Kar Island, Madang, Papua New Guinea. Both are formally named as new taxa for the first time, in accordance with the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

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 over a period spanning more than 40 years.

All necessary government issued wildlife licenses, permits and authorities were obtained as needed.

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 (ICZN).

In the unlikely event two or more newly named taxa are deemed to be the same 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 June 2020 (e.g. the Peter Uetz website) (including if also viewed prior), unless otherwise stated and was accurate in terms of the content 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 or 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.

CONSERVATION

In terms of conservation of each population of each newly described taxon, the relevant comments in Hoser (1989, 1991, 1993, 1995b, 1996, 2019a and 2019b) apply.

Wildlife laws as currently enforced in Papua New Guinea and Indonesia, are not in a materially significant way enhancing the long-term survival prospects of any of the relevant species.

Over breeding of humans and the environmental problems associated with this overpopulation are by far the greatest long term threat to each and every relevant species, noting that already liberated feral pest species continue to cause ongoing stress and decline of the relevant species as explicitly detailed in Hoser (1991).

ACANTHOPHIS (*PLATYELAPID*) *OXYI SP. NOV.*

LSIDURN:LSID:ZOOBANK.ORG:ACT:811A7CA7-DB9E-4E5D-B9D9-DBD80C72423C

Holotype: A preserved specimen at the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA, specimen number MCZ Herp R-7565, collected from Manokwari, West Papua Province, Indonesia, Latitude -0.8667 S., Longitude 134.0833 E. This facility allows access to its holdings.

Diagnosis: *Acanthophis oxyi sp. nov.* is readily separated from all other species of *Acanthophis* by the following unique combination of characters: Anterior two upper labials and rostral, wholly grey brown and without any white, rear two upper labials ivory white, each with a large black spot on the upper margin of anterior labial and upper rear of posterior labial; on flanks, each of lower two rows of scales are as follows: brown edged but with most of scale, including centres, being large black spots, these running the length of the body, with blotches in upper row being as large or larger than those in the lower row (in contrast to a similar arrangement in all other species that may be similar), black markings on chin do not reach the lower lip; unique to this species is a well defined fold of skin or ridge running from the mid-section of the back of the eye, in a diagonal downward direction to run along the upper margin of the two rear upper labials (those being the white ones, with black near the upper margin). The ridge line dissolves above end of the second last upper labial. A lesser ridge runs anterior to the eye from mid-section to nostril. Scale above the eye is moderately raised in adults.

Acanthophis laevis Macleay, 1877 and other related taxa from south of the main central cordillera, being the species morphologically most similar to *A. oxyi sp. nov.* do not have the well defined rows of black spots running the entire length of the lower flanks or the well-defined fold of skin or ridge posterior to the eye.

Acanthophis barnetti Hoser, 1998, of the nominate form, from the Sepik River region and potentially east of there in Papua New Guinea is readily separated from *A. oxyi sp. nov.* by having black on the chin running up the lower labials as well formed bars and clearly entering the lip. Dark spots on the two rear upper labials are not well-defined as they are bordered at the upper margins with grey or grey peppering. Furthermore in *A. barnetti* upper anterior labials are whitish at the lower margins.

These same characters separate the morphologically similar *A. crotalusei* Hoser, 1998, save for the fact that the black on the lower labials does not quite enter the lower lip and black spotting on the anterior upper labials is relatively prominent.
Other less similar species within *Acanthophis* including the highly rugose southern New Guinea *Acanthophis rugosus* (Loveridge, 1948) and the other Australian species, are separated from the preceding taxa on the basis of the original descriptions in Hoser (1998a and 2002),

Distribution: *A. oxyi sp. nov.* is only definitively known from the upper birds head region of Irian Jaya, Indonesia, being the type locality. However morphologically similar specimens from Biak and north of the central cordillera in Irian Jaya, as far east as at least Jayapura are tentatively assigned to this species. *A. barnetti* Hoser, 1998 is found in the Sepik River region of PNG, this being presumably an eastern limit for putative *A. oxyi sp. nov.*.

Etymology: *A. oxyi sp. nov.* is named in honour of a Great Dane dog, Oxyuranus, AKA “Oxy” (now deceased) who for 8 years guarded the research facility of this author from attacks and thefts. *Oxyuranus* Kinghorn, 1923 is the genus name for a well-known group of highly venomous elapid snakes.

ACANTHOPHIS (*PLATYELAPID*) *CROTALUSEI KARKARENSIS SUBSP. NOV.*

LSIDurn:lsid:zoobank.org:act:30CAF45A-E182-4E7E-B64D-C629B8D88271

Holotype: A preserved specimen at the Australian Museum, Sydney, New South Wales, Australia, specimen number R.121443 collected from Kulkul Plantation, Karkar Island, Madang District, Papua New Guinea, Latitude -4.37 S., Longitude 145.54 E. This government-owned facility allows access to its holdings.

Paratypes: Two preserved specimens at the Australian Museum, Sydney, New South Wales, Australia, specimen numbers R122103 and R122104 collected from Karkar Island, Madang District, Papua New Guinea, Latitude -4.37 S., Longitude 145.54 E.

Diagnosis: *Acanthophis crotalusei karkarensis subsp. nov.* is the taxon of Death Adder (Genus *Acanthophis* Daudin, 1803) from Kar Kar Island, Madang District, Papua New Guinea. It would normally key out as *A. crotalusei* Hoser, 1998 as diagnosed by Hoser (1998a), being the most proximally close species, but is separated from nominate *A. crotalusei* by having well defined black spots in the centres of the middle and rear upper labials, which are otherwise purely white, versus middle and rear upper labials that are otherwise peppered in nominate *A. crotalusei* (and *A. barnetti* Hoser, 1998). As seen in nominate *A. crotalusei* and *A. barnetti* the two rows of scales of the lower flanks are not prominently spotted with black in the centre of each scale as seen in *A. oxyi sp. nov.*. Dorsal light bands in *A. crotalusei karkarensis subsp. nov.* are distinct, being at least one scale in width along most of the body, versus indistinct and/or less than this in both nominate *A. crotalusei* and *A. barnetti.* The brown stripe at the rear of the head is thin in nominate *A. crotalusei* and *A. barnetti* and wide in *A. crotalusei karkarensis subsp. nov.*

Distribution: *A. crotalusei karkarensis subsp. nov.* is known only from Kar Kar Island, Madang Province, Papua New Guinea.

Etymology: The new subspecies is named in reflection of where it is known to occur.

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CONFLICTS OF INTEREST

None.

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Four new species of Reed Snake from Peninsular Malaysia (Serpentes: Colubridae: Calamariinae).

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ABSTRACT

Divergent populations of Reed Snakes within the snake subfamily Calamariinae are formally identified and named as new species. All are from Peninsular Malaysia in south-east Asia.

The new species are two from the genus *Macrocalamus* Günther, 1864, closely related to *M. chanardi* David and Pauwels, 2004, one from the genus *Oreocalamus* Boulenger, 1899 and one from the genus *Collorhabdium* Smedley, 1932.

Formally identifying each form as a new species is the critically important first step in their long-term conservation in the face of unprecedented threats caused by ongoing human population growth.

Keywords: Herpetology; snake; Malaysia; Calamariinae; Asia; *Macrocalamus*; *Oreocalamus*; *Collorhabdium*; new species; *wellsei*; *wellingtoni*; *daranini*; *turneri*.

INTRODUCTION

The diminutive Reed Snakes within the snake subfamily Calamariinae are easily overlooked components of ecosystems in south-east Asia.

Most species are known from relatively few specimens and almost all appear to be range restricted in the Sundaland region of south-east Asia.

A number of taxonomic studies have indicated forms of putative species that may in fact be of hitherto unnamed taxa.

These studies were revisited with reference to relevant specimens and studies of other similarly geographically constrained species in order to ascertain or confirm that there were potentially unnamed species.

Four potentially unnamed species, for which no synonym names were available were examined.

These were two from the genus *Macrocalamus* Günther, 1864, closely related to *M. chanardi* David and Pauwels, 2004, one from the genus *Oreocalamus* Boulenger, 1899 and one from the genus *Collorhabdium* Smedley, 1932. Both latter genera have until now been treated as monotypic.

This paper is written as a result of this review determining that there are in fact four different taxa worthy of species level recognition.

MATERIALS AND METHODS

All relevant and available specimens and literature was inspected. This includes with particular reference to the original type material and associated descriptions of the relevant putative species.

Specimens from all known areas that putative *Macrocalamus chanardi* David and Pauwels, 2004, Gray, 1842, *Oreocalamus hanitschi* Boulenger, 1899 and *Collorhabdium williamsoni* Smedley, 1932 were audited to attempt to find consistent species-level differences between sampled populations.

Of particular relevance to this review, were phylogenetic and morphological studies of reptiles that helped identify biogeographical barriers for species similarly eco-constrained as these species as well as geological studies that helped identify potential barriers to dispersion of populations.

Included in the audit were photos of specimens with good locality data and distribution maps from State Museums, based on specimens in their collections.

Where available and applicable, fossil specimens and records were also reviewed.

Past descriptions and synonymies were reviewed with a view to using available names for species groups if they had been properly proposed in the past but in the case of the relevant taxa subject of this paper, no names were available.

Publications relevant to the taxonomic and nomenclatural conclusions in terms of the putative new species including all known synonyms, and specifically relevant to the taxonomic decisions in terms of the newly named forms include the following: Boo Liat (1963), Boulenger (1894, 1896, 1899, 1912), Chan-ard *et al.* (1999, 2015), Cox *et al.* (1998), Das (2012), Das and Lim (2001), David and Pauwels (2004), Duméril *et al.* (1854), Grandison (1972, 1978), Gumprecht (2000), Günther (1864), Hoser (2012), Malkmus *et al.* (2002), Manthey (1983), Manthey and Grossmann (1997), Quah *et al.* (2019), Ride *et al.* (1999), Smedley (1931, 1932), Smith (1930), Tweedie (1940, 1953), Vogel and David (1999), Vogel and Han-Yuen (2010), Yaakob and Lim (2002) and sources cited therein.

RESULTS

As already stated in the abstract, four hitherto unnamed forms had been identified as potentially unnamed taxa.

This was confirmed after inspection of specimens (via good quality photos made available to me) and a review of the relevant literature.

Hence the four relevant species are formally named in accordance with the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

These are as follows: Two species are from the genus *Macrocalamus* Günther, 1864, being closely related to *M. chanardi* David and Pauwels, 2004.

The two species are from elevated areas of Peninsular Malaysia.

Another species, also from Peninsula Malaysia is from the genus *Oreocalamus* Boulenger, 1899, which until now has been treated as monotypic for the putative species *O. hanitschi* Boulenger, 1899 from Borneo.

The fourth newly named species is one that until now was treated as a population of the taxon

Collorhabdium williamsoni Smedley, 1932, but is sufficiently divergent to warrant being named as a separate species-level taxon. It is also from Peninsular Malaysia.

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, 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 30 June 2020 (including if also viewed prior), unless otherwise stated and was accurate in terms of the content 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 or 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.

CONSERVATION

In terms of conservation of these newly described species, the relevant comments in Hoser (1989, 1991, 1993, 1995b, 1996, 2019a and 2019b) apply.

Wildlife laws as currently enforced in Malaysia are not in a materially significant way enhancing the long-term survival prospects of the relevant species.

Over breeding of humans and the environmental problems associated with this overpopulation are by far the greatest long term threat to the relevant species, noting that already liberated feral pest species continue to cause ongoing stress and decline of similar species as explicitly detailed in Hoser (1991).

MACROCALAMUS WELLSEI SP. NOV.

LSIDURN:LSID:ZOOBANK.ORG:ACT:52315894-EDA6-4587-9FF0-E23AFD97FD9B

Holotype: A preserved male specimen at the University Sains Malaysia Herpetological Collection, Penang, Malaysia, specimen number USMHC 1960 collected at Habu, Cameron Highlands, Pahang, Malaysia, Latitude 4.4401 N., Longitude 101.3913 E. This facility allows access to its holdings.

Paratype: A preserved female specimen at the La Sierra University Herpetological Collection, La Sierra University, Riverside, CA, USA, specimen number LSUHC 11685 collected at Robinson Falls. Cameron Highlands, Pahang, Malaysia, Latitude 4.4608 N., Longitude 101.3881 E.

Diagnosis: Until now, both *Macrocalamus wellsei sp. nov.* and *M. wellingtoni sp. nov.* have been treated as southern populations of *M. chanardi* David and Pauwels, 2005, with a type locality of Bukit Larut, Perak, West Malaysia. That species taxon is found from there at least as far north as Gunung Jerai, Kedah, West Malaysia.

All three species are readily separated from all other previously named and identified species of *Macrocalamus* Günther, 1864 by the following unique suite of characters: Dorsum pale to dark brown, reddish brown or greyish brown, never black. Bright yellow dorsolateral stripes absent; two rows of light, dark-edged dorsolateral ocelli; a single, dark, ventrolateral stripe present (never two stripes); venter mid-way along body is orange, pink or coral (light pink) and immaculate; loreal is present.

Most similar to these species is *M. vogeli* David and Pauwels, 2005 but that species is readily separated from all of *M. wellsei sp. nov.*, *M. wellingtoni sp. nov.* and *M. chanardi* by having a venter that is heavily speckled with brownish black (instead of being immaculate as seen in the other three species).

M. wellsei sp. nov., *M. wellingtoni sp. nov.* and *M. chanardi* are readily separated from one another as follows:

In *M. chanardi*, the venter is strongly yellow at the anterior end (including the chin and upper neck), grading through orange midway to red under the tail, separating this species from the other two. *M. wellsei sp. nov.* and *M. wellingtoni sp. nov.* are white under the chin and upper neck before quickly grading through orange on the lower neck to red under the belly and tail.

M. wellsei sp. nov. are separated from the other two species by having two well defined rows of light brown spots forming lines running longitudinally down the upper dorsum to the base of the tail, versus absent or ill defined in the other two species or if well defined, this being so only at the anterior end of the body.

Both *M. wellsei sp. nov.* and *M. wellingtoni sp. nov.* have a wide and well-defined light streak running from the back of the eye to the neck, versus ill defined and not touching the eye in *M. chanardi.*

Dorsally, *M. wellsei sp. nov.* is blackish brown in colour, versus dark brown in the other two species.

The genus *Macrocalamus* Günther, 1864 is separated from other snakes by the following unique suite of characters: A colubrid snake genus characterized by: A cylindrical body, a head triangular, depressed, barely distinct from a thick neck with tapered preocular region and snout, 15 smooth dorsal scale rows, without apical pits throughout the body, internasals fused with prefrontals and a very elongate loreal. Rostral higher than broad, triangular, well visible from above, totally separating the nasals from each other and contacting the prefrontals that are significantly notched by the rostral

on their anterior margin; internasals fused with prefrontals; nasals entire, rather small, roughly pentagonal; nostril piercing shield between the lower margin of the nasal and the upper margin of the first supralabial; one pair of large prefrontals, followed by a hexagonal, elongated frontal, pointing caudally, that is located between one undivided supraocular on each side; a very large parietal separated from the seventh supralabial by the anterior temporal; one elongated loreal between the nasal and the preocular; 7 or 8 supralabials, first very small, second and third always in contact with the loreal, fourth and fifth always entering the orbit; one (rarely 2) preocular, one postocular; no subocular; 1 squarish anterior temporal and 2 superposed posterior temporals, the superior one much longer than inferior; 7 lower labials.

Distribution: *M. wellsei sp. nov.* appears to be restricted to the Cameron Highlands, Pahang, Malaysia. North of this region one finds *M. chanardi* and south of here one finds *M. wellingtoni sp. nov.* (from Fraser's Hill and Genting Highlands).

Etymology: The new species *M. wellsei sp. nov.* is named in honour of Richard Wells of Lismore, New South Wales, Australia in recognition of his many major contributions to the taxonomy and nomenclature of Australian reptiles, including the historical publication Wells and Wellington (1985). The formation of this scientific name is deliberate, as Richard Wells is often referred to as "Wellse", "Wellsei", or "Wellsey" and therefore it should not be changed.

MACROCALAMUS WELLINGTONI SP. NOV.

LSIDURN:LSID:ZOOBANK.ORG:ACT:E3274F48-829F-4933-9D7A-EABD37479B33

Holotype: A preserved adult female specimen at the University Sains Malaysia Herpetological Collection, Penang, Malaysia, specimen number USMHC 1540 from Fraser's Hill, Pahang, Malaysia, Latitude 3.7119 N., Longitude 101.7366 E.

Paratype: A preserved juvenile specimen at the University Sains Malaysia Herpetological Collection, Penang, Malaysia, specimen number USMHC 1523 from Fraser's Hill, Pahang, Malaysia, Latitude 3.7119 N., Longitude 101.7366 E.

Diagnosis: Until now, both *Macrocalamus wellingtoni sp. nov.* and *M. wellsei sp. nov*. have been treated as southern populations of *M. chanardi* David and Pauwels, 2005, with a type locality of Bukit Larut, Perak, West Malaysia. That species taxon is found from there at least as far north as Gunung Jerai, Kedah, West Malaysia.

All three species are readily separated from all other previously named and identified species of *Macrocalamus* Günther, 1864 by the following unique suite of characters: Dorsum pale to dark brown, reddish brown or greyish brown, never black. Bright yellow dorsolateral stripes absent; two rows of light, dark-edged dorsolateral ocelli; a single, dark, ventrolateral stripe present (never two stripes); venter mid-way along body is orange, pink or coral (light pink) and immaculate; loreal is present.

Most similar to these species is *M. vogeli* David and Pauwels, 2005 but that species is readily separated from all of *M. wellsei sp. nov*., *M. wellingtoni sp. nov.* and *M. chanardi* by having a venter that is heavily speckled with brownish black (instead of being immaculate as seen in the other three species).

M. wellsei sp. nov., *M. wellingtoni sp. nov.* and *M. chanardi* are readily separated from one another as follows:

In *M. chanardi*, the venter is strongly yellow at the anterior end (including the chin and upper neck), grading through orange midway to red under the tail, separating this species from the other two. *M. wellsei sp. nov.* and *M. wellingtoni sp. nov*. are white under the chin and upper neck before quickly grading through orange on the lower neck to red under the belly and tail.

M. wellsei sp. nov. are separated from the other two species by having two well defined rows of light brown spots forming lines running longitudinally down the upper dorsum to the base of the tail, versus absent or ill defined in the other two species or if well defined, this being so only at the anterior end of the body.

Both *M. wellsei sp. nov.* and *M. wellingtoni sp. nov.* have a wide and well-defined light streak running from the back of the eye to the neck, versus ill defined and not touching the eye in *M. chanardi.*

Dorsally, *M. wellsei sp. nov.* is blackish brown in colour, versus dark brown in the other two species.

The genus *Macrocalamus* Günther, 1864 is separated from other snakes by the following unique suite of characters: A colubrid snake genus characterized by: a cylindrical body, a head triangular, depressed, barely distinct from a thick neck with tapered preocular region and snout, 15 smooth dorsal scale rows, without apical pits throughout the body, internasals fused with prefrontals and a very elongate loreal. Rostral higher than broad, triangular, well visible from above, totally separating the nasals from each other and contacting the prefrontals that are significantly notched by the rostral on their anterior margin; internasals fused with prefrontals; nasals entire, rather small, roughly pentagonal; nostril piercing shield between the lower margin of the nasal and the upper margin of the first supralabial; one pair of large prefrontals, followed by a hexagonal, elongated frontal, pointing caudally, that is located between one undivided supraocular on each side; a very large parietal separated from the seventh supralabial by the anterior temporal; one elongated loreal between the nasal and the preocular; 7 or 8 supralabials, first very small, second and third always in contact with the loreal, fourth and fifth always entering the orbit; one (rarely 2) preocular, one postocular; no subocular; 1 squarish anterior temporal and 2 superposed posterior temporals, the superior one much longer than inferior; 7 lower labials.

Distribution: *M. wellingtoni sp. nov.* occurs in the region from Fraser's Hill and Genting Highlands in Pahang, Malaysia. *M. wellsei sp. nov.* appears to be restricted to the Cameron Highlands, Pahang, Malaysia. North of this region one finds *M. chanardi.*

Etymology: Named in honour of Cliff Ross Wellington of Ramornie, New South Wales, Australia in recognition of his many major contributions to the taxonomy and nomenclature of Australian reptiles, including the historical publication Wells and Wellington (1985), as well as his services for wild life in Thailand and other parts of south east Asia, including many excursions in Thai bush.

COLLORHABDIUM DARANINI SP. NOV.

LSIDURN:LSID:ZOOBANK.ORG:ACT:34C8E055-53D9-4474-AD53-47CE87381297

Holotype: A preserved specimen at the La Sierra University Herpetological Collection, La Sierra University, Riverside, CA, USA, specimen number LSUHC 12753 collected from Genting Highlands, Pahang, Malaysia, Latitude 3.4240 N., Longitude 101.7932 E.

Diagnosis: *Collorhabdium daranini sp. nov.* has until now been treated as a southern population of *C. williamsoni* Smedley, 1932, being previously monotypic for the genus.

Collorhabdium williamsoni from the Cameron Highlands, Pahang, Malaysia, is readily separated from *C. daranini sp. nov.* from Genting Highlands, Pahang, Malaysia by having seven clearly visible longitudinal black lines running down the body, versus none or indistinct in *C. daranini sp. nov.* as well as a large yellow spot on either side of the neck at the back of the head, versus absent in *C. daranini sp. nov.*

Both species, being the entirety of the genus *Collorhabdium* Smedley, 1932 are readily separated from all other Calamariinae by the following unique suite of characters: Head not distinct from the neck, eye small; pupil round; nostril between a very small anterior and very large posterior nasal; prefrontal not entering the eye; preocular and temporals absent. 9 maxillary teeth, anterior ones slightly larger. Posterior mandibular teeth are shorter. Body is rounded and covered with smooth scales without apical pits. 15 mid-body rows, rounded ventrals. Short tail, pointed and all divided subcaudals. Snout obtusely pointed, projecting, rostral is visible from above and large; suture between internasals is either equal to, or slightly longer than broad, being longer than the distance from the tip of the snout, shorter than parietals, more than twice as broad as the supraocular. Preocular is large; a single postocular; no temporals; five upper labials; third and fourth entering the eye; first lower labial in contact with next behind the mental. Anterior sublinguals much longer than the posterior, in contact with 3 or 4 lower labials. 14 mid body rows, 144-152 ventrals in males (161 in a female) anal entire, 30-32 subcaudals in males and 22 recorded in a female.

Brownish, greyish or blackish above. The head has indistinct yellow markings and there may or may not be a distinctive large yellow spot on either side of the neck at the back of the head. There may or may not be seven longitudinal lines running the length of the body. Venter is white, with the dorsal colouration extending on to the outer edges of the ventrals, and further in under the anal plate. Chin and throat specked with darker pigment. Up to about 30 cm in adult length.

Distribution: *Collorhabdium daranini sp. nov.* is known only definitively from the Genting Highlands, Pahang, Malaysia, but presumably also occurs as far north as Fraser's Hill, Pahang, Malaysia. *C. williamsoni* Smedley, 1932 occurs in the Cameron Highlands, Pahang, Malaysia.

Etymology: *Collorhabdium daranini sp. nov.* is named in honour of Dara Nin of Ringwood, Victoria, Australia, who for many years has worked with Snakebusters: Australia's best reptiles shows educating people about wildlife and conservation with Australia's only hands on reptile shows that let people handle the animals.

OREOCALAMUS TURNERI SP. NOV.

LSIDurn:lsid:zoobank.org:act:D2FB6679-B8AB-45A1-8158-8480CCB269AD

Holotype: A preserved specimen at the The Field Museum of Natural History, Chicago, Illinois, 60605, USA, specimen number: FMNH Amphibians and Reptiles 130994, collected from Mt. Batu Berinchang (AKA Mount Batu Brinchang), in the Cameron Highlands, Pahang, Malaysia, Latitude 4.5175 N., Longitude 101.3825 E. This facility allows access to its holdings.

Diagnosis: *Oreocalamus turneri sp. nov.* from Peninsula Malaysia has until now been treated as an outlier population of *Oreocalamus hanitschi* Boulenger, 1899 from northern Borneo. However it is readily separated from that species by the frontal not being quite as deep as wide (versus as deep as wide in *O. hanitschi*) and the absence of the reddish tinge seen in the dorsal colouration of live *O. hanitschi. O. turneri sp. nov.* also has a yellowish venter versus orangeish in *O. hanitschi.*

Both species are similar in most respects to species within *Macrocalamus* Günther, 1864, which they would otherwise key out as, but can be separated from *Macrocalamus* as described in this paper (see latter part of description of *M. wellsei sp. nov.* or *M. wellingtoni sp. nov.*), by the presence of a pair of internasal shields (versus not so in *Macrocalamus*) and the presence of 17 dorsal mid body scale rows.

Oreocalamus has no tracheal lung and the first upper labial may either be distinct or united to the nasal. *Oreocalamus hanitschi* is defined in detail in Boulenger (1899).

Distribution: *Oreocalamus turneri sp. nov.* is known only from the type locality in Peninsula Malaysia.

Etymology: *O. turneri sp. nov.* is named in honour of Grant Turner, originally of Bundoora, (Melbourne) Victoria, Australia, but more recently of Queensland, Australia, in recognition of his many contributions to herpetology in Australia, in particular with reference to his many years of intensive fieldwork on the reptiles and frogs of the Basalt Plains on Melbourne's northern outskirts. As of 2020 this important habitat has been almost wholly destroyed by ongoing residential housing developments in line with Australian government policy of increasing the human population by several orders of magnitude.

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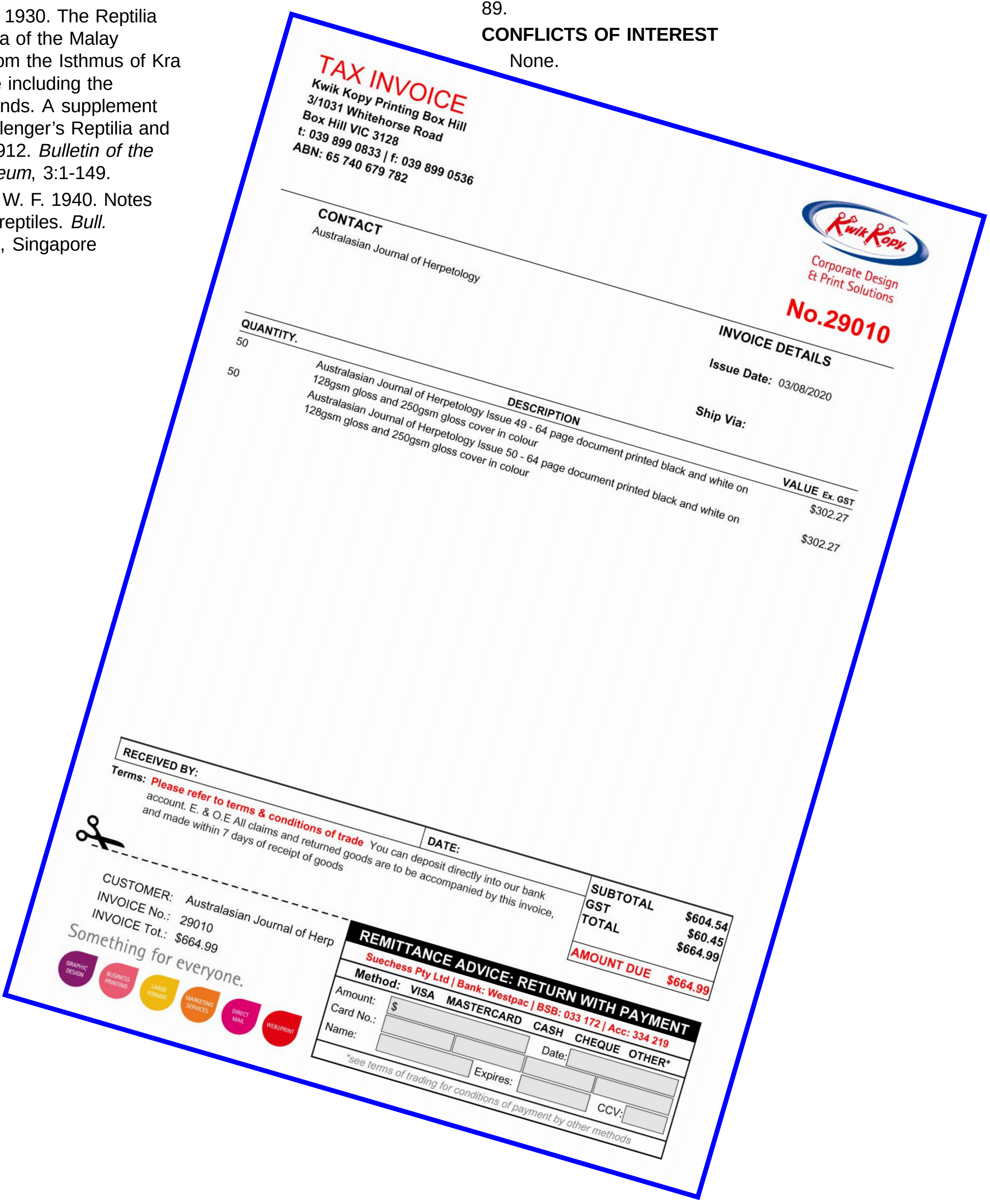
CONFLICTS OF INTEREST

None.



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A new species of *Raclitia* Gray (Serpentes, Homalopsidae) from Peninsular Malaysia.

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ABSTRACT

Specimens of the rare mud snake *Raclitia indica* Gray, 1842 are known from both sides of Peninsula Malaysia. Morphological differences between specimens from either side are well known in the literature. This paper formally names the eastern form as a new species *Raclitia oxyi sp. nov.*.

Keywords: Herpetology; snake; Malaysia; *Raclitia*; Asia; *indica*; new species; *oxyi.*

INTRODUCTION

The rare mud snake *Raclitia indica* Gray, 1842 is known only from a handful of specimens. This apparent rarity is presumed to be a result of limited searching for specimens in potential areas of habitat, combined with limited extant distribution.
The putative taxon as formally named by Gray (1842), was for many years known only from the lower western portion of Peninsula Malaysia in the regions of Perak and Selangor (Quah *et al.* 2018). However the same authors detailed further specimens referred to this species from Lumbuk Yu and Chini Lake, Pahang on the eastern side of the Malay Peninsula.

Those specimens were revisited with a view to confirming that they were not conspecific with the nominate form of *R. indica.* This paper is written as a result of this review determining that they are in fact a different taxon worthy of species level recognition.

MATERIALS AND METHODS

All relevant and available specimens and literature was inspected. This includes with particular reference to the original type material and associated descriptions of this by Gray and later authors.

Specimens from all known areas that putative *Raclitia indica* Gray, 1842 occur were audited for consistent species-level differences.

Of particular relevance to this review, were phylogenetic and morphological studies of reptiles that helped identify biogeographical barriers for species similarly eco-constrained as *R. indica* as well as geological studies that helped identify potential barriers to dispersion of populations.

Included in the audit were photos of specimens with good locality data and distribution maps from State Museums, based on specimens in their collections.

Where available and applicable, fossil specimens and records were also reviewed.

Past descriptions and synonymies were reviewed with a view to using available names for species groups if they had been properly proposed in the past but in the case of the relevant taxon subject of this paper, no names were available.

Publications relevant to the taxonomic and nomenclatural conclusions in terms of the putative new species including all known synonyms, and specifically relevant to the taxonomic decision in terms of the newly named form include the following: Boulenger (1896, 1912), Bourret (1934a, 1934b), Duméril *et al.* (1854), Grandison (1978), Gray (1842), Murphy (2007), Murphy and Voris (2014), Quah *et al.* (2018), Ride *et al.* (1999), Smith (1930), Tweedie (1953) and sources cited therein.

RESULTS

As already stated in the abstract, one hitherto unnamed form had been tentatively identified as an unnamed taxon.

This was confirmed after inspection of specimens (via good quality photos made available to me) and a review of the relevant literature.

Hence the eastern form (also potentially extending to Selangor) of the putative species *R. indica* is formally named as a new species for the first time. This is done in accordance with the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

The record of *R. indica* from Singapore is treated as being either a misreported collection location or alternatively a "wide" specimen, as in transported to Singapore from elsewhere as a vagrant or similar (i.e. brought inadvertently with goods from elsewhere). In any event, it matches the western putative taxon, being the nominate form of *R. indica.*

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 are 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 20 February 2020 (including if also viewed prior), unless otherwise stated and was accurate in terms of the content 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 or 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.

CONSERVATION

In terms of conservation of this newly described taxon, the relevant comments in Hoser (1989, 1991, 1993, 1995b, 1996, 2019a and 2019b) apply.

Wildlife laws as currently enforced in Malaysia are not in a materially significant way enhancing the long-term survival prospects of the relevant species.

Over breeding of humans and the environmental problems associated with this overpopulation are by far the greatest long term threat to the relevant species, noting that already liberated feral pest species continue to cause ongoing stress and decline of similar species as explicitly detailed in Hoser (1991).

RACLITIA OXYI SP. NOV.

LSIDURN:LSID:ZOOBANK.ORG:ACT:4DD66510-1F5A-4C13-80ED-804903FF6632

Holotype: A preserved specimen at the La Sierra University, Herpetological Collection, La Sierra University, Riverside, California, USA. Specimen number LSUHC 11747 collected at Lubuk Yu, Pahang, Malaysia.

Paratype: A preserved specimen at the La Sierra University, Herpetological Collection, La Sierra University, Riverside, California, USA. Specimen number LSUHC 11748 collected at Lubuk Yu, Pahang, Malaysia.

Diagnosis: *Raclitia oxyi sp. nov.* has until now been treated as either *R. indica* Gray, 1842, or alternatively a species unnamed but associated with and close phylogenetically to *R. indica. Raclitia oxyi sp. nov.* is however readily separated from *R. indica* (by way of comparison with syntypes of that species) by having the following unique suite of characters: 164 or less ventrals (vs 173) in males and 162 ventrals (vs 175) in females as well as no preoculars (vs 1 in *R. indica*). Colour photographs of the type specimens in life can be found in Quah *et al.* (2018) in Fig. 2.

Both species, *Raclitia oxyi sp. nov.* and *R. indica*, constituting the entirety of the genus are separated from all other Homalopsidae by the following unique suite of characters: Rostral broader than deep; internasals distinct; frontal as broad as or narrower than the supraocular (which appears to have fused with an upper postocular), little longer than broad, as long as its distance from the rostral or the end of the snout, shorter than the parietals; loreal longer than deep, in contact with the internasal; one or no (zero) preocular and always one postocular; temporals 1+2; 7 or 8 upper labials, fourth entering the eye; 8-9 lower labials; four lower labials in contact with the anterior chin-shields, which are longer than the posterior; the latter separated from each other by scales. Scales in 19-20 mid-body rows. Ventrals 155-175; anal divided; subcaudals 28-36. In preservative, dark purplish brown above, with a few interrupted, yellowish, transverse lines on the occiput and anterior part of the body; sides with yellowish or red vertical bars; belly yellowish to orange or red, spotted with black.

Total max. length to 372 mm; max. tail length to 425 mm (adapted from Boulenger 1896 and Quah 2018).

Distribution: *Raclitia oxyi sp. nov.* is only definitively known from Lumbuk Yu and Chini Lake, Pahang, Malaysia. It is likely to be found more widely, pending further collections by herpetologists. The nominate form of *R. indica* is believed to be from Perak, Malaysia.

Etymology: *R. oxyi sp. nov.* is named in honour of a (now deceased) Great Dane dog, named *Oxyuranus* (AKA "Oxy") in recognition of 8 years loyal service guarding the author's wildlife breeding and research facility. *Oxyuranus* Kinghorn, 1923 is a well known genus of venomous elapid snake from Australasia.

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CONFLICTS OF INTEREST

None.

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A new subgenus and a new subspecies within the lizard genus *Isopachys* Lönnberg, 1916 (Squamata:Sauria: Scincomorpha).

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ABSTRACT

A review of the lizard genus *Isopachys* Lönnberg, 1916 as currently recognized found that one species in the group, namely *Isopachys anguinoides* (Boulenger, 1914), originally named "*Lygosoma anguinoides*" is sufficiently divergent from all other species to be recognized at the genus level. It is therefore placed in a new subgenus formally named for the first time according to the rules of the *International Code of Zoological Nomenclature* (Ride *et al*. 1999).

Furthermore the northern population of *Isopachys roulei* (Angel, 1920) from the vicinity of Nakhon Ratchasima Province, Thailand, is also significantly divergent from the southern population from the Chonburi Province, Thailand. It is herein formally named as a new subspecies.

Noting the extreme human population growth and habitat degradation in the relevant region, it is important that the diversity in the genus be formally recognized so that relevant populations can be afforded proper conservation protection before they may be exterminated due to a misguided belief that they are not distinct from other genus or species level taxa.

Keywords: Lizard; skink; taxonomy; nomenclature; *Isopachys*; *anguinoides*; *borealis*; *gyldenstolpei*; *roulei*; new subgenus; *paraisopachys*; new subspecies; *rosswellingtoni*.

INTRODUCTION

An audit was conducted on the south-east Asian skink genus *Isopachys* Lönnberg, 1916 as currently recognized with a view to confirming that the current taxonomy and nomenclature were correct and if not, then to correct any obvious errors.

This included a review of published studies, both morphological and molecular, a review of the literature, including formal descriptions and type material and inspection of specimens, photos and the like from known localities in order to confirm the relevant taxonomy.

This was done as part of a wider-ranging audit into the south-east Asian herpetofauna that has been ongoing for some decades.

The preceding also sums up the materials and methods in terms of this paper.

The results of the audit found that the current taxonomy and nomenclature in terms of the genus is effectively sound save for the fact that one species, *Isopachys anguinoides* (Boulenger, 1914), originally named "*Lygosoma anguinoides*" is sufficiently divergent from all other species to be recognized at the genus level. This finding is based both on molecular divergence as seen in published phylogenies cited herein as well as the corresponding morphological differences between this and the other species in the genus *Isopachys.*

While the divergence between the two groups warrants a genus level differentiation, I am aware of the fact that there is a widespread disdain among some herpetologists for the creation of monotypic genera. Therefore in terms of this paper, I take the conservative position and herein formally name a new subgenus to accommodate this most divergent member of the putative genus *Isopachys* in accordance with the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

Because it seems that all other species of *Isopachys* are the closest relatives of the species *I. anguinoides*, I have called the new genus *Paraisopachys*, meaning in Latin, "not quite *Isopachys*".

The species *Isopachys roulei* (Angel, 1920) was originally described from a specimen in the Chonburi Province, Thailand, and until recently was only known from that province.

Kunya *et al.* (2011), detailed a new specimen, that they treated as being of the same species from the Nakhon Ratchasima Province, Thailand. The authors also treated this population as being a range extension of the same species, noting that their specimen and others of this species had either similar or same scale counts and/or morphology and within the same known range.

This included in terms of the following statistics:
Nasal scales in contact,
frontonasal larger than frontal,
Frontoparietals separated,
Prefrontal scales paired,
Third temporal scale present,
Post mental scale fused,
4 supralabials,
22 scales at neck,
18 midbody scale rows,
15 scales at tail,
133 scales parietal-vent,
75.2 mm snout-vent length ,
Tail tip shape was tapering.

However an inspection of the northern specimen showed that it had a different colouration to a large series of specimens from the southern population, which in turn were consistent in their differences to the single known northern specimen.

While the distance between the two populations (at closest known points) is only about 100 km in a straight line, the bulk of the intervening region is unsuitable habitat for this species or any others in the genus, being largely riverine flats and the like, versus elevated hills or sandy soils in proximity to same, as preferred by species in this genus.

This indicates that the two populations are both separated and have been for a significant period of time.

Clearly the northern population should be regarded as different at the species level. However in the absence of robust molecular data, I herein conservatively describe this northern taxon as a new subspecies. By doing so, this will afford this population immediate recognition and allow for proper conservation and management plans to be implemented and before this population is potentially exterminated inadvertently in the belief it is in fact part of a more widely distributed species (see Hoser 2019a and 2019b for examples of such occurring).

The conservation record of governments in the region is detailed by Hoser (1989, 1991, 1993 and 1996) giving further urgency to the need to formally recognize at the appropriate level the relevant forms described herein.

Published literature relevant to the taxonomic conclusions within this paper include: Angel (1920), Boulenger (1914), Brygoo (1985), Chan-ard *et al*. (2011, 2015), Chuaynkern *et al.* (2015), Das (2010), Greer (1997), Heyer (1972), Honda *et al*. (2000), Kamsook *et al.* (2006), Kunya *et al.* (2011), Lang and Böhme (1990), Lönnberg (1916), Nabhitabhata (2000), Nabhitabhata *et al*. (2004), Pauwels *et al.* (2003, Pyron *et al.* (2013), Smith (1935, 1937), Stuart and Emmett (2006), Taylor (1963) Teynié *et al*. (2004) and Trautmann (2006) and sources cited therein.

In terms of the following formal descriptions the following points should be noted:

1/ All descriptions of specimens in terms of form and colour relate to normal adult specimens of typical form for each taxon unless otherwise stated.

2/ Spellings of names assigned to taxa should not be altered in any way unless mandated by the *International Code of Zoological Nomenclature* (Ride *et al.* 1999) or superseding nomenclatural rules.

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

PARAISOPACHYS SUBGEN. NOV.

LSIDurn:lsid:zoobank.org:act:AC68DF0C-69D5-46C1-9196-4DE4642D48A5

Type species: *Lygosoma anguinoides* Boulenger, 1914.

Diagnosis: Until now, the species now known as *Isopachys anguinoides* (Boulenger, 1914), has been treated as a member of the genus *Isopachys* Lönnberg, 1916, type species *Isopachys gyldenstolpei* Lönnberg, 1916.

However *Paraisopachys gen. nov*. are separated from *Isopachys* by the following suite of characters: nasals are separated, versus in contact in *Isopachys*; the frontoparietals are in contact, versus separated in *Isopachys*; 5 supralabials, versus 4 or 5 in *Isopachys*; less than 110 scales parietal to vent, versus more than 120 in *Isopachys.*

Skinks in the genus *Isopachys* and *Paraisopachys* are defined and separated from other skinks as follows: Vermiform and lacking limbs having only vestiges of pectoral and pelvic girdles. The head is continuous with the body and lacking any obvious external neck segment. The snout is covered by a series of enlarged heavily keratinized shields to facilitate burrowing. Eyes are vestigial. The tympanum is encapsulated and not externally visible (derived from Chan-ard *et. al.* 2015).

Boulenger's original 1914 description of "*Lygosoma anguinoides*" with a type locality of Bangtapham, Siam (Thailand) can also be regarded as an accurate description and diagnosis of this subgenus.

Distribution: Known only from upper Peninsula Thailand.

Etymology: In Latin, *Paraisopachys*, means, "not quite *Isopachys*".

Content: *Isopachys* (*Paraisopachys*) *anguinoides* (Boulenger, 1914) (monotypic). The nominate subgenus includes the following species: *I. gyldenstolpei* Lönnberg, 1916 (type species); *I. borealis* Lang and Böhme, 1990 and *I. roulei* (Angel, 1920) (two subspecies, one formally named below).

ISOPACHYS ROULEI ROSSWELLINGTONI SUBSP. NOV.

LSIDurn:lsid:zoobank.org:act:00166334-A697-4193-97A2-1B7F41560821

Holotype: A preserved specimen at the Thailand Natural History Museum, Specimen number: THNHM 15362 collected from Ban Lampiakpattana, Tambon Nonsomboon, Amphoe Soeng Sang, Nakhon Ratchasima, Thailand, Lat. 14.19 N., Long 102.25 E.

Diagnosis: The subspecies *Isopachys roulei rosswellingtoni subsp. nov*. is similar in most respects to nominate *Isopachys roulei* (Angel, 1920). However it is separated by consistent colour difference.

In nominate *I. roulei roulei* head and back are a slightly pinkish-fawn with two broad dark bluish-brown longitudinal stripes running along the length of the body and well onto the tail. In *I. roulei rosswellingtoni subsp. nov*. the longitudinal stripes are narrow and at times broken on the dorsum and do not present as distinct like in nominate *I. roulei roulei.* In *I. roulei rosswellingtoni subsp. nov.* the longitudinal stripes are brown in colour and lack any bluish tinge.

Both *I. roulei roulei* and *I. roulei rosswellingtoni subsp. nov.* are separated from all other members of the genus *Isopachys* Lönnberg, 1916 by having the following suite of characters: 18 midbody rows, nasals in contact and frontoparietals separated, the latter two characters separating this and other species in the nominate genus from the species *Isopachys* (*Paraisopachys*) *anguinoides* (Boulenger, 1914), monotypic for the subgenus *Paraisopachys subgen. nov.*.

I. borealis Lang and Böhme, 1990 has 20-22 midbody rows and *I. gyldenstolpei* Lönnberg, 1916 has 24-28 midbody rows, separating both species from both *I. roulei roulei* and *I. roulei rosswellingtoni subsp. nov.*.

Further descriptive detail about this new subspecies including a photo of the holotype and relevant habitat information is seen in Kunya *et al.* (2011).

Distribution: Known only from the type locality of Ban Lampiakpattana, Tambon Nonsomboon, Amphoe Soeng Sang, Nakhon Ratchasima Province, Thailand, Latitude 14.19 N., Longitude 102.25 E.

Etymology: Named in honour of herpetologist Cliff Ross Wellington of New South Wales, Australia in recognition of his many contributions to herpetology and wildlife conservation in general including for example Wells and Wellington (1984, 1985) and Wellington (2015), including his standing up against the reckless taxonomic vandalism of Wolfgang Wüster and his band of thieves who engage in such nefarious practices as stealing wildlife from educational wildlife displays, attacking private property, making threats to kill by telephone, pseudoscience in the form of stealing works of others and acts of taxonomic vandalism in breach of the rules of the ICZN and other acts of scientific fraud as detailed by Goodman (2019), Hoser (2009, 2012a-b, 2013a-b, 2015a-f, 2016, 2019a-b) and sources cited therein. Wellington has also worked extensively in terms of wild life in Thailand, where his contribution has been lengthy, intense and significant.

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A new subspecies of *Tropidonotus* from Morotai Island, Indonesia.

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ABSTRACT

A new subspecies of *Tropidonotus* from Morotai Island, Indonesia is formally described according to the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999). It is similar in most respects to *Tropidonotus truncatus* (Peters, 1863) from the adjacent Halmahera Island, but is separated from that taxon by its significantly higher subcaudal and ventral counts.

Keywords: Taxonomy; reptilia; squamata; nomenclature; snake; Morotai Island; Indonesia; *Tropidoniophis*; *truncatus*; *newsubspecies*; *morotaiensis.*

INTRODUCTION

As part of an audit of the snakes and lizards of the New guinea region, it came to my attention that a specimen of snake assigned by an earlier author (Tanner, 1950) to the species *Tropidonotus truncatus* (Peters, 1863) from Morotai Island, North Maluccas, Indonesia was significantly divergent from that form, even though it is known from an immediately adjacent island (Halmahera).

While there is a deep sea channel between the two islands, they are proximal (about 15 km straight line at the nearest points) and in the absence of molecular data, I would not separate the two at species level. I do note however that sea-depth measurements indicate the two land masses remained separated (just) by sea during the most recent glacial maxima, although it appears (based on extant sea depth maps) this distance was only in the order of 1-2 km in width.

See details at: https://maps.ngdc.noaa.gov/viewers/bathymetry/

Hence the description below of this new subspecies made in accordance with the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

MATERIALS, METHODS AND RESULTS

These are inferred and effectively stated 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.

SUBSPECIES *TROPIDONOPHIS TRUNCATUS MOROTAIENSIS SUBSP. NOV.*

LSIDurn:lsid:zoobank.org:act:8ECEDADE-E075-4A78-BFF0-6A23971CF1D7

Holotype: A preserved specimen at the Brigham Young University, Provo, Utah, United States of America, specimen number BYU 7482 Collected at Morotai Island, North Moluccas, Indonesia. This facility allows access to its holdings.

Diagnosis: *Tropidonotus truncatus morotaiensis subsp. nov.* has until now been treated as an inular race of *Tropidonotus truncatus* (Peters, 1863) originally described from Halmahera Island, (type locality) being adjacent to the south and separated by a straight line distance over water of about 15 km from nearest points on extant islands.

Tropidonotus truncatus morotaiensis subsp. nov. is separated from *T. truncatus* (Peters, 1863) as defined by Boulenger (1893) at page 216 or De Rooij (1915) at pages 77-78 by having 155 ventrals and 48 subcaudals versus 142-149 ventrals and 43 subcaudals in the nominate subspecies.

Tropidonotus truncatus morotaiensis subsp. nov. is further identified by the following suite of characters: Rostral almost as high as broad, visible from above, making a broad straight suture with the internasals, which are smaller than the prefrontals; frontal two-thirds the length of the parietals; loreal as broad as long; 2 pre-oculars and 2 postoculars; temporals 1 + 1; 8 upper and 9 lower labials; 3 lower labials in contact with the first pair of chinshields which are shorter than the posterior pair; 15 rows of mid-body scales; ventrals 155; subcaudals 48 all divided; anal divided.

Color in life is black above except for a reasonably prominent white nuchal band and dark brown on the head; ventral colour is black except for some white mottling on the chin, labial and anterior ventral scales (derived from Tanner, 1950).

Distribution: Known only from Morotai Island, North Moluccas, Indonesia.

Etymology: Named in reflection of where this taxon occurs.

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An overdue break up of the rodent genus *Pseudomys* into subgenera as well as the formal naming of four new species.

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ABSTRACT

An audit of all previously named species and synonyms within the putative genus of Australian mice *Pseudomys* (including genera phylogenetically included within *Pseudomys* in recent studies) found a number of distinctive and divergent species groups.

Some of these groups have been treated by past authors as separate genera (e.g. *Notomys* Lesson, 1842) and others as subgenera (e.g. *Thetomys* Thomas, 1910). Other groups have been recognized (e.g. as done by Ford 2006), but remain unnamed.

This paper assessed the current genus-level classification of all species and assigned them to species groups.

Due to the relatively recent radiation and divergence of most species groups being around the five million year mark (Smissen 2017), the appropriate level of division was found to be subgenera. As a result, eleven subgenera are recognized, with five formally named for the first time in accordance with the rules of the *International Code of Zoological Nomenclature* (Ride *et al*. 1999).

At the species level, four putative species were found to have divergent populations which had not been given taxonomic recognition. Each are formally named as new species on the basis of known morphological and/or genetic divergence. Two new subspecies of Pebble-mound Mouse are also formally named.

Formal description of relevant forms is the critical and most important first step in ensuring the long-term conservation of these potentially vulnerable native forms as previously outlined by Hoser (2019a, 2019b).

Keywords: Mammals; Australia; Muridae; genus; *Pseudomys*; *Ascopharynx*; *Notomys*; *Thetomys*; *Gyomys*; new subgenus; *Eekmys*; *Farkmys*; *Ohmys*; *Oimys*; *Ouchmys*; species; *fumeus*; *oralis*; *shortridgei*; *johnsoni*; new species; *albapes*; *griseorursus*; *pesrosea*; *pellicauda*; new subspecies; *luxauris*; *occultatum*.

INTRODUCTION

The large Australian genus of native rodents in the genus *Pseudomys* Gray, 1832, within the family Muridae was audited over a period of some years.

The purpose of the exercise was to review the classification at the genus-level following on from a number of published phylogenetic studies (e.g. Ford 2006, Smissen 2017, Steppan and Schenk 2017) incorporating this same putative genus and allied putative genera.

The audit of species based on these studies showed that species within the putative genus *Notomys* Lesson, 1842 were nestled within the tree for *Pseudomys*, as were other named groups, most of which have until now been treated as synonyms of *Pseudomys*. See for example Bannister *et al.* (1988).

In terms of the generic arrangement of species within *Pseudomys sensu lato*, type species *Pseudomys australis* Gray, 1832, that there are distinctive species groups beyond those closest to the type species, potentially worthy of genus-level division has been known for decades.

By way of example, Ford (2006) wrote:

"I will begin with a review of species groups that are now firmly established, and build on these as the core units for defining 'sensible' genera within the *Pseudomys* complex. Unfortunately, as is so often the case with murid rodents, the groups outlined here are of roughly equal depth to their radiation and isolation from each other. Thus, there are apparently isolated and problematic species that are not easily assigned to these groups, and this has been one of the persuasive arguments in favour of retaining a larger genus *Pseudomys*. However, each group has a distinct identity, which should be the over-riding argument in favour of their generic recognition, rather than recognition as intrageneric groupings. In either case, resolution of these groupings represents a major step forward in understanding the relationships among these species."

Ford then outlined about nine main species groups and their component species, but did not formally name any.

Within the putative genus of *Pseudomys* some of these groups have been treated by past authors as separate genera (e.g. *Notomys* Lesson, 1842) and others as subgenera (e.g. *Thetomys* Thomas, 1910). Other groups have been recognized (e.g. as done by Ford 2003 and 2006), but remain unnamed.

This study assessed the current genus-level classification of all species and in finality assigned them to relevant species groups, with names also assigned to all.

MATERIALS AND METHODS

Specimens of most species were inspected either live or dead as was all relevant and available literature. This included all previous descriptions of taxa, including known synonyms as cited at the end of this paper. This is an expanded list over and above that published by Bannister *et al.* (1988), that also includes most recently described forms.

Of particular relevance to this review, were phylogenetic and morphological studies that helped identify morphologically similar species and/or those most closely related.

Included in the audit were photos of species with good locality data and distribution maps from State Museums, based on specimens in their collections, noting that for many species, the historical distributions were very different to the extant distributions.

Where available and applicable, fossil specimens and records were also reviewed.

Past descriptions and synonymies were reviewed with a view to using available names for species groups if they had been properly proposed in the past.

Publications relevant to the taxonomic and nomenclatural conclusions in terms of the genus *Pseudomys sensu lato* including all descriptions of all known species, including all known synonyms, include the following: Anstee (1996), ACT TAMS (1999, 2010 and undated), Baverstock *et al.* (1981), Baynes and Jones (1993), Baynes *et al.* (1987), Bennett *et al.* (1991), Braithwaite (1977), Braithwaite and Brady (1993), Brazenor (1934a, 1934b), Breed and Ford (2007), Butler and Merrilees (1971), Carron *et al.* (1990), Cockburn (1978, 1981a, 1981b), Cockburn *et al.* (1995), Cooper (1993), Cooper *et al.* (2003), Dickman and McKechnie (1985), Dickman *et al.* (2000), Dunlop and Pound (1991), Edwards (2009), Finlayson (1932, 1940, 1960), Ford (2006), Ford and Johnson (2007), Ford *et al.* (2003), Fox and Briscoe (1980), Fox *et al.* (1994), Fusco *et al.* (2016), Gould (1842, 1844, 1845, 1853. 1858, 1863), Gray (1832, 1844), Gynther and O'Reilly (1995), Haby and Herpich (2010), Happold (1976), Higgins and Petterd (1844), Hoser (1991), Iredale and Troughton (1934), Jerry *et al.* (1998), Johnson (1959), Jones (1925), Jurskis *et al.* (1997), King (1984), King and Mackowski (1986), Kirkpatrick and Martin (1971), Kitchener (1980, 1985), Kitchener and Humphreys (1986, 1987), Kitchener *et al.* (1985), Krefft (1862), Lee (1995), Lesson (1842), Macak and Menkhorst (2016), Mack (1861), Meek and Triggs (1999), Menkhorst (1995, 2003), Menkhorst and Broome (2008), Menkhorst and Knight (2001), Menkhorst and Seebeck (2001), Moro and Spencer (2003), Ogilby in Anonymous (1838), Poole (1994), Quinlan *et al.* (2004), Read (1993), Read and Tweedie (1996), Ride (1956, 1970), Ride *et al.* (1999), Rowe *et al.* (2008), Salinas (2009), Seebeck and Menkhorst (2000), Schulz and Wilks (2017), Shortridge (1936), Smissen (2017), Start (1996), Start *et al.* (2000), Steppan and Schenk (2017), Strahan (1996), Tate (1951), Thomas (1882, 1902, 1907, 1910a, 1910b, 1921a, 1921b, 1926), Thomas and Dollman (1909), Troughton (1932, 1936, 1937, 1939), Trouessart (1897), Van Dyck and Birch (1996), Wahlquist (2020), Waite (1896, 1898, 1900), Waterhouse (1839, 1843), Watts and Aslin (1981), Wilson *et al.* (1992), Woinarski (1992), Woods and Ford (2000) and sources cited therein.

RESULTS

Studies of Ford (2006), Smissen (2017), Steppan and Schenk (2017) and others as cited by them all confirm that *Pseudomys sensu lato* can be readily divided into about 11 main morphologically distinctive species groups, all divergent from one another about 5 MYA, plus or minus 2 MYA.

Due to the relatively recent radiation and divergence of most species groups being around the five million year mark (Smissen 2017), the appropriate level of division was determined by me to be subgenera.

This is contrary to the position of some mammalogists who as a group tend to split genera more readily than a person who is principally a herpetologist such as myself, who would rarely ever consider splitting reptile genera with a known divergence of less than 10 MYA.

As a result, eleven subgenera are formally recognized herein, with five formally named for the first time in accordance with the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

I have little doubt that a number of mammalogists will decide to elevate subgenera named in this paper to full genus status. The ultimate final position of these groupings will be determined long after I die, if ever.

At the species level, three putative species were found to have divergent populations which had not been given taxonomic recognition. Each are formally named as new species on the basis of known morphological and/or genetic divergence. A fourth population of one of the split species was also determined to be divergent across a known biogeographical barrier affecting similarly habitat constrained taxa and so it too has been formally identified and named as a fourth new species.

Two new subspecies of Pebble-mound Mouse are also formally named. One has until now been treated as the Queensland population of *P. johnsoni* Kitchener, 1985 and the other a Victoria River region (NT) population of *P. johnsoni.*

Formal description of relevant forms is the critical and most important first step in ensuring the long-term conservation of these potentially vulnerable native forms.

While eleven subgenera within *Pseudomys sensu lato* are recognized herein, six, including the nominate one do have available names.

These are as follows:

Pseudomys Gray, 1832, type species: *Pseudomys australis* Gray, 1832.

Notomys Lesson, 1842, type species: *Dipus mitchelli* Ogilby, 1838.

Mastacomys Thomas, 1882, type species: *Mastacomys fuscus* Thomas, 1882.

Ascopharynx Waite, 1900, type species: *Hapalotis cervinus* Gould, 1853.

Thetomys Thomas, 1910, type species: *Mus nanus* Gould, 1858.

Gyomys Thomas, 1910, type species: *Mus novaehollandiae* Waterhouse, 1843.

Five new subgenera are formally named herein according to the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

These are as follows:

Eekmys subgen. nov., type species: *Pseudomys* (*Gyomys*) *occidentalis* Tate, 1951.

Farkmys subgen. nov., type species: *Pseudomys oralis* Thomas, 1921.

Ohmys subgen. nov., type species: *Mus albocinereus* Gould, 1845.

Oimys subgen. nov., type species: *Mus shortridgei* Thomas, 1907.

Ouchmys subgen. nov., type species: *Pseudomys chapmani* Kitchener, 1980.

Furthermore three putative species were found to have divergent populations worthy of taxonomic recognition.

The Hastings River Mouse, originally described as *Pseudomys oralis* Thomas, 1921, herein placed in the subgenus *Farkmys* *subgen. nov.* has also been known to consist of two divergent populations, which also are deeply genetically divergent based on mitochondrial DNA (Smissen 2017). The unnamed northern population is formally named as *P. albapes sp. nov.*.

The Smoky Mouse, originally described as *Pseudomys fumeus* Brazenor, 1934, herein placed in the subgenus *Ohmys subgen. nov.* has long been recognized as having two morphologically divergent, geographically disjunct populations (e.g. Strahan *et al.*, 1988). The western Victorian population carries the species name and so those from the east of Victoria and New South Wales as defined by most authors (e.g. Strahan *et al.* 1988) is the unnamed putative taxon.

However within the so-called eastern population of that species, the northern-most outlier populations in the high country of New South Wales (NSW) and the Australian Capital Territory (ACT) are divergent from the population centred in the Victorian eastern highlands and Gippsland coast region, which are also separated by a significant gap in known distribution. Therefore it too is formally named as a divergent new species.

The unnamed taxon from New South Wales is formally named herein as a new species, *Pseudomys griseorursus sp. nov.*.

The unnamed taxon from Victoria is formally named herein as a new species, *P. pesrosea sp. nov.*.

The Heath Rat, originally described as *Mus shortridgei* Thomas, 1907, herein placed in the newly named subgenus *Oimys subgen. nov.* has long been known to consist of two geographically disjunct populations in historical times. The unnamed eastern form from south-west Victoria, with a divergence estimated by two authors at around 1.4 MYA (+/- 100 K years) is formally named as *P. pellicauda sp. nov.*.

As already mentioned, putative, *Pseudomys johnsoni* Kitchener, 1985 from Queensland is formally named herein as a new subspecies. It is significantly morphologically divergent from the nominate population of *P. johnsoni* in the central Northern Territory. It is also separated by a wide geographical barrier that at present seems to be unpassable for these mice. Noting that both Ford (2006) and more recently Smissen (2017) found very limited genetic divergence between putative species of Pebble-mound mice including *P. johnsoni* herein placed in the subgenus *Ouchmys subgen. nov.*, type species: *Pseudomys chapmani* Kitchener, 1980, and this being in the face of significant morphological divergence, I have taken the conservative position and named the relevant taxon as a subspecies. I note herein that a divergence of this form from the nominate form is likely to be in the range of 1 MYA or possibly far less.

The new form is only represented by four specimens in Australian Museums and this is in spite of a significant collection effort in the area they are known to occur.

A similar situation occurs for the Victoria River region (NT) population variously assigned to *P. johnsoni* or the taxon *P. laborifex* Kitchener and Humphreys, 1986, now treated as synonymous with *P. johnsoni* or a subspecies of it. It is also formally described herein as a new subspecies.

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 (ICZN).

In the unlikely event two or more newly named taxa are deemed to be the same 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 June 2020 (including if also viewed prior), unless otherwise stated and was accurate in terms of the content 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 or fur reaction to chemical or other input.

Unless otherwise stated, all colour descriptions of species refer to outer fur colour and not skin.

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.

The etymology of all five new genus names are similar. All are derived from the verbal responses of native Aboriginals when they set eyes on the said species, with the suffix mys added to them.

These are *Eekmys subgen. nov.*, *Farkmys subgen. nov.*, *Ohmys subgen. nov., Oimys subgen. nov.*, and *Ouchmys subgen. nov.*.

All four species named herein are named based on Latin words used to describe a character state of each as outlined in each of the formal descriptions.

Due to the taxonomic rearrangement of the genus *Pseudomys* in this paper, being made to reflect the phylogenetic reality of the group, the taxon name *Ascopharynx fuscus* Jones, 1925, becomes a junior homonym of *Mastacomys fuscus* Thomas, 1882 and is therefore unavailable to be used in the ongoing genus level arrangement. The next available name for the relevant taxon is *Notomys fuscus eyreius* Finlayson, 1960 and so the relevant taxon is identified elsewhere in this paper as either *Pseudomys eyreius* (Finlayson, 1960) or *P.* (*Notomys*) *eyreius* (Finlayson, 1960).

The name *P. subrufus* (Krefft, 1862) is the correct nomen for the taxon widely known as *P. desertor* Troughton, 1932, which based on current (and accepted herein) taxonomic concepts is a junior synonym of the earlier name. There is no reasonable basis to reverse priority of names as it goes against all published versions of the *International Code of Zoological Nomenclature* and predecessors.

Reversing priority of scientific names is a recipe for nomenclatural anarchy and is something that should only be considered in extreme and unusual cases. This has been the position of the *International Commission of Zoological Nomenclature* (ICZN) since its inception. This is not the case for *P. subrufus* (Krefft, 1862).

CONSERVATION

In terms of conservation of each population of each subgenus or species as described below, the relevant comments in Hoser (1989, 1991, 1993, 1996, 2019a and 2019b) apply.

Wildlife laws as currently enforced in Australia, are not in a materially significant way enhancing the long-term survival prospects of any of the relevant species.

Over breeding of humans and the environmental problems associated with this overpopulation are by far the greatest long term threat to each and every relevant species, noting that already liberated feral pest species continue to cause ongoing stress and decline of some relevant species as explicitly detailed in Hoser (1991).

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.

EEKMYS SUBGEN. NOV.

LSIDURN:LSID:ZOOBANK.ORG:ACT:FBBB6615-C09E-4735-B024-08DE041A7D07

Type species: *Pseudomys* (*Gyomys*) *occidentalis* Tate, 1951.

Diagnosis: The subgenus *Eekmys subgen. nov.* is monotypic for the Western Mouse *Pseudomys* (*Gyomys*) *occidentalis* Tate, 1951.

The subgenus *Gyomys* Thomas, 1910, type species: *Mus novaehollandiae* Waterhouse, 1843 is of a different and divergent lineage within *Pseudomys sensu lato.*

Eekmys subgen. nov. are readily separated from all other *Pseudomys* Gray, 1832 *sensu lato* by the following suite of characters: White paws, dorsum and sides with a mixture of dark grey and yellowish buff fur with black guard hairs. Venter is greyish-white. Head-body length is 90-110 mm (average of 97 mm), tail length is 120-140 (average 129) mm, weight 33-53 (average 34) grams, (derived from Strahan *et al.* 1988).

Distribution: Known only from small remnant bushland reserves in the Western Australian wheat belt.

Etymology: In 1980 I spent time with some local western Australian Aboriginals of the Noongar tribe, from the West Australian wheat belt.

When the women see this species they yell out the word "eek!" Hence the nomen "*Eekmys*".

Content: *Pseudomys* (*Eekmys*) *occidentalis* Tate, 1951.

FARKMYS SUBGEN. NOV.

LSIDURN:LSID:ZOOBANK.ORG:ACT:747DA097-195D-4530-882B-F2E303B25A8B

Type species: *Pseudomys australis oralis* Thomas, 1921.

Diagnosis: Rodents in the subgenus *Farkmys subgen. nov.* are separated from other species within *Pseudomys* Gray, 1832 *sensu lato* by the following suite of characters: Brownish-grey above and buff to greyish-white below. Separated from other rodents of similar size in eastern New South Wales and southern Queensland (where they are found) by having large protruberant eyes, a rounded snout with a "Roman Nose", distinctively white feet, with a slight pinkish tinge on the toes and a tail that is dark above and distinctively separate from the white furred underside. Palatial foramina 7-5. Upper molar series 6-7. Separated from species in the nominate subgenus *Pseudomys* Gray, 1832 by having a proportionately long skull as well as a long and narrow interorbital region that is sharply square edged.

Palatial foramina is proportionately short, not or scarcely penetrating between the molars, versus reaching the middle of molar one in subgenus *Pseudomys.*

Further separated from *Pseudomys* and the other subgenera by having longer and softer hair and lacking a brownish tone to the underside.

Distribution: In recent geological times, the subgenus occurred from north-east Victoria, along the coast of New South Wales to the Sunshine Coast about 100 km north of Brisbane in Queensland, Australia. Molecular evidence suggests more than one identifiable lineage (Smissen 2017), with one of these formally named in this paper.

Etymology: The putative species *P. oralis* was thought to be rare and so when I enlisted Birpai Aboriginal people to assist in finding the taxon near the Hastings River in New South Wales in the winter of 2019 the hunter yelled "fark" when he grabbed for one and it bit him. Hence the derived name "*Farkmys*".

Content: *Pseudomys* (*Farkmys*) *oralis* Thomas, 1921. (type species); *P.* (*Farkmys*) *albapes sp. nov.*

OHMYS SUBGEN. NOV.

LSIDURN:LSID:ZOOBANK.ORG:ACT:32ABDD3C-D0D0-4B15-8604-196EFA69463B

Type species: *Mus albocinereus* Gould, 1845.

Diagnosis: Members of the subgenus *Ohmys subgen. nov.* are readily separated from other members of *Pseudomys* Gray, 1832 *sensu lato* by the following suite of characters, being one or other of:

1/ Hairs soft and fine and 11-12 mm long on back. General colour is blue-grey, under surface is paler grey, the bases of the hairs slaty, the tips greyish-white. Ears are of medium length and greyish. Hands and feet are silvery white. The last hind sole pad is small and round. Tail is longer than head and body, pale brown above, white on the sides and below. Feet, ears and teeth of moderate size (*P. albocinereus* (Gould, 1845), *P. apodemoides* (Finlayson, 1932), *P. glaucus* (Thomas, 1910)), or:

2/ As above, except as follows: Hairs soft and fine and 14-15 mm long on back. Body pale silvery grey, grey, blue-grey or blackish, tail is similar to body in colour on top but with white lateral stripes. Belly is grey to white. Feet are pink with white fur. Feet, ears and teeth are of large size (*P. fumeus* (Brazenor, 1934), *P. griseorursus sp. nov.*, *P. pesrosea sp. nov.*).

Distribution: Hilly parts of Victoria and New South Wales.

Etymology: While hunting a rodent of this genus in the Grampian Ranges in Western Victoria, in late 2014 a member of the Jardwadjali Aboriginal tribe yelled "Oh" as he nearly trod on one by his foot. Hence the name "*Ohmys*".

Content: *P.* (*Ohmys*) *albocinereus* (Gould, 1845) (type species); *P.* (*Ohmys*) *apodemoides* (Finlayson, 1932); *P.* (*Ohmys*) *fumeus* (Brazenor, 1934); *P.* (*Ohmys*) *glaucus* (Thomas, 1910); *P. griseorursus sp. nov.*; *P.* (*Ohmys*) *pesrosea sp. nov.*.

OIMYS SUBGEN. NOV.

LSIDURN:LSID:ZOOBANK.ORG:ACT:E99947D5-E8FE-4962-ACC7-D4228C165E45

Type species: *Mus shortridgei* Thomas, 1907.

Diagnosis: Members of the subgenus *Oimys subgen. nov.* are readily separated from other members of *Pseudomys* Gray, 1832 *sensu lato* by one or other of the following suites of characters:

Chestnut brown or reddish-grey brown above, greyish-white underneath. White upper lip and chin, pale orange eye ring. Tail is brown above and white on lower sides and below. The tail looks scaly with length equal to or shorter than the animal's head-body length. Feet and toes brown, except for toe tips that are whitish. Ears are covered with fine hairs (*P. subrufus* (Krefft, 1862)), or:

Larger species of *Pseudomys*, with a body mass in a range from 55 to 90 grams for an average weight of 70 grams. The head and body length of 95 to 120 millimeters and the tail length of 85 to 100 mm is always proportionally shorter than the body. The pelage is densely furred, grey-brown above and flecked with buff and black and the body is comparatively stocky. The tail is well covered in dark grey or brown hair at the upper side, being a whitish colour below and not annulated as seen in *Rattus* Fischer, 1803 species. There is a broad face and short muzzle, with bulging eyes. Rounded ears are 14 to 16 mm from the notch at the head. Ears are covered with fine hairs (*P. shortridgei* (Thomas, 1907), *P. pellicauda sp. nov.*).

Distribution: The historical (pre European settlement) range of the subgenus was probably drier parts of most of the southern two thirds of Australia, including much of Western Australia and all other mainland states with the possible exception of Queensland. Now, as far as is known the subgenus has an extant and very patchy distribution including south-west Victoria and central Australia, including northern South Australia and the south of the Northern Territory, south-west Western Australia and is not known to exist elsewhere.

Etymology: In 1996, I engaged an Aboriginal from the Bunganditj tribe to assist me in locating a species in this subgenus in heath country in far south-west Victoria. We failed to find any. However I was advised that when they see these rodents they yell out “oi” to alert their friends. Hence the subgenus name “*Oimys*”.

Content: *P.* (*Oimys*) *shortridgei* (Thomas, 1907) (type species); *P.* (*Oimys*) *subrufus* (Krefft, 1862); *P.* (*Oimys*) *pellicauda sp. nov.*.

OUCHMYS SUBGEN. NOV.

LSIDURN:LSID:ZOOBANK.ORG:ACT:DE2A0C64-A0F4-4745-B2B8-C4A715C807DE

Type species: *Pseudomys chapmani* Kitchener, 1980.

Diagnosis: Mice in the subgenus *Ouchmys subgen. nov.*, type species: *Pseudomys chapmani* Kitchener, 1980 are commonly known as the Pebble-mound Mice in reflection of the nesting habits of the known species. Those species carry small stones and pebbles up to half their own weight in their mouths and arrange them in piles, shuffling them into position with their forelimbs. These are at the entrance of shallow burrows, which are sometimes plugged with the stones.

While similar in most respects to mice in the subgenus *Pseudomys* Gray, 1832 *sensu strict*o, species within the subgenus *Ouchmys subgen. nov.* are readily separated from those species (and the other subgenera) by their short tail, ears and feet, with the feet being no longer than 16 mm. Eye is of medium size. Within the subgenus *Gyomys* Thomas, 1910, the species *P. delicatulus* (Gould, 1842) is unusual in that it has similarly short feet.

Ouchmys subgen. nov. are further defined by being yellow-grey, brown or orange above and on the sides, head blackish-brown, paws brown overlain with white, white below, including the throat and upper rear edge of the mouth. Outer inner ear is grey or pink, depending on species and central inner ear is dark greyish pink or light pink. Long hairs are on the outer ear and minimal hair or none inside.

Distribution: Scattered hilly and rocky locations across the top third of Australia, with relevant known species separated by well-established known biogeographical barriers.

Etymology; When in the Pilbara of Western Australia in 1980, searching for Pilbara Death Adders *Acanthophis wellsi* Hoser, 1998, I painfully stubbed my toe on a pile of stones at the edge of a burrow of *P. chapmani* Kitchener, 1980, and screamed “Ouch”. Hence the name “*Ouchmys*”. The local Aboriginals and their heritage had been erased by European invaders, so I was not able to ascertain any Aboriginal name for the species. In 2020 a cave in the Juukan Gorge, was blown up by the Transnational Tax Avoiding Mining Corporation Rio Tinto. The cave contained 40,000 year old Aboriginal paintings (Wahlquist 2020).

Content: *P.* (*Ouchmys*) *chapmani* (Kitchener, 1980) (type species); *P.* (*Ouchmys*) *calabayi* (Kitchener and Humphreys, 1987); *P.* (*Ouchmys*) *johnsoni* (Kitchener, 1985); *P.* (*Ouchmys*) *patrius* (Thomas and Dollman, 1909).

PSEUDOMYS (*FARKMYS*) *ALBAPES SP. NOV.*

LSIDURN:LSID:ZOOBANK.ORG:ACT:18D94630-B4C4-4F0B-890C-F2D2A15C0EC1

Holotype: A preserved female specimen in the Queensland Museum, Brisbane, Queensland, Australia, specimen number JM10958 collected from Gambubal State Forest in south-east Queensland, Australia, Latitude -28.2297 S., Longitude 152.4272 E. This government-owned facility allows access to its holdings.

Paratype: A preserved female specimen in the Queensland Museum, Brisbane, Queensland, Australia, specimen number JM9994 collected from Gambubal State Forest in south-east Queensland, Australia, Latitude -28.25 S., Longitude 152.35 E.

Diagnosis: Until now, *P. albapes sp. nov.* has been treated as a northern population of the Hastings River Mouse, *P. oralis* Thomas, 1921 from northern New South Wales, generally north of the Hunter Valley in wetter areas. *P. albapes sp. nov.* occurs from Washpool National Park in northern New South Wales, north along the coast and nearby highlands to the Sunshine Coast, roughly 100 km north of Brisbane in South-east Queensland.

Genetic studies have shown *P. albapes sp. nov.* to have species-level divergence from *P. oralis.*

The two species form the entirety of the subgenus *Farkmys subgen. nov.* and are morphologically similar.

P. oralis is separated from *P. albapes sp. nov.* by having strongly russet outer hairs in swathes across the upper body, versus not so in *P. albapes sp. nov.*. Under the eye of *P. oralis* is a semi-distinct patch of whitish hair. This patch is yellowish in *P. albapes sp. nov.*.

Rodents in the subgenus *Farkmys subgen. nov.* are separated from other species within *Pseudomys* Gray, 1832 *sensu lato* by the following suite of characters: Brownish-grey above and buff to greyish-white below. Separated from other rodents of similar size in eastern New South Wales and southern Queensland (where they are found) by having large protruberant eyes, a rounded snout with a “Roman Nose”, distinctively white feet, with a slight pinkish tinge on the toes and a tail that is dark above and distinctively separate from the white furred underside. Palatial foramina 7-5, Upper molar series 6-7. Separated from species in the nominate subgenus *Pseudomys* Gray, 1832 by having a proportionately long skull, long and narrow interorbital region that is sharply square edged.

Palatial foramina is proportionately short, not or scarcely penetrating between the molars, versus reaching the middle of molar one in subgenus *Pseudomys*.

Further separated from *Pseudomys* and the other subgenera by having longer and softer hair and lacking a brownish tone to the underside.

P. albapes sp. nov. in life is depicted online at:

https://www.bigvolcano.com.au/stories/mouse/index.html

The type form of *P. oralis* from Mount Royal, NSW in life is depicted online at:

https://www.flickr.com/photos/dougbeckers/3461154326/

and at:

https://www.flickr.com/photos/dougbeckers/3460327815/

Distribution: *P. albapes sp. nov.* is known from Washpool National Park in northern New South Wales, north along the coast and nearby highlands to the Sunshine Coast, roughly 100 km north of Brisbane in South-east Queensland. The species *P. oralis* Thomas, 1921 is known from live specimens south of Washpool National Park in New South Wales, south to the Hunter Valley, with finds of subfossil remains attributed to this species extending south to north-east Victoria.

Etymology: The Latin words “*albapes*” refers to the pale or white feet in this species.

PSEUDOMYS (*OHMYS*) *GRISEORURSUS SP. NOV.*

LSIDURN:LSID:ZOOBANK.ORG:ACT:C49B3034-E109-4781-9421-9B07EF839157

Holotype: A preserved specimen at the Australian National Wildlife Collection, Canberra, ACT, Australia, specimen number: M13231 collected from the Brindabella Ranges, ACT, Australia, Latitude -35.32 S., Longitude 148.83 E. This government-owned facility allows access to its holdings.

Paratypes: Three preserved specimens at the Australian National Wildlife Collection, Canberra, ACT, Australia, specimen numbers: M28451, M28452 and M28453, all collected from Yarrangobilly Caves, Kosciuszko National Park River Walk, NSW, Australia, Latitude -35.7167 S., Longitude 148.5 E.

Diagnosis: Until now, *P. griseorursus sp. nov.* known from the Alpine regions of the Snowy Mountains in New South Wales with a second population in the Brindabella Ranges, west of the City of Canberra in the ACT and *P. pesrosea* from the central eastern Highlands of Victoria and the nearby east Gippsland coast as well as immediately adjacent areas of coastal New South Wales have been treated as eastern populations of the Smoky Mouse

P. fumeus (Brazenor, 1934) with a type locality of the Otway Ranges in south-west Victoria.

That more than one taxon has been lumped in this assemblage has been known for many years. For example Andrew Cockburn in Strahan *et al*. (1988) wrote:

“No formal subspecies have been described but the following types will ultimately warrant distinction on size, cranial and pelage characters: *Pseudomys fumeus* (Western form), west of Melbourne, now only known from the Grampian Ranges. Large more darkly coloured. *Pseudomys fumeus* (Eastern form) east of Melbourne, in sub-fossil deposits in New South Wales. Small, pale, grey.”

The eastern populations also appear to be separated from one another by distribution and morphology and so are also split into two.

The three species *P. fumeus*, *P. griseorursus sp. nov*. and *P. pesrosea* are readily separated from one another as follows:

P. fumeus has dark brownish-grey fur and a light bluish-grey iris. Lightening of the jowls is not obvious The entirety of the inner ear is orange. Average adult size is 90-100 mm, 120-145 mm tail length and 60-90 grams in weight.

P. griseorursus sp. nov. has silver grey fur and a dark iris. Lightening of the jowls is obvious and is not heavily peppered with black. The inner ear is brownish-grey at the outer edges and orange in the interior. Average adult size is 80-90 mm, 100-120 mm tail length and 40-70 grams in weight.

P. pesrosea has grey fur and a dark iris. On the snout between the eyes and the nose are numerous well-defined black tipped hairs. Lightening of the jowls is obvious and heavily peppered with black. The inner ear is brown at the outer edges and orange in the interior. Average adult size is 80-90 mm, 100-120 mm tail length and 40-70 grams in weight.

A photo of *P. fumeus* in life can be found online at:

https://collections.museumsvictoria.com.au/species/8434

A photo of *P. griseorursus sp. nov*. in life can be found at: https://www.environment.nsw.gov.au/news/endangered-kosciuszko-mouse-survives-fires

A photo of *P. pesrosea sp. nov*. in life can be found at:

https://www.researchgate.net/figure/Smoky-Mouse-Pseudomys-fumeus-trapped-at-Mt-Terrible-May-2010-P-Menkhorst_fig1_323866907

and:

https://www.ari.vic.gov.au/research/threatened-plants-and-animals/smoky-mice-movement-across-a-strategic-fuel-break

Members of the subgenus *Ohmys subgen. nov*. are readily separated from other members of *Pseudomys* Gray, 1832 *sensu lato* by the following suite of characters, being one or other of:

1/ Hairs soft and fine and 11-12 mm long on back. General colour is blue-grey, under surface is paler grey, the bases of the hairs slaty, the tips greyish-white. Ears are of medium length and greyish. Hands and feet are silvery white. The last hind sole pad is small and round. Tail is longer than head and body, pale brown above, white on the sides and below. Feet, ears and teeth of moderate size (*P. albocinereus* (Gould, 1845), *P. apodemoides* (Finlayson, 1932), *P. glaucus* (Thomas, 1910)), or:

2/ As above, except as follows: Hairs soft and fine and 14-15 mm long on back. Body pale silvery grey, grey, blue-grey or blackish, tail is similar to body in colour on top but with white lateral stripes. Belly is grey to white. Feet are pink with white fur. Feet, ears and teeth are of large size (*P. fumeus* (Brazenor, 1934), *P. griseorursus sp. nov*., *P. pesrosea sp. nov*.).

Distribution: *P. griseorursus sp. nov*. is known from the Alpine regions of the Snowy Mountains in New South Wales with a second population in the Brindabella Ranges, west of the City of Canberra in the ACT.

Etymology: The species name “*griseorursus*” is taken from the Latin meaning “grey back”, which is a feature separating this taxon from the western form known as *P. fumeus* (Brazenor, 1934).

PSEUDOMYS* (*OHMYS*) *PESROSEA SP. NOV.

LSIDurn:lsid:zoobank.org:act:92514510-1789-437C-A9FD-8DE165556C7B

Holotype: A preserved male specimen at the National Museum of Victoria, Melbourne, Australia, specimen number C26821 collected from 22.7km east of Sheep Yard Flat on Howqua Track, at the Howqua River, in the highlands region of eastern Victoria, Australia, Latitude -37.17 S., Longitude 146.53 E. This government-owned facility allows access to its holdings.

Paratype: A preserved male specimen at the National Museum of Victoria, Melbourne, Australia, specimen number C19176 collected from 13 km south of Mount Howitt on Butcher Country Spur Track, in the highlands region of eastern Victoria, Australia, Latitude -37.3 S., Longitude 146.65 E.

Diagnosis: Until now, *P. griseorursus sp. nov*. known from the Alpine regions of the Snowy Mountains in New South Wales with a second population in the Brindabella Ranges, west of the City of Canberra in the ACT and *P. pesrosea* from the central eastern Highlands of Victoria and the nearby east Gippsland coast as well as immediately adjacent areas of coastal New South Wales have been treated as eastern populations of the Smoky Mouse *P. fumeus* (Brazenor, 1934) with a type locality of the Otway Ranges in south-west Victoria.

That more than one taxon has been lumped in this assemblage has been known for many years. For example Andrew Cockburn in Strahan *et al*. (1988) wrote:

“No formal subspecies have been described but the following types will ultimately warrant distinction on size, cranial and pelage characters: *Pseudomys fumeus* (Western form), west of Melbourne, now only known from the Grampian Ranges. Large more darkly coloured. *Pseudomys fumeus* (Eastern form) east of Melbourne, in sub-fossil deposits in New South Wales. Small, pale, grey.”

The eastern populations also appear to be separated from one another by distribution and morphology and so are also split into two.

The three species *P. fumeus*, *P. griseorursus sp. nov*. and *P. pesrosea* are readily separated from one another as follows:

P. fumeus has dark brownish-grey fur and a light bluish-grey iris. Lightening of the jowls is not obvious The entirety of the inner ear is orange. Average adult size is 90-100 mm, 120-145 mm tail length and 60-90 grams in weight.

P. griseorursus sp. nov. has silver grey fur and a dark iris. Lightening of the jowls is obvious and is not heavily peppered with black. The inner ear is brownish-grey at the outer edges and orange in the interior. Average adult size is 80-90 mm, 100-120 mm tail length and 40-70 grams in weight.

P. pesrosea has grey fur and a dark iris. On the snout between the eyes and the nose are numerous well-defined black tipped hairs. Lightening of the jowls is obvious and heavily peppered with black. The inner ear is brown at the outer edges and orange in the interior. Average adult size is 80-90 mm, 100-120 mm tail length and 40-70 grams in weight.

A photo of *P. fumeus* in life can be found online at:

https://collections.museumsvictoria.com.au/species/8434

A photo of *P. griseorursus sp. nov*. in life can be found at: https://www.environment.nsw.gov.au/news/endangered-kosciuszko-mouse-survives-fires

A photo of *P. pesrosea sp. nov*. in life can be found at:

https://www.researchgate.net/figure/Smoky-Mouse-Pseudomys-fumeus-trapped-at-Mt-Terrible-May-2010-P-Menkhorst_fig1_323866907

and:

https://www.ari.vic.gov.au/research/threatened-plants-and-animals/smoky-mice-movement-across-a-strategic-fuel-break

Members of the subgenus *Ohmys subgen. nov*. are readily separated from other members of *Pseudomys* Gray, 1832 *sensu lato* by the following suite of characters, being one or other of:

1/ Hairs soft and fine and 11-12 mm long on back. General colour is blue-grey, under surface is paler grey, the bases of the hairs slaty, the tips greyish-white. Ears are of medium length and greyish. Hands and feet are silvery white. The last hind sole pad is small and round. Tail is longer than head and body, pale brown above, white on the sides and below. Feet, ears and teeth of moderate size (*P. albocinereus* (Gould, 1845), *P. apodemoides* (Finlayson, 1932), *P. glaucus* (Thomas, 1910)), or:

2/ As above, except as follows: Hairs soft and fine and 14-15 mm long on back. Body pale silvery grey, grey, blue-grey or blackish, tail is similar to body in colour on top but with white lateral stripes. Belly is grey to white. Feet are pink with white fur. Feet, ears and teeth are of large size (*P. fumeus* (Brazenor, 1934), *P. griseorursus sp. nov.*, *P. pesrosea sp. nov.*).

Distribution: *P. pesrosea* appears to be restricted to the central eastern Highlands of Victoria and the nearby east Gippsland coast as well as immediately adjacent areas of coastal New South Wales.

Etymology: The new species name "*pesrosea*" comes from the Latin meaning foot is pink.

PSEUDOMYS (*OIMYS*) *PELLICAUDA SP. NOV.*

LSIDURN:LSID:ZOOBANK.ORG:ACT:4681F91D-EC3F-4612-89A8-1BFC3F614681

Holotype: A preserved female specimen at the National Museum of Victoria, Melbourne, Australia, specimen number C24361 collected from 13.3 km north east of Dartmoor, Victoria, Australia, Latitude -37.83 S., Longitude 141.37 E.

This government-owned facility allows access to its holdings.

Paratype: A preserved female specimen (skin and skeleton) at the National Museum of Victoria, Melbourne, Australia, specimen number C16137 collected from 17 km west of Casterton, Victoria, Australia, Latitude -37.6 S., Longitude 141.2 E.

Diagnosis: Until now the species *P. pellicauda* known only from heathlands in far south-west Victoria and potentially immediately adjacent parts of far south-east South Australia, has been treated as an east Australian population of the Heath Rat *P. shortridgei* (Thomas, 1907) from south-west Australia.

Cooper *et al.* (2013) asserted eastern and western populations of putative *P. shortridgei* separated "following the last glacial just a few thousand years ago".

However they also cited a mtDNA sequence divergence of about 2.6 per cent which contradicts their assertion.

Such divergence implies a separation of populations of about 1.3 MYA which for small rapidly evolving species such as mice is a species-level divergence.

Salinas *et al.* (2009) also wrote:

"As a result of these findings, we suggest that the heath mouse comprises two highly divergent (but genetically diverse) lineages and the aridity of the Nullabor Plain has clearly been a barrier for dispersals since the early Pleistocene (~1.43 million years ago). The populations either side of the Nullarbor Plain are genetically differentiated and should be defined as separate Evolutionary Significant Units (ESUs)."

In other words they clearly need taxonomic recognition as done herein.

The two species are readily separated as follows: *P. shortridgei* has light brown fur on top, with dark grey peppering underneath, becoming greyish on the flanks and anterior snout. Outer inner ear is yellow.

By contrast *P. pellicauda* has dark brown fur on top, with darker brown peppering underneath and overall with a strong russet tinge. It also has noticeably darker brown fur on the head and snout (versus the body). Outer inner ear is brown.

A photo of *P. pellicauda* in life can be found online at:

https://www.flickr.com/photos/160417453

A photo of *P. shortridgei* in life can be found online at:

https://www.agefotostock.com/age/en/Stock-Images/Rights-Managed/UIG-961-24-hrd00332

Members of the subgenus *Oimys subgen. nov.* are readily separated from other members of *Pseudomys* Gray, 1832 *sensu lato* by one or other of the following suites of characters:

Chestnut brown or reddish-grey brown above, greyish-white underneath. White upper lip and chin, pale orange eye ring. Tail is brown above and white on lower sides and below. The tail looks scaly with length equal to or shorter than the animal's head-body length. Feet and toes brown, except for toe tips that are whitish. Ears are covered with fine hairs (*P. subrufus* (Krefft, 1862)), or:

Larger species of *Pseudomys*, with a body mass in a range from 55 to 90 grams for an average weight of 70 grams. The head and body length of 95 to 120 millimeters and the tail length of 85 to 100 mm is always proportionally shorter than the body. The pelage is densely furred, grey-brown above and flecked with buff and black and the body is comparatively stocky. The tail is well covered in dark grey or brown hair at the upper side, and a whitish colour below and not annulated as seen in *Rattus* Fischer, 1803 species. There is a broad face and short muzzle, with bulging eyes. Rounded ears are 14 to 16 mm from the notch at the head. Ears are covered with fine hairs (*P. shortridgei* (Thomas, 1907), *P. pellicauda sp. nov.*).

Distribution: The species *P. pellicauda* is known only from heathlands in far south-west Victoria and potentially immediately adjacent parts of far south-east South Australia.

In the recent geological past, both *P. pellicauda* and *P. shortridgei* had a wider distribution, straddling either side of the Nullabor as detailed in Cooper *et al.* (2003).

Etymology: The new species name "*pellicauda*" literally means hairy tail.

PSEUDOMYS (*OUCHMYS*) *JOHNSONI LUXAURIS SUBSP. NOV.*

LSIDURN:LSID:ZOOBANK.ORG:ACT:39CE3A41-D0DF-46C9-BBF7-E910C8A13024

Holotype: A preserved female specimen in the Queensland Museum, Brisbane, Queensland, Australia, specimen number: JM10866 collected from Maronan Station, via Cloncurry, north-west Queensland, Latitude -21.1728 S., Longitude 140.9141 E. This government-owned facility allows access to its holdings.

Paratypes: Two preserved specimens in the Queensland Museum, Brisbane, Queensland, Australia, specimen numbers: JM10867 and JM10868 collected from Maronan Station, via Cloncurry, north-west Queensland, Latitude -21.1728 S., Longitude 140.9141 E, and one preserved specimen in the Queensland Museum, Brisbane, Queensland, Australia, specimen number: JM14557 collected from 7 km west of Cloncurry on the Barkley Highway, north-west Queensland, Latitude -20.7 S., Longitude 140.5 E.

Diagnosis: The taxon herein named as *Pseudomys johnsoni luxauris subsp. nov.* has been treated by mammalogists as either an eastern population of *P. johnsoni* Kitchener, 1985 (e.g. the type material records in the Qld Museum) or as an undescribed form (e.g. Start 1996).

Start (1996), wrote:

"An undescribed *Pseudomys* species builds pebble mounds in the Cloncurry - Mt Isa area of north-western Queensland. It is not *P. johnsoni*, as stated in van Dyck (1996) (van Dyck and Birch 1996, van Dyck personal communication)."

Ford (2003), similarly wrote:

"Populations of mice from the Mt Isa-Cloncurry region of western Queensland were initially thought to be *P. johnsoni* by Van Dyck (pers comm), but he later (van Dyck and Birch, 1996, Van Dyck 1997) regarded them as an undescribed species."

It is clearly morphologically divergent from nominate *P. johnsoni* to be worthy of taxonomic recognition, especially in light of wide geographical discordance between the two populations.

Nominate *P. johnsoni* is a north-central Australian form, extending to Western Australia, while *P. johnsoni luxauris subsp.*

nov. is apparently confined to the elevated rocky region between Camooweal in the west and near Cloncurry in the East, all in Queensland. Between these areas is a large expanse of relatively flat black soil plains, which no doubt forms a barrier between movement between these areas for the relevant species.

P. johnsoni luxauris subsp. nov. is readily separated from all of nominate *P. johnsoni johnsoni*, treated herein as including *Pseudomys laborifex* Kitchener and Humphreys, 1986, from the Kimberley district of Western Australia), *P. chapmani* Kitchener, 1980 from the Pilbara in Western Australia as well as south of there, *P. calabayi* Kitchener and Humphreys, 1987 from near Darwin in the NT and hilly areas east of there, including the Arnhem Land Escarpment and *P. patrius* (Thomas and Dollman, 1909) from north-east Queensland by the following unique suite of characters: Orange fur, versus brown, grey or yellow in all other species, a dark beetroot brown iris and an inner ear that is light pink in colour, including the outer edges, versus not so in all other species except in putative *P. laborifex.*

Dark blackish grey peppering on the dorsum is prominent in *P. johnsoni luxauris subsp. nov.* due to the relatively light colour of the fur.

Hair on the forefeet of *P. johnsoni luxauris subsp. nov.* is whitish orange versus whitish or whitish grey in all other species.

Photos of *P. johnsoni luxauris subsp. nov.* in life can be found online at:

https://www.flickr.com/photos/ryanfrancis/16974339001/

and at:

https://www.flickr.com/photos/ryanfrancis/16787825660/

P. johnsoni occultatum subsp. nov. formally described below is a subspecies from the Victoria River District of the Northern Territory. It is separated from *P. johnsoni* and *P. laborifex* (as originally identified by the describers), as well as *P. johnsoni luxauris subsp. nov.* by the following suite of characters: Brownish fur on the dorsum versus yellowish brown in *P. laborifex* and brownish grey in nominate *P. johnsoni.* Inner ear is light orange with the outer areas having scattered grey peppering, versus absent in *P. laborifex* and an area of thick charcoal grey in the outer region of the inner ear in *P. johnsoni.*

Mice in the subgenus *Ouchmys subgen. nov.*, type species: *Pseudomys chapmani* Kitchener, 1980 (including all species mentioned previously in this description) are commonly known as the Pebble-mound Mice in reflection of the nesting habits of the known species. Those species carry small stones and pebbles up to half their own weight in their mouths and arrange them in piles, shuffling them into position with their forelimbs. These are at the entrance of shallow burrows, which are sometimes plugged with the stones.

While similar in most respects to mice in the subgenus *Pseudomys* Gray, 1832 *sensu strict*o*,* species within the subgenus *Ouchmys subgen. nov.* are readily separated from those species (and the other subgenera) by their short tail, ears and feet, with the feet being no longer than 16 mm. Eye is of medium size. Within the subgenus *Gyomys* Thomas, 1910, the species *P. delicatulus* (Gould, 1842) is unusual in that it has similarly short feet. *Ouchmys subgen. nov.* are further defined by being yellow-grey, brown or orange above and on the sides, head blackish-brown, paws brown overlain with white, white below, including the throat and upper rear edge of the mouth. Outer inner ear is grey or pink, depending on species and central inner ear is dark greyish pink or light pink. Long hairs are on the outer ear and minimal hair or none inside.

Distribution: *P. johnsoni luxauris* is apparently confined to the elevated rocky region between Camooweal in the west and near Cloncurry in the East, all in Queensland.

Etymology: The new subspecies name "*luxauris*" literally means "light ear" in reflection of that fact that this newly named subspecies is separated from the nominate species and other closely related species in the subgenus by the lighter colour of the inner ear.

PSEUDOMYS* (*OUCHMYS*) *JOHNSONI OCCULTATUM SUBSP. NOV.

LSIDURN:LSID:ZOOBANK.ORG:ACT:67791393-03E2-4ECB-B62B-36FB02698667

Holotype: A preserved specimen at the Museum and Art Gallery of the Northern Territory, Darwin. Northern Territory, Australia, specimen number: U4897 collected from the Wickham River in the Gregory National Park, Northern Territory, Latitude -16.6 S., Longitude 130.45 E. This government-owned facility allows access to its holdings.

Paratypes: Six preserved specimens at the Museum and Art Gallery of the Northern Territory, Darwin. Northern Territory, Australia, specimen numbers: U4898, U4899, U4900, U4901, U4902 and U4903 collected from the Wickham River in the Gregory National Park, Northern Territory, Latitude -16.6 S., Longitude 130.45 E.

Diagnosis: *P. johnsoni occultatum subsp. nov*. has until now been treated as a population of *P. johnsoni* Kitchener, 1985 or alternatively of *P. laborifex* Kitchener and Humphreys, 1986, a taxon since synonymised at the species level with *P. johnsoni* Kitchener, 1985 based on the findings of Ford (2003 and 2006).

However all three of *P. johnsoni occultatum subsp. nov.*, nominate *P. johnsoni* and *P. laborifex* were shown by Ford to be three recently divergent lineages worthy of taxonomic recognition, leading to the formal description herein.

P. johnsoni occultatum subsp. nov. is separated from *P. johnsoni* and *P. laborifex* (as originally identified by the describers) by the following suite of characters: Brownish fur on the dorsum versus yellowish brown in *P. laborifex* and brownish grey in nominate *P. johnsoni.* Inner ear is light orange with the outer areas having scattered grey peppering, versus absent in *P. laborifex* and an area of thick charcoal grey in the outer region of the inner ear in *P. johnsoni.*

P. johnsoni luxauris subsp. nov. from the Cloncurry/Mount Isa area of Queensland is readily separated from all of nominate *P. johnsoni johnsoni*, treated herein as including *Pseudomys laborifex* Kitchener and Humphreys, 1986, from the Kimberley district of Western Australia and *P. johnsoni occultatum subsp. nov*. from north-west Northern Territory, *P. chapmani* Kitchener, 1980 from the Pilbara in Western Australia as well as south of there, *P. calabayi* Kitchener and Humphreys, 1987 from near Darwin in the NT and hilly areas east of there, including the Arnhem Land Escarpment and *P. patrius* (Thomas and Dollman, 1909) from north-east Queensland by the following unique suite of characters: Orange fur, versus brown, grey or yellow in all other species, a dark beetroot brown iris and an inner ear that is light pink in colour, including the outer edges, versus not so in all other species except in putative *P. laborifex.*

Dark blackish grey peppering on the dorsum is prominent in *P. johnsoni luxauris subsp. nov.* due to the relatively light colour of the fur.

Hair on the forefeet of *P. johnsoni luxauris subsp. nov.* is whitish orange versus whitish or whitish grey in all other species.

Photos of *P. johnsoni luxauris subsp. nov.* in life can be found online at:

https://www.flickr.com/photos/ryanfrancis/16974339001/

and at:

https://www.flickr.com/photos/ryanfrancis/16787825660/

Mice in the subgenus *Ouchmys subgen. nov.*, type species: *Pseudomys chapmani* Kitchener, 1980 (including all species mentioned previously in this description) are commonly known as the Pebble-mound Mice in reflection of the nesting habits of the known species. Those species carry small stones and pebbles up to half their own weight in their mouths and arrange them in piles, shuffling them into position with their forelimbs. These are at the entrance of shallow burrows, which are sometimes plugged with the stones.

While similar in most respects to mice in the subgenus *Pseudomys* Gray, 1832 *sensu strict*o*,* species within the subgenus *Ouchmys subgen. nov.* are readily separated from those species (and the other subgenera) by their short tail, ears and feet, with the feet being no longer than 16 mm. Eye is of medium size. Within the subgenus *Gyomys* Thomas, 1910, the species *P. delicatulus* (Gould, 1842) is unusual in that it has similarly short feet.

Ouchmys subgen. nov. are further defined by being yellow-grey, brown or orange above and on the sides, head blackish-brown, paws brown overlain with white, white below, including the throat and upper rear edge of the mouth. Outer inner ear is grey or pink, depending on species and central inner ear is dark greyish pink or light pink. Long hairs are on the outer ear and minimal hair or none inside.

Distribution: *P. johnsoni occultatum subsp. nov.* are apparently confined to the Victoria River District of the Northern Territory.

Etymology: The new subspecies name "*occultatum*" comes from the Latin word meaning hidden. This taxon has been largely hidden from science until now, save for its initial identification as a separate and genetically distinctive lineage by Ford (2003).

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CONFLICTS OF INTEREST

None.

SPECIES LIST GENUS *PSEUDOMYS* GRAY, 1832 (BY SUBGENERA)

***Pseudomys* Gray, 1832.**
P. australis Gray, 1832 (monotypic).
***Notomys* Lesson, 1842.**
P. mitchelli (Ogilby, 1838) (type species).
P. alexis (Thomas, 1922)
P. aquilo (Thomas, 1921)
P. eyreius (Finlayson, 1960)
P. mordax (Thomas, 1922)
***Mastacomys* Thomas, 1882.**
P. fuscus (Thomas, 1882) (monotypic).
***Ascopharynx* Waite, 1900.**
P. cervinus (Gould, 1853) (type species).
P. amplus (Brazenor, 1936)
P. macrotis (Thomas, 1921)
P. longicaudatus (Gould, 1844)
***Thetomys* Thomas, 1910.**
P. nanus (Gould, 1858) (type species).
P. gracilicaudatus (Gould, 1845)
***Gyomys* Thomas, 1910.**
P. novaehollandiae (Waterhouse, 1843) (type species).
P. bolami (Troughton, 1932)
P. delicatulus (Gould, 1842)
P. fieldi (Waite, 1896)
P. hermannsburgensis (Waite, 1896)
P. higginsi (Trouessart, 1897)
P. pilligaensis Fox and Briscoe, 1980
P. praeconis (Thomas, 1910).
Eekmys subgen. nov.
P. occidentalis (Tate, 1951) (monotypic).
Farkmys subgen. nov.
P. oralis (Thomas, 1921) (type species)
P. albapes sp. nov.
Ohmys subgen. nov.
P. albocinereus (Gould, 1845) (type species)
P. apodemoides (Finlayson, 1932)
P. fumeus (Brazenor, 1934)
P. glaucus (Thomas, 1910)
P. griseorursus sp. nov.
P. pesrosea sp. nov.
Oimys subgen. nov.
P. shortridgei (Thomas, 1907) (type species).
P. subrufus (Krefft, 1862)
P. pellicauda sp. nov.
Ouchmys subgen. nov.
P. chapmani (Kitchener, 1980) (type species).
P. calabayi (Kitchener and Humphreys, 1987)
P. johnsoni (Kitchener, 1985)
P. patrius (Thomas and Dollman, 1909)

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An overdue break-up of the genus *Pogonomys* Milne-Edwards, 1877 (Mammalia: Muridae) into two genera and the formal naming of five long overlooked species.

LSIDURN:LSID:ZOOBANK.ORG:PUB:33BC1FC2-DC2E-49EB-8003-1DD4E3528194

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ABSTRACT

An audit of all previously named species and synonyms within the putative genus of mainly New Guinean prehensile tailed mice *Pogonomys* Milne-Edwards, 1877 found a number of distinctive and divergent species that were not yet recognized by science.

Five species were recognized by most authorities as of early 2020.

A sixth species, *Mus mollipilosus* Peters and Doria, 1881, is resurrected from the synonymy of *Pogonomys macrourus* Milne-Edwards, 1877 on the basis of dentition and body form.

Five species and two other subspecies are formally named for the first time in this paper, including one newly named species based on a pair of Holocene age upper and lower left molar teeth collected in Irian Jaya.

The divergent lineage including *P. loriae* Thomas, 1897, *P. mollipilosus* (Peters and Doria, 1881), *P. fergussoniensis* Laurie, 1952 and four closely related taxa that are newly named are also placed in a newly erected and named genus *Macropogonomys gen. nov.*.

Scientific description of relevant forms is the critical and most important first step in ensuring the long-term conservation of these potentially vulnerable native forms as previously outlined by Hoser (2019a, 2019b).

Keywords: Mammals; Australia; New Guinea; Indonesia; Papua; Rat; Muridae; genus; *Pogonomys*; species; *championi*; *fergussoniensis*; *loriae*; *macrourus*; *mollipilosus*; *sylvestris*; *dryas*; new genus; *Macropogonomys*; new species; *maxhoseri*; *mickpughi*; *mippughae*; *aplini*; *sharonhoserae*; new subspecies; *blacki*; *gedyei*.

INTRODUCTION

The large, mainly from New Guinea genus of native rodents in the genus *Pogonomys* Milne-Edwards, 1877 has for many years been known to have underestimated species-level diversity.

These are iconic rodents on the basis of their relatively large size and long prehensile tail.

In the 30 years preceding the publication of this paper, a number of scientists had claimed to be working on revisions of this genus, with a view improving the taxonomy.

However this has not occurred and in the process of my own works on other species from the New Guinea bioregion over this same time frame, it has been abundantly clear that the genus *Pogonomys* is well overdue for a major taxonomic revision.

This need has become more urgent as it has become increasingly evident that introduced rodents that are commensally cohabiting with humans have been aggressively displacing *Pogonomys* within Australia's wet tropics and it is reasonable to infer a similar fate awaits New Guinea populations that are facing an ever increasing suite of human threats.

Almost without exception, these threats arise due to the pressure of increasing human populations throughout New Guinea combined with the indirect pressure of increasing human numbers outside of the immediate area, causing a drain on resources within the New Guinea area.

This drainage on resources manifests in mining operations, deforestation, introduced plants and animals, including predatory species such as cats and other rodents, pathogens, poisoned water sources and so on (see also Fusco *et al.* 2016; Hoser 1989, 1991, 1993, 1995, 1996, 2019a, 2019b, Wilson *et al.* 1992).

The basis of this paper was an audit of the genus and species-level taxonomy of the putative genus *Pogonomys*, following on from a number of studies either on this genus directly, or inadvertently including members of it as part of other studies.

This study assessed the current genus-level classification of all species and in finality assigned them to relevant species groups, with names also assigned to all, although I should hastily add that further species do await formal description, even after publication of this paper.

MATERIALS AND METHODS

Specimens of most species were inspected either live, dead or by way of quality photos of type material, as was all relevant and available literature.

This included all previous descriptions of taxa, including known synonyms as cited at the end of this paper.

Of particular relevance to this review, were phylogenetic and morphological studies that helped identify morphologically similar species and/or those most closely related.

Included in the audit were photos of species with good locality data and distribution maps from State Museums, based on specimens in their collections, noting that for many species, the historical distributions were very different to the extant distributions.

Where available and applicable, fossil specimens and records were also reviewed.

Past descriptions and synonymies were reviewed with a view to using available names for species groups if they had been properly proposed in the past.

Publications relevant to the taxonomic and nomenclatural conclusions in terms of the genus *Pogonomys sensu lato* including all descriptions of all known species, including all known synonyms, include the following: Aplin and Opiang (2011), Aplin *et al.* (1993, 1999), Bannister *et al.* (1988), Baverstock *et al.* (1981), Blyth (1859), Breed and Ford (2007), Bryant (2013), Dennis and Menzies (1979), Dollman (1930), Ellerman (1941), Fill *et al.* (2013), Ford (2003, 2006), Flannery (1988, 1995a, 1995b), Fusco *et al.* (2016), Helgen (2007), Helgen *et al.* (2008), Laurie (1952), Laurie and Hill (1954), Lee (1995), Lidicker and Ziegler (1968), Menkhorst and Knight (2001), Milne-Edwards (1868, 1877), Musser (1981), Musser and Carleton (1993, 2005), Pacifici *et al.* (2013), Peters (1868), Peters and Doria (1881), Ride *et al.* (1999), Rothschild and Dollman (1933), Rowe *et al.* (2008), Rummler (1938), Smissen (2017), Steppan and Schenk (2017), Strahan (1988), Tate (1936, 1951), Tate and Archbold (1935), Taylor *et al.* (1982, 1985), Thomas (1895, 1896, 1888, 1897, 1904, 1908, 1920, 1921, 1922a, 1922b), Van Dyck (1986), Walker (1983), Watts and Aslin (1981), Wilson and Reeder (1993, 2005), Wilson *et al.* (1992), Winter and Whitford (1995), Ziegler (1982), and sources cited therein.

RESULTS

Phylogenetic studies, including that of Steppan and Schenk (2017) and others as cited by them all confirm that *Pogonomys sensu lato* can be readily divided into two main morphologically divergent lineages at the genus level.
One of these lineages is unnamed and so it is formally named within this paper for the first time.

The new genus *Macropogonomys gen. nov.* with the type species *Macropogonomys maxhoseri sp. nov.* includes all species associated with the better-known *Pogonomys loriae* Thomas, 1897.

These are the species with generally enlarged molars and of greater body size.

At the species level, a number of putative species within *Pogonomys sensu lato* were found to have divergent populations which had not been given taxonomic recognition.

Some of these populations had been previously flagged as divergent by earlier authors, but not named since and to that extent I cannot claim actual first recognition or discovery of the differences between all relevant populations, even though I am the first to formally name them.

Each new species is formally named as a new species on the basis of known morphological and/or genetic divergence.

Ignoring synonym names as listed in the previously listed references, there are six recognized species within *Pogonomys sensu lato* predating the publishing of this paper, which are agreed by myself and as follows:

Pogonomys macrourus Milne-Edwards, 1877 (type for genus)

P. championi Flannery, 1988

P. fergussoniensis Laurie, 1952

P. loriae Thomas, 1897

P. mollipilosus (Peters and Doria, 1881)

P. sylvestris Thomas, 1920

The species *P. loriae* Thomas, 1897, *P. fergussoniensis* Laurie, 1952 and *P. mollipilosus* (Peters and Doria, 1881) are the relevant species that are transferred to the new genus *Macropogonomys gen. nov.*, along with four other newly named species.

A new species associated with *P. sylvestris* Thomas, 1920 and the similar *P. championi* Flannery, 1988 is also formally named as *P. sharonhoserae sp. nov.*.

Mus mollipilosus Peters and Doria, 1881 (holotype specimen MSNG 3491, at The Museo Civico di Storia Naturale di Genova, Genoa, Italy), since placed in the genus *Pogonomys*, but herein transferred to *Macropogonomys gen. nov.* is treated as being a valid species associated with *Pogonomys loriae* Thomas, 1897 (also transferred to *Macropogonomys gen. nov.*) on the basis of dentition (large teeth, versus small in others in the genus) as reported by Helgen (2007) and Helgen *et al.* (2008).

Other authors including Musser and Carleton (1993, 2005) synonymised *P. mollipilosus* (as identified by them) with *P. macrourus* on the basis of where it was found, being a lowland area, with *P. loriae* (as identified by them) generally regarded as a species of the mid-to upper altitudes.

Dentition of the holotype of *Macropogonomys mollipilosus* excludes the possibility that it and *P. macrourus* are conspecific.

Because dorsal colouration of this form is radically different from that of the type form of *M. loriae* Thomas, 1897, including specimens from both east, west and north of where the holotype of *P. mollipilosus* was collected and also differs in colouration from Australian "*Pogonomys*" herein formally named as *M. maxhoseri sp. nov.*, all three are herein treated as different species, this being the only obvious conclusion available.

See also confirmation of this view, via mtDNA results in Bryant (2013) at page 265 or via a second analysis on page 267.

M. mollipilosus is separated from *M. loriae* by having a face of the same colour to body, not one that is slightly lighter and by being of a reddish-brown on the dorsum, versus being a slaty grey colour with just a tinge of buff.

M. maxhoseri sp. nov. has been treated in the literature as *M. mollipilosus* (e.g. Dennis and Menzies 1979, or Strahan 1988) but differs from that species on the basis of colouration and biology. *M. mollipilosus* and the distantly related *P. macrourus* are superficially similar in that they both have brilliant light rufous fur, versus not so in *M. maxhoseri sp. nov.*.

M. mollipilosus and *M. maxhoseri sp. nov.* are both more stout in build than *P. macrourus.*

M. mollipilosus and *M. macrourus* are both inhabitants of lowland regions, including drier habitats, whereas *M. maxhoseri sp. nov.* is strictly confined to wetter uplands and immediately adjacent rainforests, although this does include lowland rainforests.

The following taxa, *P. lepidus* Thomas, 1897, *P. lepidus huon*, Tate and Archbold, 1935 and

P. lepidus derimapa, Tate and Archbold, 1935 are all tentatively regarded as synonyms of *P. macrourus*, although I note that the putative Weyland Mountains taxon *P. lepidus derimapa* is larger and more robust than those east of there and may in fact warrant resurrection as a subspecies or species at a later time.

P. dryas Thomas, 1904, from not far north of Port Moresby, Papua New Guinea is regarded as a junior synonym of *M. loriae* with a type locality of being from not far south of the Papua New Guinea capital city.

Morphologically divergent species within the genus *Chiruromys* Thomas, 1888 (originally coined as a subgenus) are all accepted as valid and within the separate genus. These are: The Greater Tree Mouse, *Chiruromys forbesi* (Thomas, 1888), Lamia, *Chiruromys lamia* (Thomas, 1897) (with *Chiruromys kagi* Tate, 1951 treated herein as a junior synonym) and the Lesser Tree Mouse, *Chiruromys vates* (Thomas, 1908).

The species newly named in this paper are as follows:

M. maxhoseri sp. nov. is the species from north Queensland, Australia, which has been variously treated as *M. mollipilosus* (see above), which as a pair are separated from *M. loriae* and most closely associated species by not being blackish or extremely dark in dorsal colouration. *M. maxhoseri sp. nov.* and *M. mollipilosus* are separated from one another by fur colour as detailed in the descriptions in this paper. *M. maxhoseri sp. nov.* is further split into a total of three subspecies, that are reproductively isolated from one another by well known biogeographic barriers and morphologically divergent.

P. sharonhoserae sp. nov. is the name assigned to a western population until now treated as putative *P. sylvestris* from western New Guinea (Indonesia).

Macropogonomys mickpughi sp. nov. is the grey bellied taxon until now referred to as a form of *M. loriae* (now also *Macropogonomys gen. nov.*) from the Eastern Highlands region of New Guinea.

M. mippughae sp. nov. is a lighter coloured taxon until now referred to *P. loriae* (now also *Macropogonomys gen. nov.*) from the ranges in northern New Guinea.

M. aplini sp. nov. is a new taxon described from an upper and lower left molar teeth (2 in total) found in Western New Guinea with different dentition (tooth structure) to any currently known form. The bones are of Holocene age and the taxon may still be extant in the relevant part of Western New Guinea (Indonesia).

It is hoped that by formally naming the taxon, living specimens may yet be discovered and properly managed, before they otherwise get wiped out through the ongoing habitat destruction in the region.

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 (ICZN).

In the unlikely event two or more newly named taxa are deemed to be the same 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 June 2020 (including if also viewed prior), unless otherwise stated and was accurate in terms of the content 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 or fur reaction to chemical or other input.

Unless otherwise stated, all colour descriptions of species refer to outer fur colour and not skin.

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.

CONSERVATION

In terms of conservation of each population of each subgenus or species as described below, the relevant comments in Hoser (1989, 1991, 1993, 1995, 1996, 2019a and 2019b) apply.

Wildlife laws as currently enforced in Australia, Papua New Guinea and Indonesia, are not in a materially significant way enhancing the long-term survival prospects of any of the relevant species.

Over breeding of humans and the environmental problems associated with this overpopulation are by far the greatest long term threat to each and every relevant species, noting that already liberated feral pest species continue to cause ongoing stress and no doubt the decline of these species as detailed for similar species in Hoser (1991).

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.

The situation in Indonesia and Papua New Guinea is no different.

MACROPOGONOMYS GEN. NOV.

LSIDURN:LSID:ZOOBANK.ORG:ACT:ECEE478B-A504-480A-909C-756B33D7E006

Type species: *Macropogonomys maxhoseri sp. nov.*

Diagnosis: Until now, species within the genus *Macropogonomys gen. nov.* have been treated as being within the putative genus *Pogonomys* Milne-Edwards, 1877, with a type species of *Pogonomys macrourus* Milne-Edwards, 1877.

Species within both these genera and the morphologically similar *Chiruromys* Thomas, 1888 (type species *Pogonomys forbesi* Thomas, 1888), that was originally conceived as a subgenus within *Pogonomys*, but in recent years has been treated as a separate full genus are separated from all other Muridae by the following unique suite of characters:

Skull with interorbital constriction apparent, and with rounded braincase; supraorbital ridges as a rule well developed. Rostrum long (e.g. *P. sylvestris* Thomas, 1920) to short (*P. forbesi* (Thomas, 1888) and others). Zygomatic plate and infraorbital foramen nearly of the specialized type found in *Crateromys* Thomas, 1895, but infraorbital foramen less narrowed than in that genus. Zygomata widely spreading. Bullae very small. Palate broad; incisive foramina shortened, and considerably in front of tooth row. Incisors usually broad and rather powerful.

Upper molars complex; the centre row of cusps the largest, but neither the inner nor the outer rows showing much sign of reduction. M.1 with ten cusps, including a strong T.7, and an extra outer posterior cusp; M.2 with nine cusps (only T.2 is suppressed); M.3 not much smaller than M.2, mostly trilaminate, and with no clear outer row. The pattern is evidently traceable even in old age, and wears down slowly. A small extra front cusp in front of foremost lamina of M.1 may be present. Lower teeth like *Chiropodomys* Peters, 1868, the outer subsidiary row of cusps very clear, nearly developing as an extra row, though not comparable to *Hapalomys* Blyth, 1859.

Mammae 1-2 = 6. Tail long, nearly naked, the hairs more or less vestigial; terminal portion above without scales, quite naked, transversely wrinkled, and obviously prehensile.

The scales of the rest of the tail not, as is usual in rodents, square or arranged in distinct rings, but more or less pentagonal or lozenge-shaped, and set in diagonal slanting series, somewhat like the dorsal scales of a snake. Hindfoot broad, of arboreal type, with the fifth digit elongated, but the hallux not opposable, or not fully so and bearing claw. Manus with D.3 rather shortened sometimes. Fur soft.

The genera *Macropogonomys gen. nov.* and *Pogonomys* are separated from the morphologically similar *Chiruromys* by having scales on the tail that are mosaic-formed, the apical edges not free and not jutting over the scales of the next row, versus scales of the tail with apical edges mostly formed into a rounded point, which juts over the scales of the next row (and terminal portion) more developed in *Chiruromys*. Premaxillar region of skull lower and longer (i.e. not "Squirrel-formed"), versus premaxillar region of skull shorter (i.e. "Squirrel-formed") with rostrum shortened, and zygomata more spreading in *Chiruromys.* Palatal foramina wider posteriorly than anteriorly, versus not narrowed in front in *Chiruromys.* Simple molars, M.3 more reduced posteriorly, the fourth transverse row merged with the third, versus molars tending to be more complex and fourth transverse row of M.3 usually not merged into the third row in *Chiruromys*.

Species within *Macropogonomys gen. nov.* are separated from *Pogonomys* by their larger average maximum adult size and more robust build (head-body length 140-150 mm versus 120 mm, tail length 215-185 mm versus 170 mm) and noticeably enlarged molar teeth (versus not noticeably enlarged in *Pogonomys*) as well as the fact that the last 1-2 cm of tail has hair on it like on the body, versus not so in *Pogonomys.*

Macropogonomys gen. nov. are further separated from *Pogonomys* by having a conspicuous to inconspicuous darker ring of fur around the eye, often being black (versus wholly absent in *Pogonomys*, excluding the three very small grey bellied species within

Pogonomys).

Distribution: Known only from mainland New Guinea, including both Papua New Guinea and Irian Jaya (Indonesia), including ranges on the coast north of the central cordillera and northern Queensland, Australia.

Etymology: The name *Macropogonomys gen. nov.* is in reflection of the relatively large size of these species as adults as compared to the nominate genus *Pogonomys* Milne-Edwards, 1877 and the relatively large molar teeth in species within this morphologically similar and closely related genus.

Content: *Macropogonomys maxhoseri sp. nov.* (type species); *M. aplini sp. nov.*; *M. fergussoniensis* (Laurie, 1952); *M. loriae* (Thomas, 1897); *M. mickpughi sp. nov.*; *M. mippughae sp. nov.*.

MACROPOGONOMYS MAXHOSERI SP. NOV.

LSIDURN:LSID:ZOOBANK.ORG:ACT:599FF21C-C3C6-435A-AC3A-A2CDF4B484BE

Holotype: A preserved female specimen at the Queensland Museum, Brisbane, Queensland, Australia, specimen number JM407, collected from Lake Barrine, Eastern Atherton Tableland, Queensland, Australia, Latitude -17.25 S., Longitude 145.6333 E. This government-owned facility allows access to its holdings.

Paratype: A preserved female specimen at the CSIRO, Australian National Wildlife Collection, Canberra, ACT, Australia, specimen number M21828 collected from the Atherton Tableland, Queensland, Australia.

Diagnosis: *Macropogonomys maxhoseri sp. nov.* is the Australian species of putative *Pogonomys* Milne-Edwards, 1877 occurring in north-east Queensland. Until now, most authorities, including Bannister *et al.* (1988) and Strahan (1988) have treated this taxon as a population of *P. mollipilosus* (Peters and Doria, 1881), now also transferred to the new genus *Macropogonomys gen. nov.*.

M. maxhoseri sp. nov. as defined herein is also split into three regionally divergent populations, named as subspecies.

These are nominate *M. maxhoseri sp. nov.* known from the southern Wet Tropics of far north Queensland, Australia, generally north from Millaa Millaa Latitude -17.4667 S., Longitude 145.6667 E. in the south to Kuranda Latitude -16.8167 S., Longitude 145.6333 E. in the north with a centre of distribution on the Atherton Tableland.

M. maxhoseri blacki subsp. nov. is found in the northern Wet Tropics of far north Queensland, Australia, generally north of Julatten, Latitude -16.6 S., Longitude 145.3333 E. in the south to Shiptons Flat, Latitude -15.8 S., Longitude 145.25 E. in the north (being south of Cooktown).

M. maxhoseri gedyei subsp. nov. is known only from Iron Range, Latitude -12.7164 S., Longitude 143.3022 E. in far north Queensland.

All three subspecies are confined to rainforests and associated forested uplands.

All subspecies of *M. maxhoseri sp. nov.* are readily separated from the morphologically similar species *M. mollipilosus* and *Pogonomys macrourus* Milne-Edwards, 1877 by fur colour. Both *M. mollipilosus* and *Pogonomys macrourus* Milne-Edwards, 1877 are characterised by having more-or-less uniformly bright reddish-brown fur on the dorsum, which is not the case for any subspecies of *M. maxhoseri sp. nov.*.

Species within *Macropogonomys gen. nov.* including all subspecies of *M. maxhoseri sp. nov.* are separated from *Pogonomys* by their larger average maximum adult size and more robust build (head-body length 140-150 mm versus 120 mm, tail length 215-185 mm versus 170 mm), and noticeably enlarged molar teeth (versus not noticeably enlarged in *Pogonomys*); last 1-2 cm of tail has hair on it like on the body, versus not so in *Pogonomys.*

Macropogonomys loriae (Thomas, 1897) and associated species are separated from *M. maxhoseri sp. nov.* by their larger average maximum adult size and more robust build (head-body length 150 mm versus 140 mm, tail length 215 mm versus 185 mm)(see below as well), and extremely enlarged molar teeth (versus enlarged but to a lesser degree in *M. maxhoseri sp. nov.*).

Macropogonomys gen. nov. are further separated from *Pogonomys* by having a conspicuous to inconspicuous darker ring around the eye (versus wholly absent in *Pogonomys*).

Macropogonomys gen. nov. include all of *M. maxhoseri sp. nov.* (type species); *Macropogonomys loriae* (Thomas, 1897), *M. aplini sp. nov.*, *M. fergussoniensis* (Laurie, 1952), *M. mickpughi sp. nov.*, and *M. mippughae sp. nov.*.

The three other species within *Pogonomys*, and remaining in that genus, namely *P. championi* Flannery, 1988, *P. sharonhoserae sp. nov.* and *P. sylvestris* Thomas, 1920 are all separated from the other species in *Pogonomys* as well as *M. maxhoseri sp. nov.* (all subspecies) by having greyish fur on the venter as opposed to white.

Besides being separated from all other New Guinean *Pogonomys* by larger adult size (see above), *M. maxhoseri sp. nov.* of each subspecies are separated from the reddish-brown dorsally, white ventered species formerly placed in *Pogonomys*, namely *M. mollipilosus* and *Pogonomys macrourus* by colouration of fur in that they are not reddisj brown above.

Nominate *M. maxhoseri maxhoseri subsp. nov.* (defined herein as well as a nominate subspecies) has greyish fur with a brownish tinge on the sides. Fur on the flanks is not significantly lighter than on the dorsum. There is a significant amount of black both anterior to and posterior to the eye.

M. maxhoseri blacki subsp. nov. has brown fur with faint russet streaks on the upper flanks. Fur on the dorsum is also noticeably darker than on the lower flanks. There is a moderate amount of dark anterior and posterior to the eye.

M. maxhoseri gedyei subsp. nov. has yellowish brown fur all over the dorsum, becoming beige on the lower flanks, and without any faint russet streaks on the flanks. There is a moderate amount of dark anterior and posterior to the eye.

M. mollipilosus and *Pogonomys macrourus* differ from all forms of *M. maxhoseri sp. nov.* by having reddish brown fur on the dorsum and white on the belly.

M. maxhoseri maxhoseri sp. nov. of the nominate form is depicted in Strahan (1998) on page 439 at bottom.

Further specimens of the nominate form of *M. maxhoseri sp. nov.* (that is *M. maxhoseri maxhoseri subsp. nov.* formally named as a subspecies here as well explicitly) in life can be seen in images at:
https://www.flickr.com/photos/54876436@N08/15006605510/
and
https://www.flickr.com/photos/zimny_anders/50132548593/
Images of *M. maxhoseri blacki subsp. nov.* in life can be seen online at:
https://www.flickr.com/photos/ryanfrancis/22732918268/
and
https://www.flickr.com/photos/ryanfrancis/22759014229/
and
https://www.flickr.com/photos/elliotbudd/35404315791
and
https://www.flickr.com/photos/euprepiosaur/7463535064/

The holotype of *M. mollipilosus* is depicted in *Helgen et al*. (2008) on page 658 at top.

A photo of the type form of *M. loriae* can be found online at:
https://www.flickr.com/photos/144046509@N08/27552017576/

Other relevant information on this new species and its historical classification is given below.

Bannister *et al*. (1988) regarded Australian *Pogonomys* Milne-Edwards, 1877 as being of the species "*P. mollipilosus* (Peters and Doria, 1881)", with a type locality of southern New Guinea. This designation was agreed by Strachan (1988), although Strachan (1988) stated "the specific identity of the Australian population is in some dispute".

This contention has been repeated by other authors including Dennis and Menzies (1979), who synonymised the New Guinea type specimen of "*P. mollipilosus*" with the earlier named form *Pogonomys macrourus* Milne-Edwards, 1877, effectively meaning the Australian species may be of that form as well.

Dennis and Menzies (2009), also wrote: "However, the position is somewhat complicated by the recent discovery of *Pogonomys* in Northern Queensland (John Winter and Jack Mahoney, personal communication). We have been able to examine two of the Queensland specimens but could not include them in our computer programme. The possibility that *mollipilosus* is an Australian species occurring in New Guinea only in the lower Fly River region cannot be ignored."

Problems with this contention were raised by Helgen *et al*. (2008) who wrote:

"Few specimens of *Pogonomys* have been collected in the TransFly region of southern New Guinea, and the taxonomic status of *Pogonomys mollipilosus* has never been satisfactorily resolved. Dennis & Menzies (1979: 322) observed that "the possibility that *mollipilosus* is an Australian species occurring in New Guinea only in the lower Fly River region cannot be ignored", and Australian samples of *Pogonomys* have been explicitly discussed under the name *Pogonomys mollipilosus* (Winter & Whitford 1995), thus assumed to represent a distinct species occurring in Australia and the TransFly. Musser & Carleton (1993, 2005) believed that the holotype of *mollipilosus* to be a specimen of the widespread lowland New Guinea taxon *Pogonomys macrourus* and synonymized it accordingly, but the last revisionary treatment of *Pogonomys* that involved firsthand comparisons of the holotype of *mollipilosus* was the review published by Dennis & Menzies (1979).

Our own examination of the young holotype (Helgen 2007: 747) indicates that it is a larger-toothed rat compared to samples of *P. macrourus*, probably does not belong within the synonymy of that taxon as currently recognized (Musser & Carleton 2005), and possibly shows a closer morphological resemblance to the larger-bodied species *P. loriae*."

Wilson and Reeder (2005), wrote:

"We list five species of *Pogonomys*, another undescribed species is endemic to the Snow Mtns in Prov. of Papua (= Irian Jaya) (Musser and Lunde, in ms.), and there is possibly a seventh that has yet to be named occurring in NE coastal Queensland (in rainforests of Cape York Peninsula and farther south in the wet tropics between Cooktown and Townsville; Watts and Aslin, 1981, and Winter and Whitford, 1995). Mahoney and Richardson (1988:170) catalogued taxonomic, distributional, and biological references for the Australian sample, which was identified as *P. mollipilosus* by Watts and Aslin (1981) and reviewed under that name by Winter and Whitford (1995). The holotype of *mollipilosus*, however, was obtained near Daru on the south coast of the Trans-Fly region of S New Guinea and is an example of *P. macrourus*, which is known only from mainland New Guinea (see account of that species). The Australian *Pogonomys* has a much larger body and longer tail than does *P. macrourus* (compare measurements for the Australian sample listed in Winter and Whitford, 1995:643, with those of New Guinea *P. macrourus* given by Flannery, 1995a), dark brownish gray upperparts and pure white underparts (bright reddish brown dorsal fur in *P. macrourus*), and does not appear to represent *P. macrourus*. Its body size, tail length, and fur coloration recall the New Guinea *P. loriae*, a generally montane inhabitant (see account of that species), but it averages smaller in those external dimensions (contrast measurements listed by Winter and Whitford with those for *P. loriae* presented by Flannery, 1995a:316). Furthermore, it seems biogeographically implausable that *P. loriae* also occurs in NE Queensland. No other species of nonvolant mammal that is endemic to the Australian-New Guinea region exhibits such a distribution. The typically Australian species that also occur in New Guinea are known only from the Trans-Fly region, not the Central Cordillera or outlying mountain ranges (Norris and Musser, 2001). The Australian *Pogonomys* is most likely a separate species from the New Guinea representatives, and its alliance needs to be determined by careful comparison with samples of *P. macrourus* and *P. loriae*; at that time perhaps the holotype of *mollipilosus* should be reexamined."

Inspection by myself of high quality colour images of the holotype of *P. mollipilosus*, *P. macrourus* and Australian "*Pogonomys*" from the three biogeographic areas they are known to occur (south wet tropics, north wet tropics and Iron Range, all in north-east Queensland, Australia) led to the inescapable conclusion that each were separate taxa.

The basis of the genus-level classification is explained elsewhere, but is strongly supported by the molecular results of Bryant (2013), who used samples of *P. macrourus*, *P. championi, P. sylvestris*, *M. loriae* and *M. maxhoseri sp. nov.*.

Distribution: Nominate *M. maxhoseri sp. nov.* are known from the southern Wet Tropics of far north Queensland, Australia, generally north from Millaa Millaa Latitude -17.4667 S., Longitude 145.6667 E. in the south to Kuranda Latitude -16.8167 S., Longitude 145.6333 E. in the north with a centre of distribution on the Atherton Tableland.

M. maxhoseri blacki subsp. nov. is found in the northern Wet Tropics of far north Queensland, Australia, generally north of Julatten, Latitude -16.6 S., Longitude 145.3333 E. in the south to Shiptons Flat, Latitude -15.8 S., Longitude 145.25 E. in the north (being south of Cooktown).

M. maxhoseri gedyei subsp. nov. is known only from Iron Range, Latitude -12.7164 S., Longitude 143.3022 E. in far north Queensland, Austrlia.

Etymology: Named in honour of Max Hoser of Campbelltown, New South Wales, Australia, a first cousin of myself in recognition of assistances to this author in herpetological research in the 1960's and 1970's, in particular with regards to Australian agamid lizards.

MACROPOGONOMYS MAXHOSERI BLACKI SUBSP. NOV.

LSIDURN:LSID:ZOOBANK.ORG:ACT:50DB6BCF-2425-41EA-B844-CBAAB8767921

Holotype: A preserved male specimen at the Australian Museum, Sydney, NSW, Australia, specimen number M.23119, collected from Bloomfield (Cooktown), Queensland, Australia, Latitude -5.8519 S., Longitude 145.3280 E. This government-owned facility allows access to its holdings.

Paratypes: A preserved male specimen at the Australian Museum, Sydney, NSW, Australia, specimen number M.23118, collected from Cedar Bay (Cooktown area), Queensland, Australia, Latitude -15.833 S., Longitude 145.366.

Five preserved specimens at the Queensland Museum, Brisbane, Queensland, Australia, specimen numbers JM5272, JM8501, JM14682, JM14683 and JM14684 collected at Shipton's Flat, (just south of Cooktown), Queensland, Australia, Latitude -15.8 S., Longitude 145.2666 E.

Diagnosis: *Macropogonomys maxhoseri sp. nov.* is the Australian species of *Pogonomys* Milne-Edwards, 1877 occurring in north-east Queensland. Until now, most authorities, including Bannister *et al*. (1988) and Strahan (1988) have treated this taxon as a population of *P. mollipilosus* (Peters and Doria, 1881), now also transferred to the new genus *Macropogonomys gen. nov.*.

M. maxhoseri sp. nov. as defined herein is also split into three regionally divergent populations, named as subspecies.

These are nominate *M. maxhoseri sp. nov.* known from the southern Wet Tropics of far north Queensland, Australia, generally north from Millaa Millaa Latitude -17.4667 S., Longitude 145.6667 E. in the south to Kuranda Latitude -16.8167 S., Longitude 145.6333 E. in the north with a centre of distribution on the Atherton Tableland.

M. maxhoseri blacki subsp. nov. is found in the northern Wet Tropics of far north Queensland, Australia, generally north of Julatten, Latitude -16.6 S., Longitude 145.3333 E. in the south to Shiptons Flat, Latitude -15.8 S., Longitude 145.25 E. in the north (being south of Cooktown).

M. maxhoseri gedyei subsp. nov. is known only from Iron Range, Latitude -12.7164 S., Longitude 143.3022 E. in far north Queensland.

All three subspecies are confined to rainforests and associated forested uplands.

All subspecies of *M. maxhoseri sp. nov.* are readily separated from the morphologically similar species *M. mollipilosus* and *Pogonomys macrourus* Milne-Edwards, 1877 by fur colour. Both *M. mollipilosus* and *Pogonomys macrourus* Milne-Edwards, 1877 are characterised by having more-or-less uniformly bright reddish-brown fur on the dorsum, which is not the case for any subspecies of *M. maxhoseri sp. nov.*.

Species within *Macropogonomys gen. nov.* including all subspecies of *M. maxhoseri sp. nov.* are separated from *Pogonomys* by their larger average maximum adult size and more robust build (head-body length 140-150 mm versus 120 mm, tail length 215-185 mm versus 170 mm), and noticeably enlarged molar teeth (versus not noticeably enlarged in *Pogonomys*); last 1-2 cm of tail has hair on it like on the body, versus not so in *Pogonomys.*

Macropogonomys loriae (Thomas, 1897) and associated species are separated from *M. maxhoseri sp. nov.* by their larger average maximum adult size and more robust build (head-body length 150 mm versus 140 mm, tail length 215 mm versus 185 mm)(see below as well), and extremely enlarged molar teeth (versus enlarged, but to a lesser extent in *M. maxhoseri sp. nov.*).

Macropogonomys gen. nov. are further separated from *Pogonomys* by having a conspicuous to inconspicuous darker ring around the eye (versus wholly absent in *Pogonomys*).

Macropogonomys gen. nov. include all of *M. maxhoseri sp. nov.* (type species); *Macropogonomys loriae*

(Thomas, 1897), *M. aplini sp. nov.*, *M. fergussoniensis* (Laurie, 1952), *M. mickpughi sp. nov.* and *M. mippughae sp. nov.*.

The three other species within *Pogonomys*, and remaining in that genus, namely *P. championi* Flannery, 1988, *P. sharonhoserae sp. nov.* and *P. sylvestris* Thomas, 1920 are all separated from the other species in *Pogonomys* as well as *M. maxhoseri sp. nov.* (all subspecies) by having greyish fur on the venter as opposed to white.

Besides being separated from all other New Guinean *Pogonomys* by larger adult size (see above), *M. maxhoseri sp. nov.* of each subspecies are separated from the reddish-brown dorsally, white ventered species formerly placed in *Pogonomys*, namely *M. mollipilosus* and *Pogonomys macrourus* by colouration of fur.

Nominate *M. maxhoseri sp. nov.* has greyish fur with a brownish tinge on the sides. Fur on the flanks is not significantly lighter than on the dorsum. There is a significant amount of black both anterior to and posterior to the eye.

M. maxhoseri blacki subsp. nov. has brown fur with faint russet streaks on the upper flanks. Fur on the dorsum is also noticeably darker than on the lower flanks. There is a moderate amount of dark anterior and posterior to the eye.

M. maxhoseri gedyei subsp. nov. has yellowish brown fur all over the dorsum, becoming beige on the lower flanks, and without any faint russet streaks on the flanks. There is a moderate amount of dark anterior and posterior to the eye.

M. mollipilosus and *P. macrourus* differ from all forms of *M. maxhoseri sp. nov.* by having reddish brown fur on the dorsum and white on the belly.

M. maxhoseri max sp. nov. of the nominate form is depicted in Strahan (1998) on page 439 at bottom.

Further specimens of the nominate form of *M. maxhoseri sp. nov.* (that is *M. maxhoseri maxhoseri subsp. nov.* formally named as a subspecies here as well explicitly) in life can be seen in images at:
https://www.flickr.com/photos/54876436@N08/15006605510/
and
https://www.flickr.com/photos/zimny_anders/50132548593/

Images of *M. maxhoseri blacki subsp. nov.* in life can be seen online at:
https://www.flickr.com/photos/ryanfrancis/22732918268/
and
https://www.flickr.com/photos/ryanfrancis/22759014229/
and
https://www.flickr.com/photos/elliotbudd/35404315791
and
https://www.flickr.com/photos/euprepiosaur/7463535064/

The holotype of *M. mollipilosus* is depicted in *Helgen et al*. (2008) on page 658 at top.

A photo of the type form of *M. loriae* can be found online at:
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Other relevant information on this new species and its historical classification is given below.

Bannister *et al*. (1988) regarded Australian *Pogonomys* Milne-Edwards, 1877 as being of the species "*P. mollipilosus* (Peters and Doria, 1881)", with a type locality of southern New Guinea. This designation was agreed by Strachan (1988), although Strachan (1988) stated:
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This contention has been repeated by other authors including Dennis and Menzies (1979), who synonymised the New Guinea type specimen of "*P. mollipilosus*" with the earlier named form *Pogonomys macrourus* Milne-Edwards, 1877, effectively meaning the Australian species may be of that form as well.

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Inspection by myself of high quality colour images of the holotype of *P. mollipilosus*, *P. macrourus* and Australian "*Pogonomys*" from the three biogeographic areas they are known to occur (south wet tropics, north wet tropics and Iron Range, all in north-east Queensland, Australia) led to the inescapable conclusion that each were separate taxa.

The basis of the genus-level classification is explained elsewhere, but is strongly supported by the molecular results of Bryant (2013), who used samples of *P. macrourus*, *P. championi, P. sylvestris*, *M. loriae* and *M. maxhoseri sp. nov.*.

Distribution: *M. maxhoseri blacki subsp. nov.* is found in the northern Wet Tropics of far north Queensland, Australia, generally north of Julatten, Latitude -16.6 S., Longitude 145.3333 E. in the south to Shiptons Flat, Latitude -15.8 S., Longitude 145.25 E. in the north (being south of Cooktown).

Nominate *M. maxhoseri sp. nov.* are known from the southern Wet Tropics of far north Queensland, Australia, generally north from Millaa Millaa Latitude -17.4667 S., Longitude 145.6667 E. in the south to Kuranda Latitude -16.8167 S., Longitude 145.6333 E. in the north with a centre of distribution on the Atherton Tableland.

M. maxhoseri gedyei subsp. nov. is known only from Iron Range, Latitude -12.7164 S., Longitude 143.3022 E. in far north Queensland.

Etymology: Named in honour of Shane Black of Mount Molloy, North Queensland, Australia, formerly of Sydney, New South Wales, Australia, in recognition of his services to herpetology, in particular with regards to his breeding of highly venomous snakes and publications of photos of little known vertebrate species from the Australian wet tropics and adjacent regions.

MACROPOGONOMYS MAXHOSERI GEDYEI SUBSP. NOV.

LSIDURN:LSID:ZOOBANK.ORG:ACT:4711945D-D4B6-41A7-B67B-FD047D43C682

Holotype: A preserved specimen at the Queensland Museum, Brisbane, Queensland, Australia, specimen number JM2354, collected from Gordon Creek, Iron Range, Queensland, Australia, Latitude -12.7163 S., Longitude 143.3022 E. This government-owned facility allows access to its holdings.

Holotype: A preserved specimen at the Queensland Museum, Brisbane, Queensland, Australia, specimen number JM2355, collected from Gordon Creek, Iron Range, Queensland, Australia, Latitude -12.7163 S., Longitude 143.3022 E.

Diagnosis: *Macropogonomys maxhoseri sp. nov.* is the Australian species of *Pogonomys* Milne-Edwards, 1877 occurring in north-east Queensland. Until now, most authorities, including Bannister *et al.* (1988) and Strahan (1988) have treated this taxon as a population of *P. mollipilosus* (Peters and Doria, 1881), now also transferred to the new genus *Macropogonomys gen. nov.*.

M. maxhoseri sp. nov. as defined herein is also split into three regionally divergent populations, named as subspecies.

These are nominate *M. maxhoseri sp. nov.* known from the southern Wet Tropics of far north Queensland, Australia, generally north from Millaa Millaa Latitude -17.4667 S., Longitude 145.6667 E. in the south to Kuranda Latitude -16.8167 S., Longitude 145.6333 E. in the north with a centre of distribution on the Atherton Tableland.

M. maxhoseri blacki subsp. nov. is found in the northern Wet Tropics of far north Queensland, Australia, generally north of Julatten, Latitude -16.6 S., Longitude 145.3333 E. in the south to Shiptons Flat, Latitude -15.8 S., Longitude 145.25 E. in the north (being south of Cooktown).

M. maxhoseri gedyei subsp. nov. is known only from Iron Range, Latitude -12.7164 S., Longitude 143.3022 E. in far north Queensland.

All three subspecies are confined to rainforests and associated forested uplands.

All subspecies of *M. maxhoseri sp. nov.* are readily separated from the morphologically similar species *M.*

mollipilosus and *Pogonomys macrourus* Milne-Edwards, 1877 by fur colour. Both *M. mollipilosus* and *Pogonomys macrourus* Milne-Edwards, 1877 are characterised by having more-or-less uniformly bright reddish-brown fur on the dorsum, which is not the case for any subspecies of *M. maxhoseri sp. nov.*.

Species within *Macropogonomys gen. nov.* including all subspecies of *M. maxhoseri sp. nov.* are separated from *Pogonomys* by their larger average maximum adult size and more robust build (head-body length 140-150 mm versus 120 mm, tail length 215-185 mm versus 170 mm), and noticeably enlarged molar teeth (versus not noticeably enlarged in *Pogonomys*); last 1-2 cm of tail has hair on it like on the body, versus not so in *Pogonomys.*

Macropogonomys loriae (Thomas, 1897) and associated species are separated from *M. maxhoseri sp. nov.* by their larger average maximum adult size and more robust build (head-body length 150 mm versus 140 mm, tail length 215 mm versus 185 mm)(see below as well), and extremely enlarged molar teeth (versus enlarged, but to a lesser extent in *M. maxhoseri sp. nov.*).

Macropogonomys gen. nov. are further separated from *Pogonomys* by having a conspicuous to inconspicuous darker ring around the eye (versus wholly absent in *Pogonomys*).

Macropogonomys gen. nov. include all of *M. maxhoseri sp. nov.* (type species); *Macropogonomys loriae* (Thomas, 1897), *M. aplini sp. nov.*, *M. fergussoniensis* (Laurie, 1952), *M. mickpughi sp. nov.*, and *M. mippughae sp. nov.*.

The three other species within *Pogonomys*, and remaining in that genus, namely *P. championi* Flannery, 1988, *P. sharonhoserae sp. nov.* and *P. sylvestris* Thomas, 1920 are all separated from the other species in *Pogonomys* as well as *M. maxhoseri sp. nov.* (all subspecies) by having greyish fur on the venter as opposed to white.

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M. maxhoseri gedyei subsp. nov. has yellowish brown fur all over the dorsum, becoming beige on the lower flanks, and without any faint russet streaks on the flanks. There is a moderate amount of dark anterior and posterior to the eye.

M. mollipilosus and *P. macrourus* differ from all forms of *M. maxhoseri sp. nov.* by having reddish brown fur on the dorsum and white on the belly.

M. maxhoseri max sp. nov. of the nominate form is depicted in Strahan (1998) on page 439 at bottom.

Further specimens of the nominate form of *M. maxhoseri sp. nov.* (that is *M. maxhoseri maxhoseri subsp. nov.* formally named as a subspecies here as well explicitly) in life can be seen in images at:
https://www.flickr.com/photos/54876436@N08/15006605510/

and

https://www.flickr.com/photos/zimny_anders/50132548593/

Images of *M. maxhoseri blacki subsp. nov.* in life can be seen online at:
https://www.flickr.com/photos/ryanfrancis/22732918268/

and

https://www.flickr.com/photos/ryanfrancis/22759014229/

and

https://www.flickr.com/photos/elliotbudd/35404315791

and

https://www.flickr.com/photos/euprepiosaur/7463535064/

The holotype of *M. mollipilosus* is depicted in *Helgen et al*. (2008) on page 658 at top.

A photo of the type form of *M. loriae* can be found online at:
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Other relevant information on this new species and its historical classification is given below.

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"the specific identity of the Australian population is in some dispute".

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Dennis and Menzies (2009), also wrote:
"However, the position is somewhat complicated by the recent discovery of *Pogonomys* in Northern Queensland (John Winter and Jack Mahoney, personal communication). We have been able to examine two of the Queensland specimens but could not include them in our computer programme. The possibility that *mollipilosus* is an Australian species occurring in New Guinea only in the lower Fly River region cannot be ignored."

Problems with this contention were raised by Helgen *et al.* (2008) who wrote:
"Few specimens of *Pogonomys* have been collected in

the TransFly region of southern New Guinea, and the taxonomic status of *Pogonomys mollipilosus* has never been satisfactorily resolved. Dennis & Menzies (1979: 322) observed that "the possibility that *mollipilosus* is an Australian species occurring in New Guinea only in the lower Fly River region cannot be ignored", and Australian samples of *Pogonomys* have been explicitly discussed under the name *Pogonomys mollipilosus* (Winter & Whitford 1995), thus assumed to represent a distinct species occurring in Australia and the TransFly. Musser & Carleton (1993, 2005) believed that the holotype of *mollipilosus* to be a specimen of the widespread lowland New Guinea taxon *Pogonomys macrourus* and synonymized it accordingly, but the last revisionary treatment of *Pogonomys* that involved firsthand comparisons of the holotype of *mollipilosus* was the review published by Dennis & Menzies (1979).

Our own examination of the young holotype (Helgen 2007: 747) indicates that it is a larger-toothed rat compared to samples of *P. macrourus*, probably does not belong within the synonymy of that taxon as currently recognized (Musser & Carleton 2005), and possibly shows a closer morphological resemblance to the larger-bodied species *P. loriae*."

Wilson and Reeder (2005), wrote:

"We list five species of *Pogonomys*, another undescribed species is endemic to the Snow Mtns in Prov. of Papua (= Irian Jaya) (Musser and Lunde, in ms.), and there is possibly a seventh that has yet to be named occurring in NE coastal Queensland (in rainforests of Cape York Peninsula and farther south in the wet tropics between Cooktown and Townsville; Watts and Aslin, 1981, and Winter and Whitford, 1995). Mahoney and Richardson (1988:170) catalogued taxonomic, distributional, and biological references for the Australian sample, which was identified as *P. mollipilosus* by Watts and Aslin (1981) and reviewed under that name by Winter and Whitford (1995). The holotype of *mollipilosus*, however, was obtained near Daru on the south coast of the Trans-Fly region of S New Guinea and is an example of *P. macrourus*, which is known only from mainland New Guinea (see account of that species). The Australian *Pogonomys* has a much larger body and longer tail than does *P. macrourus* (compare measurements for the Australian sample listed in Winter and Whitford, 1995:643, with those of New Guinea *P. macrourus* given by Flannery, 1995a), dark brownish gray upperparts and pure white underparts (bright reddish brown dorsal fur in *P. macrourus*), and does not appear to represent *P. macrourus*. Its body size, tail length, and fur coloration recall the New Guinea *P. loriae*, a generally montane inhabitant (see account of that species), but it averages smaller in those external dimensions (contrast measurements listed by Winter and Whitford with those for *P. loriae* presented by Flannery, 1995a:316). Furthermore, it seems biogeographically implausable that *P. loriae* also occurs in NE Queensland. No other species of nonvolant mammal that is endemic to the Australian-New Guinea region exhibits such a distribution. The typically Australian species that also occur in New Guinea are known only from the Trans-Fly region, not the Central Cordillera or outlying mountain ranges (Norris and Musser, 2001). The Australian *Pogonomys* is most likely a separate species from the New Guinea representatives, and its alliance needs to be determined by careful comparison with samples of *P. macrourus* and *P. loriae*; at that time perhaps the holotype of *mollipilosus* should be reexamined."

Inspection by myself of high quality colour images of the holotype of *P. mollipilosus*, *P. macrourus* and Australian "*Pogonomys*" from the three biogeographic areas they are known to occur (south wet tropics, north wet tropics and Iron Range, all in north-east Queensland, Australia) led to the inescapable conclusion that each were separate taxa.

The basis of the genus-level classification is explained elsewhere, but is strongly supported by the molecular results of Bryant (2013), who used samples of *P. macrourus*, *P. championi, P. sylvestris*, *M. loriae* and *M. maxhoseri sp. nov.*.

Distribution: *M. maxhoseri gedyei subsp. nov.* is known only from Iron Range, Latitude -12.7164 S., Longitude 143.3022 E. in far north Queensland.

Nominate *M. maxhoseri sp. nov.* are known from the southern Wet Tropics of far north Queensland, Australia, generally north from Millaa Millaa Latitude -17.4667 S., Longitude 145.6667 E. in the south to Kuranda Latitude -16.8167 S., Longitude 145.6333 E. in the north with a centre of distribution on the Atherton Tableland.

M. maxhoseri blacki subsp. nov. is found in the northern Wet Tropics of far north Queensland, Australia, generally north of Julatten, Latitude -16.6 S., Longitude 145.3333 E. in the south to Shiptons Flat, Latitude -15.8 S., Longitude 145.25 E. in the north (being south of Cooktown).

Etymology: *M. maxhoseri gedyei subsp. nov.* is named in honour of Andrew Gedye of Bentley Park, North Queensland, Australia, formerly of Cheltenham, New South Wales, in recognition of his services to herpetology, in particular with regards to the breeding of highly venomous snakes and rare pythons as well as providing information following an important field trip to Papua New Guinea.

MACROPOGONOMYS MICKPUGHI SP. NOV.

LSIDURN:LSID:ZOOBANK.ORG:ACT:74E89A43-6FE8-4ADE-ADEC-94D356C57149

Holotype: A preserved specimen in the Australian Museum, Sydney, New South Wales, Australia, specimen number M15423 collected from Mount Erimbari, Chimbu (formerly Eastern Highlands) Province, Papua New Guinea. This government-owned facility allows access to its holdings.

Paratypes: Eleven preserved specimens in the Australian Museum, Sydney, New South Wales, Australia, specimen numbers M15415-15422 and M15424-15426 collected from Mount Erimbari, Chimbu (formerly Eastern Highlands) Province, Papua New Guinea.

Diagnosis: *Macropogonomys mickpughi sp. nov.*

currently only known from the Eastern Highlands region of New Guinea has long been treated as an unusual population of the well-known species *M. loriae* (Thomas, 1897).

M. loriae occurs in southern New Guinea, including as far east as Central Province (type locality) and west of there to include the Southern Highlands Province.

M. mickpughi sp. nov. is readily separated from *M. loriae* by its slightly smaller molar teeth (as compared to *M. loriae*), these still being enlarged relative to species of *Pogonomys* as defined in this paper, and a grey-furred belly, versus white or off-white in *M. loriae* and all other members of *Macropogonomys gen. nov.*.

Both *M. mickpughi sp. nov*. and *M. loriae* are readily separated from all other *Macropogonomys gen. nov.* by their large size (head-body length 150 mm, tail length 215 mm) and fur that is very dark brown to almost black in colour.

The morphologically similar *M. mippughae sp. nov.* from the Prince Alexander Mountains, Torricelli Mountains and Bewani Mountains near the north coast of New Guinea is separated from the two preceding species by having molars of similar size and configuration to *M. mickpughi sp. nov*., off-white-fur on the venter and greyish brown as opposed to dark brown fur on the upper body.

Both *M. mickpughi sp. nov*. and *M. loriae* have obviously darker hair on the crown of the head than the body, which is not the case in *M. mippughae sp. nov.*.

The molars of *M. mickpughi sp. nov*. and *M. mippughae sp. nov*., while reduced in size as compared to *M. loriae* are still noticeably enlarged, which is not the case in *Pogonomys* Milne-Edwards, 1877 species.

M. aplini sp. nov. is known only from a subfossil left upper first molar (M1) and a subfossil lower left first molar M1 of Holocene age retrieved from Kria Cave, West Papua, Indonesia. Kria Cave is located near Ayamaru Lakes, central Bird's Head Peninsula.

Depicted in Figure 21 of Aplin *et al*. (1999), the molar is clearly from a specimen of *Macropogonomys gen. nov.* because it is consistent with other species in the genus in that it lacks both an oblique crest between t1 and t5, and a basal, anterior cingular pocket between t2 and t3 (which if present would conform with known species of *Pogonomys*). The molar, while of reduced size as compared to that of normal adult *M. loriae*, thereby implying closeness to either *M. mickpughi sp. nov*. or *M. mippughae sp. nov*., has morphological similarities more like nominate *M. loriae* being the presence of distinct t1bis and t2bis and more anterior placement of t9 (which also excludes other named species in the genus *Macropogonomys gen. nov*.).

However, the fossil molar (M1) differs from the three other preceding species in lacking a cingular ridge between the posterobuccal cusplet and the base of the hypoconid, and in the greater size of the posterobuccal cusplet which directly abuts the anterobuccal cusplet.

In the other three species the two are discrete, but linked by a short narrow crest.

These features in combination clearly indicate a species new to science and while normally I'd be loathe to name a new species on the basis of a tooth, it is likely the species remains extant in this region and is quite likely under existential threat from rapid ongoing deforestation in the region.

By naming this taxon in particular, it is hoped that live specimens can be found and proper protection and management practices invoked to ensure its survival.

Obviously features such as fur colour and the like of *M. aplini sp. nov*. cannot currently be determined.

Until now, species within the genus *Macropogonomys gen. nov.* have been treated as being within the putative genus *Pogonomys*, with a type species of *Pogonomys macrourus* Milne-Edwards, 1877.

Species within both these genera and the morphologically similar *Chiruromys* Thomas, 1888 (type species *Pogonomys forbesi* Thomas, 1888), that was originally conceived as a subgenus within *Pogonomys*, but in recent years has been treated as a separate full genus are separated from all other Muridae by the following unique suite of characters:

Skull with interorbital constriction apparent and with rounded braincase; supraorbital ridges as a rule well developed. Rostrum long (e.g. *P. sylvestris* Thomas, 1920) to short (*P. forbesi* (Thomas, 1888) and others). Zygomatic plate and infraorbital foramen nearly of the specialized type found in *Crateromys* Thomas, 1895, but infraorbital foramen less narrowed than in that genus. Zygomata widely spreading. Bullae very small. Palate broad; incisive foramina shortened, and considerably in front of tooth row. Incisors usually broad and rather powerful.

Upper molars complex; the centre row of cusps the largest, but neither the inner nor the outer rows showing much sign of reduction. M.1 with ten cusps, including a strong T.7, and an extra outer posterior cusp; M.2 with nine cusps (only T.2 is suppressed); M.3 not much smaller than M.2, mostly trilaminate, and with no clear outer row. The pattern is evidently traceable even in old age, and wears down slowly. A small extra front cusp in front of foremost lamina of M.1 may be present. Lower teeth like *Chiropodomys* Peters, 1868, the outer subsidiary row of cusps very clear, nearly developing as an extra row, though not comparable to *Hapalomys* Blyth, 1859.

Mammae 1-2 = 6. Tail long, nearly naked, the hairs more or less vestigial; terminal portion above without scales, quite naked, transversely wrinkled, and obviously prehensile.

The scales of the rest of the tail not, as is usual in rodents, square or arranged in distinct rings, but more or less pentagonal or lozenge-shaped, and set in diagonal slanting series, somewhat like the dorsal scales of a snake. Hind foot broad, of arboreal type, with the fifth digit elongated, but the hallux not opposable, or not fully so and bearing claw. Manus with D.3 rather shortened sometimes. Fur soft.

The genera *Macropogonomys gen. nov.* and *Pogonomys* are separated from the morphologically similar *Chiruromys* by having scales on the tail that are mosaic-formed, the apical edges not free and not jutting over the scales of the next row, versus scales of the tail with apical edges mostly formed into a rounded point, which juts over the scales of the next row (and terminal portion more developed in *Chiruromys*. Premaxillar region of skull lower and longer (i.e. not “Squirrel-formed”), versus premaxillar region of skull shorter (i.e. “Squirrel-formed”) with rostrum shortened, and zygomata more spreading in *Chiruromys.* Palatal foramina wider posteriorly than anteriorly, versus not narrowed in front in *Chiruromys.* Simple molars, M.3 more reduced posteriorly, the fourth transverse row merged with the third, versus molars tending to be more complex, and fourth transverse row of M.3 usually not merged into the third row in *Chiruromys.*.

Species within *Macropogonomys gen. nov.* are separated from *Pogonomys* by their larger average maximum adult size and more robust build (head-body length 140-150 mm versus 120 mm, tail length 215-185 mm versus 170 mm), and noticeably enlarged molar teeth (versus not noticeably enlarged in *Pogonomys*) as well as the fact that the last 1-2 cm of tail has hair on it like on the body, versus not so in *Pogonomys.*

Macropogonomys gen. nov. are further separated from *Pogonomys* by having a conspicuous to inconspicuous darker ring of fur around the eye, often being black (versus wholly absent in *Pogonomys*, excluding the three very small grey bellied species within *Pogonomys*).

Distribution: *M. mickpughi sp. nov.* is known only from the collection location of the type material, being Mount Erimbari, Chimbu (formerly Eastern Highlands) Province, Papua New Guinea. The taxon is presumably more widespread.

Etymology: The new species *M. mickpughi sp. nov.* is named in honour of Mick Pugh, of Geelong, Victoria, Australia, a former president of the Victorian Association of Amateur Herpetologists in honour

of his huge contribution to herpetology in Australia.

MACROPOGONOMYS MIPPUGHAE SP. NOV.

LSIDURN:LSID:ZOOBANK.ORG:ACT:C22F5C04-76D6-45CA-8C91-93F6C742C67A

Holotype: A preserved specimen at the Australian Museum, Sydney, New South Wales, Australia, specimen number M.22802 collected from the base of Mount Fu, near Imonda, West Sepik Province, Papua New Guinea, Latitude -3.333 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 M.27674 collected from near Utai, Torricelli Mountains, West Sepik Province, Papua New Guinea, Latitude -3.383 S., Longitude 141.583 E.

Diagnosis: Until now, *Macropogonomys mippughae sp. nov.* has been treated as a northern New Guinea population of *M. loriae* (Thomas, 1897).

Macropogonomys mickpughi sp. nov. also formally named in this paper is currently only known from the Eastern Highlands region of New Guinea and has also until now been treated as an unusual population of the well-known species *M. loriae* (Thomas, 1897).

M. loriae occurs in southern New Guinea, including as far east as Central Province (type locality) and west of there to include the Southern Highlands Province.

M. mickpughi sp. nov. is readily separated from *M. loriae* by its slightly smaller molar teeth (as compared to *M. loriae*) and a grey-furred belly, versus white or off-white in *M. loriae* and all other members of *Macropogonomys gen. nov.*.

Both *M. mickpughi sp. nov.* and *M. loriae* are readily separated from all other *Macropogonomys gen. nov.* by their large size (head-body length 150 mm, tail length 215 mm) and fur that is very dark brown to almost black in colour.

The morphologically similar *M. mippughae sp. nov.* from the Prince Alexander Mountains, Torricelli Mountains and Bewani Mountains near the north coast of New Guinea is separated from the two preceding species by having molars of similar size and configuration to *M. mickpughi sp. nov.*, off-white-fur on the venter and greyish brown as opposed to dark brown fur on the upper body.

Both *M. mickpughi sp. nov.* and *M. loriae* have obviously darker hair on the crown of the head than the body, which is not the case in *M. mippughae sp. nov.*.

The molars of *M. mickpughi sp. nov.* and *M. mippughae sp. nov.*, while reduced in size as compared to *M. loriae* are still noticeably enlarged, which is not the case in *Pogonomys* Milne-Edwards, 1877 species.

M. aplini sp. nov. is known only from a subfossil left upper first molar (M1) and a subfossil lower left first molar M1 of Holocene age retrieved from Kria Cave, West Papua, Indonesia. Kria Cave is located near Ayamaru Lakes, central Bird’s Head Peninsula.

Depicted in Figure 21 of Aplin *et al.* (1999), the molar is clearly from a specimen of *Macropogonomys gen. nov.* because it is consistent with other species in the genus in that it lacks both an oblique crest between t1 and t5, and a basal, anterior cingular pocket between t2 and t3 (which if present would conform with known species of *Pogonomys*). The molar, while of reduced size as compared to that of normal adult *M. loriae*, thereby implying closeness to either *M. mickpughi sp. nov.* or *M. mippughae sp. nov.*, has morphological similarities more like nominate *M. loriae* being the presence of distinct t1bis and t2bis and more anterior placement of t9 (which also excludes other named species in the genus *Macropogonomys gen. nov.*).

However, the fossil molar (M1) differs from the three other preceding species in lacking a cingular ridge between the posterobuccal cusplet and the base of the hypoconid, and in the greater size of the posterobuccal cusplet which directly abuts the anterobuccal cusplet. In the other three species the two are discrete, but linked by a short narrow crest.

These features in combination clearly indicate a species new to science and while normally I’d be loathe to name a new species on the basis of a tooth, it is likely the species remains extant in this region and is quite likely under existential threat from rapid ongoing deforestation in the region.

By naming this taxon in particular, it is hoped that live specimens can be found and proper protection and management practices invoked to ensure its survival.

Obviously features such as fur colour and the like of *M. aplini sp. nov*. cannot currently be determined.

Until now, species within the genus *Macropogonomys gen. nov.* have been treated as being within the putative genus *Pogonomys*, with a type species of *Pogonomys macrourus* Milne-Edwards, 1877.

Species within both these genera and the morphologically similar *Chiruromys* Thomas, 1888 (type species *Pogonomys forbesi* Thomas, 1888), that was originally conceived as a subgenus within *Pogonomys*, but in recent years has been treated as a separate full genus are separated from all other Muridae by the following unique suite of characters:

Skull with interorbital constriction apparent, and with rounded braincase; supraorbital ridges as a rule well developed. Rostrum long (e.g. *P. sylvestris* Thomas, 1920) to short (*P. forbesi* (Thomas, 1888) and others). Zygomatic plate and infraorbital foramen nearly of the specialized type found in *Crateromys* Thomas, 1895, but infraorbital foramen less narrowed than in that genus. Zygomata widely spreading. Bullae very small. Palate broad; incisive foramina shortened, and considerably in front of tooth row. Incisors usually broad and rather powerful.

Upper molars complex; the centre row of cusps the largest, but neither the inner nor the outer rows showing much sign of reduction. M.1 with ten cusps, including a strong T.7, and an extra outer posterior cusp; M.2 with nine cusps (only T.2 is suppressed); M.3 not much smaller than M.2, mostly trilaminate, and with no clear outer row. The pattern is evidently traceable even in old age, and wears down slowly. A small extra front cusp in front of foremost lamina of M.1 may be present. Lower teeth like *Chiropodomys* Peters, 1868, the outer subsidiary row of cusps very clear, nearly developing as an extra row, though not comparable to *Hapalomys* Blyth, 1859.

Mammae 1-2 = 6. Tail long, nearly naked, the hairs more or less vestigial; terminal portion above without scales, quite naked, transversely wrinkled, and obviously prehensile.

The scales of the rest of the tail not, as is usual in rodents, square or arranged in distinct rings, but more or less pentagonal or lozenge-shaped, and set in diagonal slanting series, somewhat like the dorsal scales of a snake. Hindfoot broad, of arboreal type, with the fifth digit elongated, but the hallux not opposable, or not fully so and bearing claw. Manus with D.3 rather shortened sometimes. Fur soft.

The genera *Macropogonomys gen. nov.* and *Pogonomys* are separated from the morphologically similar *Chiruromys* by having scales on the tail that are mosaic-formed, the apical edges not free and not jutting over the scales of the next row, versus scales of the tail with apical edges mostly formed into a rounded point, which juts over the scales of the next row (and terminal portion more developed in *Chiruromys*. Premaxillar region of skull lower and longer (i.e. not "Squirrel-formed"), versus premaxillar region of skull shorter (i.e. "Squirrel-formed") with rostrum shortened, and zygomata more spreading in *Chiruromys.* Palatal foramina wider posteriorly than anteriorly, versus not narrowed in front in *Chiruromys.* Simple molars, M.3 more reduced posteriorly, the fourth transverse row merged with the third, versus molars tending to be more complex, and fourth transverse row of M.3 usually not merged into the third row in *Chiruromys.*.

Species within *Macropogonomys gen. nov.* are separated from *Pogonomys* by their larger average maximum adult size and more robust build (head-body length 140-150 mm versus 120 mm, tail length 215-185 mm versus 170 mm), and noticeably enlarged molar teeth (versus not noticeably enlarged in *Pogonomys*) as well as the fact that the last 1-2 cm of tail has hair on it like on the body, versus not so in *Pogonomys.*

Macropogonomys gen. nov. are further separated from *Pogonomys* by having a conspicuous to inconspicuous darker ring of fur around the eye, often being black (versus wholly absent in *Pogonomys*, excluding the three very small grey bellied species within *Pogonomys*).

Distribution: *M. mippughae sp. nov.* is believed to occur in the Prince Alexander Mountains, Torricelli Mountains and Bewani Mountains in northern New Guinea both on the PNG and Indonesian sides.

Etymology: The new species *M. mippughae sp. nov.* is named in honour of Mip Pugh, of Geelong, Victoria, Australia, wife of former president of the Victorian Association of Amateur Herpetologists, Mick Pugh in honour of her huge contribution to herpetology in Australia including by breeding massive numbers of Agamid lizards and educating many others likewise.

MACROPOGONOMYS APLINI SP. NOV.

LSIDURN:LSID:ZOOBANK.ORG:ACT:24DFFC50-D295-4AAF-A5AF-65CCFFB3DDB5

Holotype: A preserved left upper molar tooth (M1) at the western Australian Museum, Perth, Western Australia, Australia, specimen number WAM 98.7.41, collected from Kria Cave, located near Ayamaru Lakes, central Bird's Head Peninsula, Papua. Indonesia, Latitude 1.2667 S., Longitude 132.2000 E. This government-owned facility allows access to its holdings.

Paratype: A preserved left lower molar tooth (M1) at the western Australian Museum, Perth, Western Australia, Australia, specimen number WAM 98.7.42 collected from Kria Cave, located near Ayamaru Lakes, central Bird's Head Peninsula, Papua. Indonesia, Latitude 1.2667 S., Longitude 132.2000 E.

Diagnosis: The species formally named herein as *Macropogonomys aplini sp. nov.* had been known to be new to science since originally discovered by Ken Aplin, but the formal naming of this taxon did not occur because of Ken Aplin's unexpected death from cancer in January 2019. Hence this formal description herein. *M. aplini sp. nov.* was originally identified by Aplin *et al.*

(1999) as being a species similar to putative *M. loriae* (Thomas, 1897). However that species as previously understood has also been divided in this paper.

Until now, *Macropogonomys mippughae sp. nov.* has been treated as a northern New Guinea population of *M. loriae* (Thomas, 1897).

Macropogonomys mickpughi sp. nov. also formally named in this paper is currently only known from the Eastern Highlands region of New Guinea and has also until now been treated as an unusual population of the well-known species *M. loriae* (Thomas, 1897).

M. loriae occurs in southern New Guinea, including as far east as Central Province (type locality) and west of there to include the Southern Highlands Province.

M. mickpughi sp. nov. is readily separated from *M. loriae* by its slightly smaller molar teeth (as compared to *M. loriae*) and a grey-furred belly, versus white or off-white in *M. loriae* and all other members of *Macropogonomys gen. nov.*.

Both *M. mickpughi sp. nov.* and *M. loriae* are readily separated from all other *Macropogonomys gen. nov.* by their large size (head-body length 150 mm, tail length 215 mm) and fur that is very dark brown to almost black in colour.

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Both *M. mickpughi sp. nov.* and *M. loriae* have obviously darker hair on the crown of the head than the body, which is not the case in *M. mippughae sp. nov.*.

The molars of *M. mickpughi sp. nov.* and *M. mippughae sp. nov.*, while reduced in size as compared to *M. loriae* are still noticeably enlarged, which is not the case in *Pogonomys* Milne-Edwards, 1877 species.

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However, the fossil molar (M1) differs from the three other preceding species in lacking a cingular ridge between the posterobuccal cusplet and the base of the hypoconid, and in the greater size of the posterobuccal cusplet which directly abuts the anterobuccal cusplet.

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Upper molars complex; the centre row of cusps the largest, but neither the inner nor the outer rows showing much sign of reduction. M.1 with ten cusps, including a strong T.7, and an extra outer posterior cusp; M.2 with nine cusps (only T.2 is suppressed); M.3 not much smaller than M.2, mostly trilaminate, and with no clear outer row. The pattern is evidently traceable even in old age, and wears down slowly. A small extra front cusp in front of foremost lamina of M.1 may be present. Lower teeth like *Chiropodomys* Peters, 1868, the outer subsidiary row of cusps very clear, nearly developing as an extra row, though not comparable to *Hapalomys* Blyth, 1859.

Mammae 1-2 = 6. Tail long, nearly naked, the hairs more or less vestigial; terminal portion above without scales, quite naked, transversely wrinkled, and obviously prehensile.

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The genera *Macropogonomys gen. nov.* and *Pogonomys* are separated from the morphologically similar *Chiruromys* by having scales on the tail that are mosaic-formed, the apical edges not free and not jutting over the scales of the next row, versus scales of the tail with apical edges mostly formed into a rounded point, which juts over the scales of the next row (and terminal portion more developed in *Chiruromys*. Premaxillar region of skull lower and longer (i.e. not "Squirrel-formed"), versus premaxillar region of skull shorter (i.e. "Squirrel-formed") with rostrum shortened, and zygomata more spreading in *Chiruromys.* Palatal foramina wider posteriorly than anteriorly, versus not narrowed in front in *Chiruromys.* Simple molars, M.3 more reduced posteriorly, the fourth transverse row merged with the third, versus molars tending to be more complex, and fourth transverse row of M.3 usually not merged into the third row in *Chiruromys.*.

Species within *Macropogonomys gen. nov.* are separated from *Pogonomys* by their larger average maximum adult size and more robust build (head-body length 140-150 mm versus 120 mm, tail length 215-185 mm versus 170 mm), and noticeably enlarged molar teeth (versus not noticeably enlarged in *Pogonomys*) as well as the fact that the last 1-2 cm of tail has hair on it like on the body, versus not so in *Pogonomys.*

Macropogonomys gen. nov. are further separated from *Pogonomys* by having a conspicuous to inconspicuous darker ring of fur around the eye, often being black (versus wholly absent in *Pogonomys*, excluding the three very small grey bellied species within *Pogonomys*).

Distribution: *M. aplini sp. nov.* is known only from the type material from Kria Cave, located near Ayamaru Lakes, central Bird's Head Peninsula, Papua. Indonesia, Latitude 1.2667 S., Longitude 132.2000 E. It is presumed to occur in nearby areas of the Bird's Head Peninsula, Papua. Indonesia, where suitable habitat remains. Deforestation and human population growth are both rampant in the area and combined with the threats posed by introduced pest species such as dogs, cats and other rodent taxa, the continued existence of this species (if still extant) is far from assured.

Etymology: Named in honour of the late Ken Aplin of Canberra, Australia, previously of Perth Western Australia, Australia in recognition of his many contributions to herpetology and mammalogy.

When meeting Ken Aplin once at the CSIRO Australian National Wildlife Collection to inspect various specimens, Aplin told me about how in 1998 he was approached by Wolfgang Wüster, a Welsh based academic (see Hoser 2015a-f), to audit species of venomous elapid snakes I had formally named in 1998 (see Hoser 1998a, 1998b) and if possible do a DNA analysis of them to prove that the species I had discovered were in fact "non-taxa".

Wüster even published this bald assertion, that all species named by myself (Raymond Hoser) in the period to year 2000 were all "non-taxa (Wüster *et al.* 2001).

Aplin did the task he was asked to do and contrary to Wüster's wishes, confirmed that in each and every case, the taxa named by myself in 1998 (six species) were all in fact valid.

The same request was made in terms of species of elapid snake and python I named in year 2000 (Hoser 2000a, 2000b) and again the results were the same. Likewise for a request made to refute the taxonomy of my pythons paper in year 2004 (see Hoser 2004)

In 1999, Aplin did in fact publish a paper confirming the validity of the species *Acanthophis wellsei* Hoser, 1998 (see Aplin and Donnellan, 1999), which enraged Wüster.

Wüster then harassed Aplin to not publish similar confirmatory works in terms of the other taxa.

However Aplin did get colleagues Rawlings *et al.* (2008) to publish confirmation of the validity of the snake genus *Broghammerus* Hoser, 2004.

Noting that *Broghammerus* happened to be the best known and longest snake on the planet, the Reticulated Python and from 2008 onwards everyone else in herpetology was ignoring Wüster's unscientific rants against "Hoser Taxonomy", Wüster became enraged and changed his line of attack.

He then decided to "dispense with the rules of the Code" his exact words, the "Code" being the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999), which dictate the rules of naming species for all scientists worldwide (see also Wüster 2020).

Wüster did this, via his document Kaiser *et al.* (2013), actually published by Wüster himself a year prior via a SPAM email to thousands of herpetologists.

As with the "paper' he published in 2001 (Wüster *et al.* 2001), Wüster also author shopped this piece to get half a dozen other alleged co-authors, although in the original emails sent out by his friend Hinrich Kaiser (Kaiser 2012a), we know that the sole author of what became known as Kaiser *et al.* (2013), was none other than the evil scheming, Wolfgang Wüster himself.

Wüster and his cohort then using the doctrine of Kaiser *et al.* (2013), decided to engage in taxonomic vandalism and rename species and genera previously named by myself (Raymond Hoser). As of mid 2020 this totalled nearly 100 genera and species illegally renamed by Wüster and his cohort of thieves, including taxa named by 1800's greats such as John Edward Gray, Wilhelm Karl Hartwich Peters and Leopold Joseph Franz Johann Fitzinger.

A 2019 list of about 70 of the taxa illegally renamed by the Wüster gang of thieves can be found online at: http://www.smuggled.com/Taxonomic-vandalism-a-recent-list-of-illegally-coined-names.htm

or

http://www.smuggled.com/Taxonomic-vandalism-Wüster-gang-of-thieves-list-of-known-illegally-renamed-taxa-as-of-1-August-2019.pdf

The Wolfgang Wüster gang of thieves had been at war against the rules of the *International Code of Zoological*

Nomenclature (Ride *et al*. 1999) previously (see Hoser 2007), but fortunately the ICZN ruled against the thieves (see references to the ICZN cases in Hoser 2007).

Their more recent war cry manifesto known as "Kaiser *et al*. (2013)", although in fact written by Wolfgang Wüster (see Kaiser 2012a) as frequently amended (see also Kaiser 2012, 2012b, 2013, 2014a and 2014b) and the claims within it, have been discredited numerous times (e.g. Cogger (2014), Dubois (2014), Dubois *et al*. (2019), Eipper (2013), Hoser (2007, 2009, 2012a, 2012b, 2015a-f, 2016, 2019a-b), Mutton (2014a, 2014b), Shea (2013a-d), Thorpe (2013, 2014a, 2014b), Wellington (2013, 2014a, 2014b, 2016), Wells (2013, 2014) and sources cited therein).

Notwithstanding these setbacks the Wolfgang Wüster gang remain undeterred and continue to commit acts of internet trolling, running countless fake accounts online for peddling hatred and lies, as well as engaging in overt scientific fraud, property theft, assault, vandalism, money fraud, money laundering, rapes, child sex offences, trafficking of amphetamines, animal abuse and cruelty, wildlife scams, shooting people (yes, two of the group have been convicted of this) and other serious crimes (Supreme Court of Western Australia 2009, Hobbs 2010, Goodman 2019).

Some members of the group have been charged and jailed for various criminal acts, including for example David John Williams, convicted and fined $7,500 for animal cruelty and wildlife smuggling at the Cairns Magistrates Court, Damien Mark Harding jailed for child sex offences, Seth Pywell fined for his role in the shooting two people, Matthew Gatt fined $8,000 for the theft of a snake and Andrew Browne jailed for child sex offences, but the group ring leaders Wolfgang Wüster, Hinrich Kaiser, Mark O'Shea and Wulf Schleip have managed to avoid criminal charges to date.

Wolfgang Wüster and Mark O'Shea even post images of themselves committing crimes online, but have somehow managed to avoidgetting charged.

Aplin advised me that he'd been aggressively badgered by Wüster to illegally rename the species *Acanthophis wellsei* Hoser, 1998 and the other Death Adder species I had named in the 21 years to 2019 and to act illegally outside the *International Code of Zoological Nomenclature* (Ride *et al.* 1999) to do so. To his credit, Ken Aplin did the honest and correct thing and refused the Wüster demand.

POGONOMYS SHARONHOSERAE SP. NOV.

LSIDURN:LSID:ZOOBANK.ORG:ACT:ACAE3FAE-C024-4B61-B5F6-CC1D366A503A

Holotype: A preserved specimen in the American Museum of Natural History, New York, USA, specimen number AMNH 150948 collected from Bele River, Irian Jaya, Indonesia, Latitude -4.12 S, Longitude 138.67 E. This facility allows access to its holdings.

Paratypes: 18 preserved specimens in the American Museum of Natural History, New York, USA, specimen numbers AMNH 150949-50, 151005-8, 151059-66, 151194-7 all collected from near Bele River, Irian Jaya, Indonesia 18 kilometers north of Lake Habbema, at 2200 meters.

Diagnosis: Until now *Pogonomys sharonhoserae sp. nov.* has been treated as a western population of *P. sylvestris* Thomas, 1920, with a type locality of Rawlinson Mountains in Morobe Province, north-east Papua New Guinea.

P. sharonhoserae sp. nov. is readily separated from *P. sylvestris* by their larger size (adult head body length 120 mm, tail 175 mm, versus adult head body length 110 mm and tail length 160 mm in *P. sylvestris*) and drab grey dorsal colouration, with almost no brown, versus bright reddish "Auburn" brown in the type form of *P. sylvestris*.

Sides of *P. sharonhoserae sp. nov*. lack the well defined rufous colouration seen on the flanks in both *P. championi* Flannery, 1988 and *P. sylvestris.*

P. championi Flannery, 1988 the only other grey-bellied species in the genus is unique within its genus in that the tail lightens, beginning from the distal end, with age. There is no clearly demarkated white tail tip, but rather the tail lightens imperceptably distally. In aged individuals almost the entire tail can be ivory in colour (Flannery 1988). It further differs from both *P. sharonhoserae sp. nov*. and *P. sylvestris* by lacking a distinct white tail tip (but rather having the pale distal portion of the tail intergrade into the darker base), in possessing more extensive white tipping on the ventral fur, and in being strongly rufescent on dorsum as well as the sides of the body.

The three preceding species are further separated from all other *Pogonomys* Milne-Edwards, 1877 and *Macropogonomys gen. nov*. (until now treated as species in the genus *Pogonomys*) by the following suite of characters: Medium species with slaty bases to the belly hairs. Fur long, soft, and fine. General colour above is darkish; under surface greyish; the hairs broadly slaty basally with creamy whitish tips. Hands and feet are pale buffy in colour. Tail pale brown, its fine sparse hairs are whitish in colour.

The skull slender in build, of standard murine proportions without enlarged molars. The muzzle is not shortened and the zygomata are not abruptly thrown outwards. Nasals long and narrow. Supraorbital edges more parallel than usual, not strongly divergent posteriorly, the edges themselves are square but not ridged. Palatal foramina short (modified from Thomas, 1920).

Until now, species within the genus *Macropogonomys gen. nov.* have been treated as being within the putative genus *Pogonomys* Milne-Edwards, 1877, with a type species of *Pogonomys macrourus* Milne-Edwards, 1877.

Species within both these genera and the morphologically similar *Chiruromys* Thomas, 1888 (type species *Pogonomys forbesi* Thomas, 1888), that was originally conceived as a subgenus within *Pogonomys*, but in recent years has been treated as a separate full genus are separated from all other Muridae by the following unique suite of characters:

Skull with interorbital constriction apparent, and with rounded braincase; supraorbital ridges as a rule well developed. Rostrum long (e.g. *P. sylvestris* Thomas, 1920) to short (*P. forbesi* (Thomas, 1888) and others). Zygomatic plate and infraorbital foramen nearly of the specialized type found in *Crateromys* Thomas, 1895, but infraorbital foramen less narrowed than in that genus. Zygomata widely spreading. Bullae very small. Palate broad; incisive foramina shortened, and considerably in front of tooth row. Incisors usually broad and rather powerful.

Upper molars complex; the centre row of cusps the largest, but neither the inner nor the outer rows showing much sign of reduction. M.1 with ten cusps, including a strong T.7, and an extra outer posterior cusp; M.2 with nine cusps (only T.2 is suppressed); M.3 not much smaller than M.2, mostly trilaminate, and with no clear outer row. The pattern is evidently traceable even in old age, and wears down slowly. A small extra front cusp in front of foremost lamina of M.1 may be present. Lower teeth like *Chiropodomys* Peters, 1868, the outer subsidiary row of cusps very clear, nearly developing as an extra row, though not comparable to *Hapalomys* Blyth, 1859.

Mammae 1-2 = 6. Tail long, nearly naked, the hairs more or less vestigial; terminal portion above without scales, quite naked, transversely wrinkled, and obviously prehensile.

The scales of the rest of the tail not, as is usual in rodents, square or arranged in distinct rings, but more or less pentagonal or lozenge-shaped, and set in diagonal slanting series, somewhat like the dorsal scales of a snake. Hindfoot broad, of arboreal type, with the fifth digit elongated, but the hallux not opposable, or not fully so and bearing claw. Manus with D.3 rather shortened sometimes. Fur soft.

The genera *Macropogonomys gen. nov.* and *Pogonomys* are separated from the morphologically similar *Chiruromys* by having scales on the tail that are mosaic-formed, the apical edges not free and not jutting over the scales of the next row, versus scales of the tail with apical edges mostly formed into a rounded point, which juts over the scales of the next row (and terminal portion more developed in *Chiruromys*. Premaxillar region of skull lower and longer (i.e. not "Squirrel-formed"), versus premaxillar region of skull shorter (i.e. "Squirrel-formed") with rostrum shortened, and zygomata more spreading in *Chiruromys.* Palatal foramina wider posteriorly than anteriorly, versus not narrowed in front in *Chiruromys.* Simple molars, M.3 more reduced posteriorly, the fourth transverse row merged with the third, versus molars tending to be more complex, and fourth transverse row of M.3 usually not merged into the third row in *Chiruromys*..

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Distribution: *P. sharonhoserae sp. nov.* is presently only definitively known from the type locality, but is likely to occur in nearby parts of the central cordillera in West Papua, Indonesia.

Etymology: The new species *P. sharonhoserae sp. nov.* is named in honour of Sharon Hoser of Perth, Western Australia in recognition of her services to herpetology in the 1960's and 1970's.

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CONFLICTS OF INTEREST

None.

SPECIES LIST

***Pogonomys* Milne-Edwards, 1877**

***Pogonomys macrourus* Milne-Edwards, 1877 (type species)**
***P. championi* Flannery, 1988**
P. sharonhoserae sp. nov.
***P. sylvestris* Thomas, 1920**

SPECIES LIST

Macropogonomys gen. nov.

***Macropogonomys maxhoseri sp. nov.* (type species)**
M. aplini sp. nov.
***M. fergussoniensis* (Laurie, 1952)**
***M. loriae* (Thomas, 1897)**
M. mickpughi sp. nov.
M. mippughae sp. nov.
***M. mollipilosus* (Peters and Doria, 1881)**

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