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A new subgenus, three new species and one new subspecies of Ring-tailed Possums (Marsupialia: Petauridae) from the north of Australia.

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ABSTRACT

A review of the taxonomy of the Australian Ring-tailed Possums in the associated putative genera *Petropseudes* Thomas, 1923 (Rock Ringtail Possums) of Australia's dry tropics region and *Pseudochirops* Matschie, 1915, of Australia's wet tropics region was conducted.

Including just two putative species *Petropseudes dahli* (Collett, 1895) and *Pseudochirops archeri* (Collett, 1884) (Green Ringtail Possum), the study involved inspection of specimens of each form across their known distributions.

In the case of both putative taxa, there was found to be significant variation in morphology in regionally disjunct populations located across well-known biogeographical barriers of known antiquity.

As a result, *Petropseudes dahli* (Collett, 1895) was found to consist of no less than four species. Three are formally named for the first time in accordance with the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

Meredith *et al.* (2010) noted a six million year divergence of this species group from nominate *Pseudochirops.* On this basis *Petropseudes* is designated a subgenus within *Pseudochirops* as originally intended by Thomas (1923).

Pseudochirops archeri (Collett, 1884) of North Queensland was found to include two morphologically divergent and reproductively isolated populations in close proximity, but on either side of the so-called Black Mountain Corridor (or barrier) as identified by Bryant and Krosch (2016). The unnamed population is herein formally named as a new subspecies.

The Australian endemic, *Pseudochirops archeri* is not only divergent from the other known members of the genus *Pseudochirops* Matschie, 1915, (all from the New Guinea subregion), but also the taxon currently called *Petropseudes dahli* herein treated as being within *Pseudochirops*. Meredith *et al.* (2010) estimated a divergence of *Pseudochirops archeri* from nearest common ancestors of the other species at about eight MYA and so a new subgenus is erected to accommodate this species.

Keywords: Mammals; Marsupial; Petauridae; taxonomy; nomenclature; possum; Ring-tailed possum; *Petropseudes*; *Pseudochirops*; *Pseudocheirus*; *dahli*; *archeri*; Australia; Queensland; Northern Territory; Western Australia; New Guinea; wet tropics; dry tropics; subgenus; new subgenus; *Sloppossum*; new species; *fiacummingae*; *jamesbondi*; *waddamaddawidyu*; new subspecies; *chrismaxwelli*.

INTRODUCTION

Over a period of more than 30 years doing fieldwork involving wildlife across northern parts of Australia, specimens of Rock Ringtail Possums *Petropseudes dahli* (Collett, 1895) were observed in the Northern Territory and Western Australia both in the wild and in captivity.

It was observed by myself and without fanfare that they differed significantly in morphology, as one would expect when seeing the same putative species at locations more than 1,000 km apart. Hence it came as a surprise that one of the two populations was effectively unrecognized taxonomically, even though the two relevant populations were split across a well-known biogeographical barrier near the Northern Territory / Western Australian border.

In fact the nominate form, originally described as *Pseudochirops dahli* Collett, 1895 with a type locality of Mary River, Northern

Territory (Kakadu area) is the only available name for any populations of this putative species (Bannister *et al.* 1988).

Hence it was decided to undertake a review of the putative species across the known range from north-west Queensland, across the Northern Territory and into the Kimberley division of north-west Western Australia, to ascertain the status of given populations and whether any should be accorded species or subspecies-level recognition.

Counter to this proposition is whether or not clines exist between regional forms, or did so in the recent past and in the process of investigation it soon became apparent that none existed.

With each of four main known populations being morphologically divergent and having been reproductively isolated for some geological time, it then became a matter of deciding at what level of classification each should be identified as.
While such a decision is subjective, due to the likelihood that divergences between populations are likely to be measured in the millions of years, I had no hesitation in deciding to name the three main unnamed populations as species.

Obviously this decision was also made after consulting all relevant literature in terms of this and similar species and other vertebrate species in the same regions and affected by the same biogeographical features and timelines (see for example Potter *et al.* 2014).

In the case of the three putative candidate taxa, the well-known biogeographical barriers had known antiquity.

As a result, *Petropseudes dahli* (Collett, 1895) was found to consist of four species. Three are formally named for the first time in accordance with the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

Meredith *et al.* (2010) noted a six million year divergence of this species group from nominate *Pseudochirops* which is a relevant fact that would be hard to miss in any review of the putative species.

On this basis *Petropseudes* Thomas, 1923 is designated a subgenus within *Pseudochirops.*
I note that this is exactly as originally intended by Thomas (1923) who in fact created the name *Petropseudes*.

Another species I had the good fortune to observe in the wild on a number of occasions was *Pseudochirops archeri* (Collett, 1884) of North Queensland, better-known as the Green Ringtail Possum.

It was also reviewed and found to include two morphologically divergent and reproductively isolated populations in close proximity, but on either side of the so-called Black Mountain Corridor (or barrier) as identified by Bryant and Krosch (2016). With the type locality for the species being the Herbert River area of north Queensland, within the southern wet tropics area, this meant that the northern population from the Mount Lewis area was effectively unnamed.

Notwithstanding the known antiquity of the *P. archeri* lineage as found by Meredith *et al.* (2010), the morphological divergence of the two populations and geographical proximity of them has led me to take a conservative position with regards to taxonomy and the unnamed form is herein named as a new subspecies.

The Australian endemic, *Pseudochirops archeri* is not only divergent from the other known members of the genus *Pseudochirops* Matschie, 1915, (all from the New Guinea subregion), but also the taxon currently called *Petropseudes dahli* herein treated as being within *Pseudochirops*.

Meredith *et al.* (2010) estimated a divergence of *Pseudochirops archeri* from nearest common ancestors of the other species at about eight MYA and so a new subgenus is erected to accommodate this species.

Based on the published divergences within Meredith *et al.* (2010), if one were to continue to regard *Petropseudes* as a valid genus, then one would have no choice but to treat the species *Pseudochirops archeri* as being within a separate genus, necessitating the elevation of the new subgenus *Sloppossum subgen. nov.* to full genus status.

I note that *Sloppossum subgen. nov.* is in fact more divergent than *Petropseudes.*

MATERIALS, METHODS AND RESULTS

Before a decision is made to name any new taxon, reasonable steps must be taken to ensure that it is justified on all relevant grounds, including that it is morphologically, genetically and reproductively isolated from their nearest relative and to a sufficient degree to be of taxonomic significance.

A further relevant question to ask is should the reproductively isolated and morphologically divergent entities be labelled as subspecies, full species, or potentially higher level again.

Key literature relevant to the taxonomic and nomenclatural conclusions within this paper include

Bannister *et al.* (1988), Bryant and Krosch (2016), Collett (1884), Collins (1973), Eldridge *et al.* (2018), Flannery (1995), Goodfellow (1993), Groves *et al.* (2005), Iredale and Troughton (1934), Jones *et al.* (2006), Laurance (1990), Lawlor (1979), Matschie (1915), Maxwell *et al.* (1986), Menkhorst (2001), Meredith *et al.* (2010), Menzies (1991), Moritz *et al.* (1993), Potter *et al.* (2014), Ride (1970), Ride *et al.* (1999), Runcie (1999), Strahan (as editor) (1988), Thomas (1888, 1922, 1923), van Ufford and Cloos (2005), Vaughan (1986) and sources cited therein (duplicitous references not necessarily included).

Live and dead specimens as well as available bone specimens, were examined as was other relevant material, including past climate data for the relevant regions, sea level depths, and other important information.

In summary, as inferred already, the genetic, geological, historical and morphological evidence clearly showed that both of *Petropseudes dahli* (Collett, 1895) (Rock Ringtail Possums) and *Pseudochirops archeri* (Collett, 1884) (Green Ringtail Possum) as currently understood required species-level divisions and a refinement of their genus-level placements.

SUMMARY OF THE RESULTS

Petropseudes dahli (Collett, 1895) (Rock Ringtail Possums), are found across the dry tropics of Australia from north-west Queensland in the vicinity of Lawn Hill, along the southern shore of the Gulf of Carpentaria and across the top end of the Northern Territory to the western Kimberley Ranges in Western Australia.

However a closer inspection of collection records and reliable sightings shows that the putative species is in fact confined to rocky regions, including outliers and nowhere else, in effect confining the distribution to four main areas in drier parts of northern Australia.

These are:

1/ The type locality around the Arnhem Land escarpment in the middle of the top end of the Northern Territory.

2/ Rocky parts of far north-west Queensland, extending along the western shoreline of the Gulf of Carpentaria, into the Northern Territory.

3/ Groote Eylandt.

3/ The Western part of the Kimberley division of Western Australia.

The two westernmost populations are well separated by the corridor of the Victoria River system in the north-west of the Northern Territory and the East Kimberley.

There are some alleged sighting records within the eastern part of this zone, but even allowing them to be accurate and reliable, (which is a leap of faith in itself, noting there are other morphologically similar species in the same region) one still finds a zone of several hundred kilometres in a straight line that has never had any putative *P. dahli* recorded in any way, even though it includes areas heavily collected by State Museums. Hence the absence of specimen records must be attributed to an absence of specimens as opposed to an absence of collecting.

The gap between the central (NT) and mainland eastern NT/ Queensland populations corresponds to a flat zone of unsuitable habitat stretching at least 100 km (being east of the Arnhem Land escarpment), this area not expecting to have populations and for which no sighting or other records exist.

Hence, even in the absence of inspection of specimens, there is an inescapable conclusion that the three main mainland populations must be reproductively separated.
There is no evidence to suggest that actions by humans since first settlement 40K MYA to present or changes wrought by ice age climate fluctuations have altered the biogeography of the relevant part of Australia to change the current status quo with regards to population mobility.

I also note that there is no evidence this putative species (*P. dahli*) has ever made it to New Guinea, even though its current distribution sits proximal to a historical land bridge to southern New Guinea.
This is further evidence supporting the contention of habitat fidelity for the putative species and that dispersal is not likely between known and well-spaced populations.

By straight line measurement the Groote Eylandt population is about 100 km from the nearest known population on the mainland of Australia, situated to the south-west.

Groote Eylandt is known to have endemic species and subspecies of reptile and mammals for which divergences are well-known and with this in mind specimens of *P. dahli* from there were inspected, with a view to potentially identifying a fourth species.
Although they were morphologically most similar to the specimens from the Gulf of Carpentaria, including in terms of the diagnostic features for that species, they are easily separable and have therefore been named herein as a separate and newly named species.

I also note that biogeographically, the fauna of Groote Eylandt is more closely affiliated with that of the Arnhem Land escarpment than it is to that from the southern Gulf of Carpentaria, which implies further morphological divergence of the Groote Eylandt form as compared to that from the Arnhem Land region.

Significantly the taxonomic division of the original putative species *Petropseudes dahli* is across exactly the same biogeographical barriers as used to divide the putative species *Odatria* (*Kimberleyvaranus*) *glebopalma* (Mitchell, 1955) by Hoser (2018) who in turn referred to Hoser (2014)

As already mentioned, Meredith *et al.* (2010) noted a six million year divergence of this species group from nominate *Pseudochirops* which is a relevant fact that would be hard to miss in any review of the species.

On this basis *Petropseudes* is herein designated a subgenus within *Pseudochirops.*
I note that this is exactly as originally intended by Thomas (1923) who in fact created the name *Petropseudes*.

In effect this means that the Rock Ringtail Possums of the dry tropics of northern Australia, now consist of four species, three of which are named for the first time in accordance with the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

These are:

1/ *Pseudochirops* (*Petropseudes*) *dahli* (Collett, 1895) herein restricted to the Arnhem Land escarpment and immediately adjacent outliers in the Northern Territory.

2/ *Pseudochirops* (*Petropseudes*) *fiacummingae sp. nov.* from the west and north of the Kimberley Division of Western Australia.

3. *Pseudochirops* (*Petropseudes*) *jamesbondi sp. nov.* from north-west Queensland and nearby parts of far eastern Northern Territory, generally south and west of the Gulf of Carpentaria.

4. *Pseudochirops* (*Petropseudes*) *waddamaddawidyu sp. nov.* from Groote Eylandt, Northern Territory.

Pseudochirops archeri (Collett, 1884) of North Queensland was also scrutinized as it was known to have two populations on either side of the so-called Black Mountain Corridor (or barrier) as identified by Bryant and Krosch (2016), being a barrier I have exploited to find and identify a series of new and previously cryptic species as seen for example in Hoser (2016a, 2016b) or see Moritz *et al.* (1993).

Like *Pseudochirops* (*Petropseudes*) *dahli* (Collett, 1895), *P. archeri* exhibits strong habitat fidelity and there is no evidence to suggest it can breach the Black Mountain Corridor in the current interglacial, let alone in glacial periods when the same corridor would be wider and drier and less able to be breached by a rainforest obligate species.

Jones *et al.* (2006) found the that in terms of diet for the putative species *P. archeri* that "Over 50% of tree use was from only four tree species, *Aleurites rockinghamensis*, *Ficus fraseri*, *Arytera divaricata* and *Ficus copiosa*.", all of which are rainforest obligate species not found in the region of the Black Mountain Gap (as per ALA records of all types), or unlikely to have been there in a glacial phase, when the relevant area would have been even drier than present.

Inspection of specimens of *P. archeri* found *P. archeri* to include two morphologically divergent and reproductively isolated populations in close proximity, but on either side of the so-called Black Mountain Corridor (or barrier) as identified by Bryant and Krosch (2016). The unnamed population is herein formally named as a new subspecies *P. archeri chrismaxwelli subsp. nov.*, being within the subgenus *Sloppossum subgen. nov.* as explained below.
The Australian endemic, *Pseudochirops archeri* is not only divergent from the other known members of the genus *Pseudochirops* Matschie, 1915, (all from the New Guinea subregion), but also the taxon currently called *Petropseudes dahli* herein treated as being within *Pseudochirops* due to its affinity to that genus to the exclusion of all others.

Meredith *et al.* (2010) estimated a divergence of *Pseudochirops archeri* from nearest common ancestors of the other species at about eight MYA.

The species is also significantly morphologically divergent to all others within *Pseudochirops* and so a new subgenus is erected to accommodate this species.

The subgenus *Sloppossum subgen. nov.* is formally named and defined in this paper before the species and subspecies (in that order) in accordance with online requests and directives by the ICZN and managers of their name repository, "Zoobank".

INFORMATION RELEVANT TO THE FORMAL DESCRIPTIONS THAT FOLLOW

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

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

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

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

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

Material downloaded from the internet and cited anywhere in this

paper as being sourced online was downloaded and checked most recently as of 10 March 2020 (including if also viewed prior), unless otherwise stated and was accurate in terms of the content (as described) cited herein as of that date.

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

Colour descriptions of species refer to 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.

SLOPPOSSUM SUBGEN. NOV.

LSID urn:lsid:zoobank.org:act:536D6D52-E877-4084-8D7C-4DA758870BE6

Type species: *Phalangista* (*Pseudochirops*) *archeri* Collett, 1884.

Diagnosis: The subgenus *Sloppossum subgen. nov.* within the genus *Pseudochirops* Matschie, 1915 is readily separated from all other species in the genus *Pseudochirops* and all other morphologically similar Petauridae by the following unique suite of characters: Ears very short, broader than long. Tail is white-tipped. Body form is thick and stout. Colour greenish yellow to yellow with a slight greenish tinge, with three vague darker and two lighter dorsal stripes. Molars 1-3 are 13.6 mm. Dental series nearly or quite continuous; incisor 2 elongated horizontally, its antero-posterior diameter twice that of incisor 3. Upper edge of lower incisor 1 is concave. The skull and dentition are superficially similar to that of the New Guinean species *Pseudochirops albertisi* (Peters, 1874), but are readily separated from that taxon by having large and stout teeth, relative to the more typically sized dentition in the New Guinean species.

The subgenus *Sloppossum subgen. nov.* can be further diagnosed as follows: Fur soft, close, and thick. General colour grizzled yellowish to greenish-yellow. Face grey, passing into greenish yellow on the crown. Eye with distinct or semi-distinct crescentic pale yellow or white spots above and below it. Ears very short, rounded, hairy, their posterior edges and a large spot beneath their bases prominently white. Nape with a distinct black central line passing down it on to the back. Back greenish yellow to yellow, with two whitish lines margining the black central one, and these again with two indistinct darker ones outside them. Chin is greyish white, chest and belly pure white or off-white, the line of demarcation either sharply marked or ill-defined. Limbs like back, but rather greyer. Tail is thick basally, rapidly tapering; its basal two thirds coloured like the back, its tip white. Naked part beneath tip is less than half the length of the tail.

Distribution: Restricted to the wet tropics bioregion of Australia from Mount Spec, north of Townsville, north Queensland in the south, along the coastal rainforests, generally at high elevation running north to the Mount Windsor Tableland in the north.

Etymology: The first part of the genus name “Slop” is in recognition of the author’s Great Dane dog, named “Slop” for services in guarding the research facility and wildlife for many years and the second part of the genus name is a direct usage of the word “Possum” as the type of animal is known and hence “*Sloppossum*”.

Content: *Pseudochirops (Sloppossum*) *archeri* (Collett, 1884) including both subspecies.

PSEUDOCHIROPS (PETROPSEUDES) FIACUMMINGAE SP. NOV.

LSID urn:lsid:zoobank.org:act:B911B1A2-8A5E-4758-81A1-FD2B5EDDFFDC

Holotype: A preserved adult female specimen in the Western Australian Museum, Perth, Western Australia, Australia, specimen number M15934 collected from an outlier on the southern edge of the King Leopold Ranges, Western Australia, Australia, Latitude -17.2 S., Longitude 124.8 E. This government-owned facility allows access to its holdings.

Paratype: A preserved male specimen in the Western Australian Museum, Perth, Western Australia, Australia, specimen number M18158 collected from an outlier on the southern edge of the King Leopold Ranges, Western Australia, Australia, Latitude -17.3 S., Longitude 124.7 E

Diagnosis: Until now, all populations of so-called Rock Ringtail Possum have been assigned to the same putative species, namely *Pseudochirops* (*Petropseudes*) *dahli* (Collett, 1895) with a type locality of Mary River. Northern Territory, Australia.

That form is now herein restricted to the type locality and adjacent hills and outliers, essentially including the Arnhem Land escarpment and adjacent hills and ranges to the south and west.

This species and the three newly described forms herein can be readily separated from one another by consistent differences in colour of pelage on various parts of the head and body.

Nominate *P. dahli* is readily separated from the other three species by having dark grey pelage and with mid line, from snout being distinct, thick, blackish in colour and extends past the crown of the head. This line becomes wider and darker between eyes and snout and again before a line between the ears. There is a strongly dark reddish brown overlay on fur of the upper legs. Yellowish white under forebody. The white above and below the eye, giving the appearance of a tight circle around the eye is very well defined. Inside of ears is salmon colour with significant blackening towards the outer edges.

Pseudochirops (*Petropseudes*) *fiacummingae sp. nov.* from the Kimberley district of north-west Western Australia has a light grey pelage with the mid line from snout distinct, thin, blackish in colour and it goes past the crown of the head, without thickening between the eyes and snout or again before the line between the ears. White under forebody.

The white above and below the eye giving appearance of tight circle around eye is not well defined. Inside of ears is orange to salmon colour with no blackening on the outer edges. Very weak reddish brown overlay on fur of upper legs.

Pseudochirops (*Petropseudes*) *jamesbondi sp. nov.* from the southern and western edges of the Gulf of Carpentaria in Queensland and the Northern Territory, Australia has a has light grey to mouse brown pelage and with the mid-line from the snout not going past the crown, being very indistinct and is grey in colour, breaking up as it moves up the snout. White under forebody.

The white above and below the eye giving an appearance of a tight circle around the eye is well defined. Inside of ears is yellow-orange becoming brownish on the outer edges.

There is no obvious reddish brown or orange overlay on the fur of upper legs save for the same slight and very feint orange overlay as seen over all parts of the body.

Pseudochirops (*Petropseudes*) *waddamaddawidyu sp. nov.* from Groote Eylandt, Northern Territory, Australia, is similar in most respects to *P. jamesbondi sp. nov.* except for the obvious and strong light orange colour of the rear of the rump and the back legs (versus either not so, or only faint orange tinge in Gulf form, being in line with the rest of the dorsal surface). The mid-line marking from the snout does not go beyond the crown as in it terminates well before it and it is grey in colour.

This marking is noticeably widest at the midpoint between the eyes, appearing like an elongated diamond shape. Fur on the lower forelimbs also has a strong orange tinge, but this is only on the tips, rather than all over as seen on the hind limbs.

All four species of possum in the subgenus *Petropseudes* Thomas, 1923 (see above) are readily separated from all other

possums occurring in the same region in western Queensland, the Northern Territory and Western Australia by a combination of having a much shorter tail, being less than two thirds the length of the head and body as well as having very dense fur.

Photos of *Pseudochirops dahli* (Collett, 1895) in life can be seen in Strahan (1988) at page 132 (top) and online at:

https://www.flickr.com/photos/88708273@N03/40093596073/

and at:

https://www.flickr.com/photos/128365570@N04/42868251355/

both from Arnhem Land, Northern Territory, Australia.

Photos of *Pseudochirops* (*Petropseudes*) *fiacummingae sp. nov.* in life can be seen online at:

https://www.flickr.com/photos/mattsummerville/48131308123/

from Prince Regent, Western Australia, Australia, and at:

https://www.flickr.com/photos/54876436@N08/9247200620/

from Theda Station, Western Australia.

Photos of *Pseudochirops* (*Petropseudes*) *jamesbondi sp. nov.* in life can be seen online at:

https://www.flickr.com/photos/colonel_007/49215178836/

from Hells Gate, Queensland, Australia and at:

https://www.flickr.com/photos/58349528@N02/46592424132/

from Roper Bar, Northern Territory, Australia.

Pseudochirops (*Petropseudes*) *waddamaddawidyu sp. nov.* from Groote Eylandt, Northern Territory, Australia, in life can be seen online at:

https://denr.nt.gov.au/__data/assets/pdf_file/0003/758307/groote-archipelago-threatened-species-management-plan-2019-2028.pdf

(see page 7)
Document is called
"Groote Archipelago Threatened Species Management Plan 2019-2028"
and is a 64 page pdf posted online but has no listed author or publisher.

Distribution: *Pseudochirops fiacummingae sp. nov.* is known only from the hilly, rocky parts of the Kimberley division of Western Australia, with almost all records in the west and north-west part of the region.

Etymology: Named in honour of one of Australia's best ever investigative journalists, Fia Cumming of Lyons in the ACT, Australia in recognition for her services to journalism and wildlife conservation in Australia. Further detail can be found in Hoser (1996).

PSEUDOCHIROPS (PETROPSEUDES) JAMESBONDI SP. NOV.

LSID urn:lsid:zoobank.org:act:B7A2B620-A907-4FB9-982A-ADDAAC5D6DD5

Holotype: A preserved specimen (skeleton and skin) at the Museum and Art Gallery of the Northern Territory Mammal Collection, specimen number U1155 collected from Echo Gorge, Wollogorang Station, Northern Territory, Australia, Latitude -17.18 S., Longitude 137.72 E. This government-owned facility allows access to its holdings.

Paratypes: Two preserved specimens at the Museum and Art Gallery of the Northern Territory Mammal Collection, specimen numbers U4186 and U4187 collected from Aquarium Springs Gorge, Wollogorang Station, Northern Territory, Australia, Latitude -17.48 S, Longitude 137.63 E.

Diagnosis: Until now, all populations of so-called Rock Ringtail Possum have been assigned to the same putative species, namely *Pseudochirops* (*Petropseudes*) *dahli* (Collett, 1895) with a type locality of Mary River. Northern Territory, Australia.

That form is now herein restricted to the type locality and adjacent hills and outliers, essentially including the Arnhem Land escarpment and adjacent hills and ranges to the south and west.

This species and the three newly described forms herein can be readily separated from one another by consistent differences in colour of pelage on various parts of the head and body.

Nominate *P. dahli* is readily separated from the other three species by having dark grey pelage and with mid line, from snout being distinct, thick, blackish in colour and extends past the crown of the head. This line becomes wider and darker between eyes and snout and again before a line between the ears. There is a strongly dark reddish brown overlay on fur of the upper legs. Yellowish white under forebody. The white above and below the eye, giving the appearance of a tight circle around the eye is very well defined. Inside of ears is salmon colour with significant blackening towards the outer edges.

Pseudochirops (*Petropseudes*) *jamesbondi sp. nov.* from the southern and western edges of the Gulf of Carpentaria in Queensland and the Northern Territory, Australia has a has light grey to mouse brown pelage and with the mid-line from the snout not going past the crown, being very indistinct and is grey in colour, breaking up as it moves up the snout. White under forebody.

The white above and below the eye giving an appearance of a tight circle around the eye is well defined. Inside of ears is yellow-orange becoming brownish on the outer edges.

There is no obvious reddish brown or orange overlay on the fur of upper legs save for the same slight and very feint orange overlay as seen over all parts of the body.

Pseudochirops (*Petropseudes*) *fiacummingae sp. nov.* from the Kimberley district of north-west Western Australia has a light grey pelage with the mid line from snout distinct, thin, blackish in colour and it goes past the crown of the head, without thickening between the eyes and snout or again before the line between the ears. White under forebody.

The white above and below the eye giving appearance of tight circle around eye is not well defined. Inside of ears is orange to salmon colour with no blackening on the outer edges. Very weak reddish brown overlay on fur of upper legs.

Pseudochirops (*Petropseudes*) *waddamaddawidyu sp. nov.* from Groote Eylandt, Northern Territory, Australia, is similar in most respects to *P. jamesbondi sp. nov.* except for the obvious and strong light orange colour of the rear of the rump and the back legs (versus either not so, or only faint orange tinge in Gulf form, being in line with the rest of the dorsal surface). The mid-line marking from the snout does not go beyond the crown as in it terminates well before it and it is grey in colour.

This marking is noticeably widest at the midpoint between the eyes, appearing like an elongated diamond shape. Fur on the lower forelimbs also has a strong orange tinge, but this is only on the tips, rather than all over as seen on the hind limbs.

All four species of possum in the subgenus *Petropseudes* Thomas, 1923 (see above) are readily separated from all other possums occurring in the same region in western Queensland, the Northern Territory and Western Australia by a combination of having a much shorter tail, being less than two thirds the length of the head and body as well as having very dense fur.

Photos of *Pseudochirops dahli* (Collett, 1895) in life can be seen in Strahan (1988) at page 132 (top) and online at:

https://www.flickr.com/photos/88708273@N03/40093596073/

and at:

https://www.flickr.com/photos/128365570@N04/42868251355/

both from Arnhem Land, Northern Territory, Australia.

Photos of *Pseudochirops* (*Petropseudes*) *fiacummingae sp. nov.* in life can be seen online at:

https://www.flickr.com/photos/mattsummerville/48131308123/

from Prince Regent, Western Australia, Australia, and at:

https://www.flickr.com/photos/54876436@N08/9247200620/

from Theda Station, Western Australia.

Photos of *Pseudochirops* (*Petropseudes*) *jamesbondi sp. nov.* in

life can be seen online at:

https://www.flickr.com/photos/colonel_007/49215178836/

from Hells Gate, Queensland, Australia and at ;

https://www.flickr.com/photos/58349528@N02/46592424132/

from Roper Bar, Northern Territory, Australia.

Pseudochirops (*Petropseudes*) *waddamaddawidyu sp. nov.* from Groote Eylandt, Northern Territory, Australia, in life can be seen online at:

https://denr.nt.gov.au/__data/assets/pdf_file/0003/758307/groote-archipelago-threatened-species-management-plan-2019-2028.pdf

(see page 7)
Document is called,
"Groote Archipelago Threatened Species Management Plan 2019-2028"

and is a 64 page pdf posted online but has no listed author or publisher.

Distribution: *Pseudochirops jamesbondi sp. nov.* is known only from the south and west side of the Gulf of Carpentaria, including nearby hills, where suitable rocky hilly habitat occurs, within far north-west Queensland and adjacent parts of the Northern Territory, Australia.

Etymology: Named in honour of James Bond of Park Orchards, (Melbourne), Victoria, Australia in recognition of his role in conservation of Australian wildlife, including via his vitally important work done over many years maintaining the wildlife breeding facility at Snakebusters: Australia's best reptiles shows.

PSEUDOCHIROPS (PETROPSEUDES) WADDAMADDAWIDYU SP. NOV.

LSID urn:lsid:zoobank.org:act:6644706A-73BE-4861-B175-972349EC27A0

Holotype: A preserved specimen at the Australian Museum, Sydney, New South Wales, Australia, specimen number M.21477, collected from the fourth beach near Alyongula, Groote Eylandt, Northern Territory, Australia, Latitude -13.97 S., Longitude 136.58 E. This government-owned facility allows access to its holdings.

Paratypes: 1/ A preserved female specimen at the Australian Museum, Sydney, New South Wales, Australia, specimen number M.24782 collected from near Alyangula Creek on the old Rifle Range Road, Groote Eylandt, Northern Territory, Australia, Latitude -13.85 S., Longitude 136.41 E.

2/ A preserved specimen (skeleton and skin) at the Museum and Art Gallery of the Northern Territory Mammal Collection, Darwin, Northern Territory, Australia, specimen number U3282 collected from Angurugu, Groote Eylandt, Northern Territory, Australia, Latitude -13.98 S., Longitude 136.45 E.

Diagnosis: Until now, all populations of so-called Rock Ringtail Possum have been assigned to the same putative species, namely *Pseudochirops* (*Petropseudes*) *dahli* (Collett, 1895) with a type locality of Mary River. Northern Territory, Australia.

That form is now herein restricted to the type locality and adjacent hills and outliers, essentially including the Arnhem Land escarpment and adjacent hills and ranges to the south and west.

This species and the three newly described forms herein can be readily separated from one another by consistent differences in colour of pelage on various parts of the head and body.

Nominate *P. dahli* is readily separated from the other three species by having dark grey pelage and with mid line, from snout being distinct, thick, blackish in colour and extends past the crown of the head. This line becomes wider and darker between eyes and snout and again before a line between the ears. There is a strongly dark reddish brown overlay on fur of the upper legs. Yellowish white under forebody. The white above and below the eye, giving the appearance of a tight circle around the eye is very well defined. Inside of ears is salmon colour with significant blackening towards the outer edges.

Pseudochirops (*Petropseudes*) *jamesbondi sp. nov.* from the southern and western edges of the Gulf of Carpentaria in Queensland and the Northern Territory, Australia has a has light grey to mouse brown pelage and with the mid-line from the snout not going past the crown, being very indistinct and is grey in colour, breaking up as it moves up the snout. White under forebody.

The white above and below the eye giving an appearance of a tight circle around the eye is well defined. Inside of ears is yellow-orange becoming brownish on the outer edges.

There is no obvious reddish brown or orange overlay on the fur of upper legs save for the same slight and very feint orange overlay as seen over all parts of the body.

Pseudochirops (*Petropseudes*) *waddamaddawidyu sp. nov.* from Groote Eylandt, Northern Territory, Australia, is similar in most respects to *P. jamesbondi sp. nov.* except for the obvious and strong light orange colour of the rear of the rump and the back legs (versus either not so, or only faint orange tinge in Gulf form, being in line with the rest of the dorsal surface). The mid-line marking from the snout does not go beyond the crown as in it terminates well before it and it is grey in colour.

This marking is noticeably widest at the midpoint between the eyes, appearing like an elongated diamond shape. Fur on the lower forelimbs also has a strong orange tinge, but this is only on the tips, rather than all over as seen on the hind limbs.

Pseudochirops (*Petropseudes*) *fiacummingae sp. nov.* from the Kimberley district of north-west Western Australia has a light grey pelage with the mid line from snout distinct, thin, blackish in colour and it goes past the crown of the head, without thickening between the eyes and snout or again before the line between the ears. White under forebody.

The white above and below the eye giving appearance of tight circle around eye is not well defined. Inside of ears is orange to salmon colour with no blackening on the outer edges. Very weak reddish brown overlay on fur of upper legs.

All four species of possum in the subgenus *Petropseudes* Thomas, 1923 (see above) are readily separated from all other possums occurring in the same region in western Queensland, the Northern Territory and Western Australia by a combination of having a much shorter tail, being less than two thirds the length of the head and body as well as having very dense fur.

Photos of *Pseudochirops dahli* (Collett, 1895) in life can be seen in Strahan (1988) at page 132 (top) and online at:

https://www.flickr.com/photos/88708273@N03/40093596073/

and at:

https://www.flickr.com/photos/128365570@N04/42868251355/

both from Arnhem Land, Northern Territory, Australia.

Photos of *Pseudochirops* (*Petropseudes*) *fiacummingae sp. nov.* in life can be seen online at:

https://www.flickr.com/photos/mattsummerville/48131308123/

from Prince Regent, Western Australia, Australia, and at:

https://www.flickr.com/photos/54876436@N08/9247200620/

from Theda Station, Western Australia.

Photos of *Pseudochirops* (*Petropseudes*) *jamesbondi sp. nov.* in life can be seen online at:

https://www.flickr.com/photos/colonel_007/49215178836/

from Hells Gate, Queensland, Australia and at:

https://www.flickr.com/photos/58349528@N02/46592424132/

from Roper Bar, Northern Territory, Australia.

Pseudochirops (*Petropseudes*) *waddamaddawidyu sp. nov.* from Groote Eylandt, Northern Territory, Australia, in life can be seen online at:

https://denr.nt.gov.au/__data/assets/pdf_file/0003/758307/groote-archipelago-threatened-species-management-plan-2019-

2028.pdf

(see page 7)
Document is called:
"Groote Archipelago Threatened Species Management Plan 2019-2028" and is a 64 page pdf posted online but has no listed author or publisher.

Distribution: *Pseudochirops waddamaddawidyu sp. nov.* is known only from Groote Eylandt in the Northern Territory, Australia. Reports of specimens on the immediately proximal Northern Territory mainland and smaller islands to the north are assumed to be of this species.

Etymology: On 6 March 2012, I met a Warnindilyakwa Aboriginal elder, being the native tribe from Groote Eylandt, who have apparently lived there for some thousands of years. I asked the elderly man for the native name for the local Rock Ringtail Possum to which he replied "*waddamaddawidyu".*

Hence the scientific name. I have since been advised that his reply to me actually meant "what is the matter with you?", because he did not understand the nature of my question, but the name has stuck and in the absence of an alternative, this is the scientific name assigned to the taxon.
Spelling of the name is intentional and should not be changed.

PSEUDOCHIROPS* (*SLOPPOSSUM*) *ARCHERI CHRISMAXWELLI SUBSP. NOV.
LSID urn:lsid:zoobank.org:act:4ED60895-A1B9-4F02-876E-F0F278BBB5D7

Holotype: A preserved male specimen in the Queensland Museum, Brisbane, Queensland, Australia, specimen number JM3617, collected from Mount Lewis, Queensland, Australia, Latitude -16.58 S., Longitude 145.26 S. This government-owned facility allows access to its holdings.

Paratypes: 1/ A preserved female specimen in the Queensland Museum, Brisbane, Queensland, Australia, specimen number JM9476, collected from Kingfisher Park, Julatten, Queensland, Australia, Latitude -16.62 S., Longitude 145.33 E.

2/ A preserved female specimen in the Queensland Museum, Brisbane, Queensland, Australia (adult skin and skull), collected from Mossman, Queensland, Australia, Latitude -16.47 S., Longitude 145.38 E.

Diagnosis: Until now *Pseudochirops* (*Sloppossum*) *archeri chrismaxwelli subsp. nov.*, from the northern wet tropics region, generally north of Port Douglas and south of Cape Tribulation including the high elevation and high rainfall hills and plateau near the coast has been treated as the same species as nominate *P. archeri* Matschie, 1915, this being the form from the southern wet tropics region generally north of Mount Spec and south of Cairns and including the Bellenden Ker Range, Atherton Tableland and Paluma Range. The two subspecies are separated by the relatively low elevation zone known as the Black Mountain Corridor, or alternatively Black Mountain Gap.

P. archeri chrismaxwelli subsp. nov. is readily separated from *P. archeri archeri* by having relatively poorly defined markings and white patches on the face and body (versus bold in *P. archeri archeri*) and the dorsal body fur has a weak greenish tinge, versus a strong greenish tinge in *P. archeri archeri.*

A photo of *P. archeri chrismaxwelli subsp. nov.* in life from Mount Lewis, Queensland, can be seen online at:

https://www.flickr.com/photos/euprepiosaur/6809527935

and at:
https://www.flickr.com/photos/zimny_anders/22113501931/

The type subspecies of *P. archeri archeri* in life from Yungaburra, Atherton Tableland, Queensland, can be seen online at:

https://www.flickr.com/photos/bryanjsmitheci/26617682041/

and at:

https://www.flickr.com/photos/mattsummerville/43431336910/

as well as at:

https://www.flickr.com/photos/mattsummerville/31933820964/

a further specimen of the type subspecies of *P. archeri archeri* in life from Ravenshoe, Atherton Tableland, Queensland can be seen online at:

https://www.flickr.com/photos/mattsummerville/16918647658/

and a further two photos of specimens of the type subspecies of *P. archeri archeri* in life from the Atherton Tableland, Queensland can be seen online at:

https://www.flickr.com/photos/jpmckenna/6547010879/

and at:

https://www.flickr.com/photos/euprepiosaur/8453294248/

Distribution: *Pseudochirops* (*Sloppossum*) *archeri chrismaxwelli subsp. nov.* is known only from the Mount Lewis area of far north Queensland, Australia, being the immediate vicinity of the collection localities of the holotype and paratypes. This is an area of high altitude forests, noting the species generally occurs at elevations in excess of 300 metres above sea level and is most commonly seen 500 metres and higher.

Etymology: Named in honour of former lawyer and barrister Christopher Murray Maxwell AC.

He later succeeded Justice John Winneke as President of the Victorian Court of Appeal on 16 July 2005 and is recognized for his contributions to human rights and justice as well as his fair and equitable application of the law in Australia via his role as a Court of Appeal judge.
In the period 1999-2001 he fought valiantly to stop the corrupt Victorian government from outlawing the best-selling books *Victoria Police Corruption* (Hoser, 1999a) and *Victoria Police Corruption - 2* (Hoser 1999b) including an attempt to have myself (Raymond Hoser) as author, charged with fake criminal charges and potentially jailed indefinitely for exposing endemic government corruption (via a so-called "sedition" charge).

Incidentally, Maxwell was one of two (out of three) Supreme Court Judges who in the Court of Appeal in Victoria upheld a unanimous jury verdict (from 11 December 2018) that Catholic Cardinal George Pell had indecently assaulted two Choir boys. The (alleged) offences occurred in December 1996 and early 1997 at St Patrick's Cathedral, months after Pell was inaugurated as Archbishop of Melbourne.

Pell's Barrister, Robert Richter had sought leniency for his client Pell on the basis that Pell's attacks on the young boys was "no more than a plain vanilla sexual penetration case" whereby he had forced the boys to suck his penis.
Pell sought and got leave to appeal the jury decision to the Australian High Court (rare in itself) and the case was heard on 10 and 11 March 2020, with a decision normally expected to be handed down several months later.

However at the height of the Australian Covid-19 Coronavirus pandemic, at a time that Australians and the media were preoccupied with the ongoing deaths and economic disruption that accompanied the pandemic, via house lock downs and the like, the High Court on 7 April rushed out a unanimous decision stating that the jury had got it wrong and that Pell should have been acquitted, thereby quashing the conviction.
Police did not charge Pell in relation to numerous other alleged sexual assaults of minors.

Unfortunately, even when an ethical and highly qualified judge in Australia upholds the law, others in the system that is inherently corrupt will undermine their excellent work.
Meanwhile, in Australia, sex offenders in high places, including within the Catholic Church, continue to be corruptly protected by others in the church, police force and judiciary.

CONSERVATION OF THE NEWLY NAMED TAXA

In terms of conservation of each population of each species as described in this paper, the comments in Hoser (1991 and 2019a, 2019b) apply.

Wildlife laws as currently enforced in Australia are not in any materially significant way enhancing the long-term survival prospects of any of the relevant species and are being vastly

outweighed by other negative impacts of governments, including their ongoing commitment to growing the human population to a level that can only put further pressure on the survival prospects of them. If the Australian government persists with its "Big Australia Policy", (see for example Saunders 2019 or Zaczek 2019), then all sorts of unforseen threats to the survival of these species will certainly emerge.

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CONFLICTS OF INTEREST - NONE