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## Opportunistic field observations of frogs and reptiles near Bendigo, Victoria, Australia in mid winter 2023.

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### ABSTRACT

Documented is a case of three morphologically divergent species of frogs utilising the same shelter site in bushland; habitat partitioning between two sympatric morphologically similar frogs; winter aggregations of lizards and related aspects of herpetofaunal activity, all on the edge of Bendigo, Victoria, Australia.

**Keywords:** Australia; frog; lizard; Bendigo; Victoria; *Pseudophryne*; *Limnodynastes*; *Platyplectron*; *Crinia*; *Christinus*; *Underwoodisaurus*; *Silvascincus*; *Nodorha*; *Lerista*; *Ctenotus*; *Morethia*; *martinekae*; *bibroni*; *dumerilii*; *tasmaniensis*; *signifera*; *fiacummingae*; *marmoratus*; *mensforthi*; *martinekae*; *striolata*; *bougainvillii*; *robustus*; *boulengeri*.

### INTRODUCTION

Reported is shelter and breeding activity of frogs, as well as aggregations of lizards in optimal resting spots in the middle of winter in the Bendigo area of Victoria on 24 June 2023.

### MATERIALS AND METHODS

On 24 June 2023 after doing a live reptile display at an address in Mandurang, near Bendigo, I spent the second half of the day searching for reptiles and frogs in two locations to photograph *in situ*.

The weather on the day was cold and with significant rain in the middle of the day, between about 12 noon and 2 PM.

The air temperature was well below 10 Deg Celsius all day. Except after 3 PM, it was generally overcast all day.

### RESULTS

#### LOCATION 1

Between 12.15 and 2.15, I searched by lifting cover in an area bound by Apelline Track, Robie Road and Munroe Road in the Bendigo Regional Park, to the south-east of the main township.

The habitat is elevated and stony ground, including mining tailings, vegetated by mainly rough-barked gum trees.

It is criss-crossed with small ephemeral watercourses and scattered man-made "dams" holding water. These are of the kind seen in paddocks across rural landscapes across Australia.

Calling from the small dams were limited numbers of *Crinia parainsignifera* Main, 1957. I searched logs entering the water and found three specimens under logs in three such situations.

Of relevance is that about 12 km south-east of this location when driving to Mandurang at about 9 AM that morning, I had pulled up at a site at Sutton Grange, which was hilly and with numerous exposed Granite outcrops and searched for about 20 minutes during which time I heard *Crinia fiacummingae* Hoser, 2023 (previously treated as a southern form of *Crinia signifera* (Girard, 1853) (see Hoser 2023a) calling from elevated soaks high on the granite-based hills. Under saturated rocks, I also found two specimens, being a male and a female (found at different locations and not in proximity).

What took me by surprise at Sutton Grange was that the frogs were calling at relative high elevations in the hilly landscape and well away from obvious watercourses.

Also found at the Sutton Grange site were 3 putative *Ctenotus robustus* Storr, 1970 and 5 Marbled Geckos *Christinus marmoratus* (Gray, 1845), with three *C. marmoratus* (1 adult and 2 juveniles) being under a single north-west facing slab of rock, angled towards the sun at the outer edge of a rock outcrop, adjacent to other crevices and rocks on the same particular outcrop (none of which had any lizards).

In each situation as outlined so far, only one or other of *C. parainsignifera* or *C. fiacummingae* were present, indicating that in this area at least, *C. parainsignifera* was more likely to be found breeding near dams and the like, while *C. fiacummingae* had a preference for soaks on hills in the wetter part of winter (as in what appeared to be the most temporary of water situations).

The separation of two morphologically almost identical species sympatric across much of Victoria by way of preferred breeding sites hasn't to my knowledge been reported before.

At the Bendigo Regional Park in the vicinity of a home and two farm dams, I lifted a well-embedded sheet of tin that was situated on an otherwise elevated stony rise. It was about 30 metres up the slope, between two dams, each about 30 metres apart in the gully, which otherwise consisted of boggy ground, but no well-defined creek as such.

I was surprised to find five adult *Limnodynastes tasmaniensis* Günther, 1858, One adult *Platyplectron dumerilii* (Peters 1863) and an adult female *Pseudophryne martinekae* Hoser, 2020 (previously treated as a divergent outlier population of *P. bibroni* (Günther, 1858). All were sitting adjacent to one another in a single section of ground under the tin. The *P. martinekae* was sited under the other frogs and stayed put as the other frogs attempted to hop away. The *P. martinekae* was not engorged with eggs, was clearly not breeding and the general condition of the frog put the breeding season for the species in the area into early autumn.

In the two hours of walking and lifting available cover (mainly rocks and some logs), in the same area, I found another 11 adult *P. Martinekae* (and all were males). None were located within 2 metres of surface water in the nearby gullies and most were found an average of 5-10 meters from the ephemeral watercourses.

While they were found under different kinds of cover, including some rocks, which in the area constituted the overwhelming majority of

potential shelter sites, the majority of the frogs (9) were found under logs with moist, but not saturated, decaying wood type of material underneath, indicating this is a preferred situation for the species. No other frogs were found in the searching. Also found were three Striped Skink Skinks (putative *Ctenotus robustus* Storr, 1970), all resting due to the cold.

#### LOCATION 2

This was a walk between 3.15 and 5.15 PM direct through bushland between "Back Road" and McLeod's Lookout, near Inglewood, Victoria, about a half hour's drive north-west of Bendigo in Victoria. In essence the car was parked on the east side of the lookout and I walked more-or-less directly up the hill, up a steep rock covered hill, lifting exfoliating rocks and other material on the way up the hill to the lookout. The return trip taken about 150 metres to the north of the lookout down a slight gully to the road and then back to the parked car, was through a relatively rock free zone but with fallen logs on the ground as cover for reptiles.

The area on the way to the lookout was a steep mainly north-east facing slope with massive amounts of granite, including flat areas, overlying smaller exfoliations and loose rocks and boulders.

Rocks lifted yielded a large number of lizards seeking shelter and heat at the same time.

Most common were Marbled Geckos *Christinus marmoratus* (Gray, 1845) (50 seen), but also seen were some Thick-tailed Gecko's *Underwoodisaurus menziesi martinekae* Hoser, 2016 (4 seen), Three Tree Skinks *Silvascincus striolata* (Peters, 1870), one putative *Nodorha bougainvillii* (Gray, 1839) (commonly placed within *Lerista* Bell, 1833, see Hoser 2023b) found under a slab of rock and 4 putative *Ctenotus robustus* were found under slabs of rock (all with dirt underneath the rock, where they had created and occupied burrows).

On the hike down the hill, I found 3 *Morethia boulengeri* (Ogilby, 1890), all under logs away from the rocks, but half-way up the hill.

Not all rock slabs apparently suitable for reptiles harboured lizards, but some harboured aggregations and one rock on a granite substrate at the base of the hill had 15 lizards.

That particular rock had 12 Marbled Geckos, 1 Thick-tailed Gecko, 2 tree skinks and 1 scorpion all resting more-or-less together at the centre under the rock. This rock and all others that had more than two lizards underneath were all pointing to the north and I noted were even angled at about 20-30 degrees on the underlying rock to be even more in line with the direct sunlight.

The relevant granite rocks were also about 5 cm thick on average in the centre, about 30 cm in length or longer, always rock on rock situations and situated near crevices and other escape routes.

In terms of the aggregation noted above, that rock was one of five overlying an embedded section of surface granite. All five were of similar size and shape and at first look, there was nothing to suggest that four rocks would yield no reptile (or scorpion) and that rock 5 would hold the massive aggregation.

The only obvious difference I noted is that four were angled directly up from a flat base and the fifth rock was slightly to the side and therefore better angled towards the sun.

Notable also was that in the 50 metres to the north of McLeod's Lookout, the foot track passes over an area that consisted of mainly bare granite on the ground, forming a sort of sea of rock. *C. fiacummingae* were heard calling from soaks and two were found under small rocks adjacent to these.

No other frogs of any species were seen in the same exact area, although when walking down a wooded gully back to my car I found an adult male *P. martinekae* under a rock and another adult male of the same species had been found under a slab of rock (on dirt) half way up the hill, near to a soak on granite substrate.

No other species of frog was heard calling however except for *C. fiacummingae*. Noting the situation of being near the summit of a large granite hill and without any watercourses as such nearby, I was surprised that any frogs would be occupying the area.

Again however it points to a species (*C. fiacummingae*) actively seeking this kind of situation to occupy and breed in as similarly seen at Sutton Grange about an hour's drive to the south-east.

#### DISCUSSION

To date herpetologists in Australia have not taken a strong interest in habitat partitioning by morphologically similar sympatric and extremely common species of frogs.

While this partitioning may occur by way of location to occupy and breed, the partitioning obviously may also occur with respect to occupation of a given single location at given times of year, as would

be expected with respect of breeding seasons.

In terms of the lizards observed, while habitat partitioning was observed in site 2, as for example in the *M. boulengeri* occupying a different kind of habitat to the other lizards, it seemed that in the cold of mid-winter in this area, most lizards were more concerned with staying warm than competing for food or anything else and so were happy to cohabit a given site.

While it may seem trivial to a human, in terms of the extra heat a lizard may get by occupying a rock slightly better angled towards the sun, for "cold blooded" animals like lizards, the relative importance of temperature and getting warm in winter may be far greater.

In terms of Australian reptiles and frogs, merely catching and identifying them has now been largely done sufficiently to establish broad-scale distributions of most species.

Herpetologists, citizen scientists and others with an interest in Australian reptiles and frogs would do well to make further inquiries into habitat partitioning by morphologically similar sympatric species and to document this, because what may seem obvious to someone who observes this daily in the field, may not have yet been formally recorded, or even known by others in the herpetological community. Likewise for the details as to how reptiles and frogs act in different weather conditions and seasons, where they rest, where they are active and how they deal with issues of thermoregulation and even each other.

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#### CONFLICT OF INTEREST

None.

## An overdue break-up of the east Australian *Calotella* (*Wittenagama*) *nobbi* (Witten, 1972) species complex.

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### ABSTRACT

As of early 2023 the *Calotella* (*Wittenagama*) *nobbi* (Witten, 1972) species complex, often placed in other genera such as *Diporiphora* Gray, 1842, *sensu* Edwards and Melville (2011), or *Amphibolurus* Wagler, 1830 *sensu* Cogger *et al.* (1983) has been treated as including up to four putative named taxa.

The most recent treatment of the species complex by Edwards and Melville (2011) synonymised both *C. nobbi coggeri* (Witten, 1972) and *C. parnabyi* Wells and Wellington, 1985 with *C. nobbi*.

Edwards and Melville (2011) also named a divergent lineage as *C. phaeospinosa*, being a classification of the group used by both Cogger (2014) and Wilson and Swan (2021), being the most recent relevant reference works.

However the molecular evidence of Edwards and Melville (2011) showed emphatically that at least 6 other unnamed forms were within the group as well as the fact that *C. parnabyi* was definitely a species-level divergent lineage.

They wrote: “Divergences within *D. nobbi* firmly place intraspecific diversification within this species in the late Miocene period (3-8 mya).”, with their best guess as being 4.1 MYA.

4.1 MYA is certainly species-level divergence for the relevant lineages.

Because these lineages are morphologically diagnosable, this paper formally names as new species the six hitherto unnamed lineages, in accordance with the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999), while also recognising all of *C. nobbi*, *C. parnabyi* and *C. phaeospinosa* as valid species, bringing the total in the species group to nine.

The molecular divergences cited by Edwards and Melville (2011) confirms the validity of the genus *Calotella* Steindachner, 1867, as used by Wells and Wellington (1985). Claiming a 10.7 MYA divergence between the type species for *Calotella* and the type species for *Wittenagama* Wells and Wellington, 1985, the genus name as proposed by Wells and Wellington is herein conservatively used as a subgenus for the relevant taxa formally named in this paper.

**Keywords:** Taxonomy; nomenclature; Australia; Queensland; New South Wales; Victoria; Dragon lizard; *Amphibolurus*; *Diporiphora*; *Calotella*; *nobbi*; *coggeri*; *parnabyi*; *phaeospinosa*; new species; *gedyei*; *ruffellae*; *dorsei*; *wiradjuri*; *josephburkei*; *aah*.

### INTRODUCTION

As of early 2023 the well-known “Nobbi dragon” found mainly in drier parts of eastern Australia, was treated as being of just two species.

This followed on from the major work on the complex by Edwards and Melville (2011).

The putative species was originally named as just one, “*Amphibolurus nobbi* Witten, 1972, by Witten (1972), with a type locality of 24 miles east north-east of Guyra, New South Wales,

Australia.

Geoff Witten also formally named a subspecies *A. nobbi coggeri* Witten, 1972 at the same time, with a type locality of the Warrumbungle Mountains in north New South Wales, Australia.

Cogger *et al.* (1983) maintained the classification of Witten, but Wells and Wellington (1985) moved the two Witten taxa to a newly erected genus *Wittenagama*, elevating the subspecies to be a full species.

They also named a form from inland central Queensland as *Wittenagama parnabyi* Wells and Wellington.

Wells and Wellington (1985) also recognized the genus *Calotella* Steindachner, 1867 for the first time in about a century for the type species group, being the *Calotella australis* Steindachner, 1867 species group, which had been placed by Cogger *et al.* (1983) within *Diporiphora* Gray, 1842, with a type species of *Diporiphora bilineata* Gray, 1842.

Significantly, numerous molecular phylogenies (including for example that of Edwards and Melville 2011) have shown these two species groups to be sufficiently divergent as to warrant genus-level divergence (well over 10 MYA) and so the use of the genus name *Calotella* is adopted in this paper for all species within the greater *Calotella australis* species group.

Wells and Wellington (1985), erected a separate genus for their “*nobbi*” group being *Wittenagama*, with a type species of *Amphibolurus nobbi coggeri* Witten, 1972 for the three putative species they placed within that genus.

These were “*Amphibolurus nobbi*”, “*A. coggeri*” (as they understood the concept) and their newly named form *W. parnabyi* Wells and Wellington, 1985 (they placed all three in their *Wittenagama*).

As set out in detail in Hoser (2023), Richard Shine and his cohort, first petitioned the ICZN to suppress the Wells and Wellington works in 1987, as in to have their works erased from the scientific record.

While this attempt at suppression failed in 1991 by way of a formal ICZN Ruling against the Richard Shine cohort of thieves (see Hoser 2023), it did in effect stop uptake of most Wells and Wellington names between 1985 and 1991.

That legacy continues to this day.

Following the ICZN ruling of 1991, Glen Shea and Ross Sadlier in Shea and Sadlier (1999), published a scathing review of the Wells and Wellington works of 1984 and 1985, in which they erroneously declared many Wells and Wellington taxa as “probably *nomen nudem*”, which further served to delay uptake of Wells and Wellington names as just alluded to.

They also and without any proper justification formally synonymised *W. parnabyi* Wells and Wellington, 1985 with “*A. nobbi*”, which has not been challenged by anyone since and was apparently blindly and unscientifically accepted by Edwards and Melville (2011).

In terms of the genus name *Calotella*, while first resurrected by Wells and Wellington, it has not since appeared in any major works including about the relevant species, which have generally most recently been placed within *Diporiphora sensu* Edwards and Melville (2011), as seen for example in Cogger (2014), Brown (2014) or Wilson and Swan (2021).

As already mentioned, Edwards and Melville (2011) cited the synonymisation of *W. parnabyi* Wells and Wellington, 1985 with “*A. nobbi*” as a basis for continuing to do so.

This position was bizarre as they admitted in the same paper that their own molecular data and morphological data confirmed that it was in fact a different species-level taxon.

It says something that two so-called scientists, each with positions in highly regarded government-controlled State Museums can fudge their conclusions to not use a properly proposed name because their cohort has taken it upon themselves to suppress the works of Richard Wells and Ross Wellington at every opportunity.

The logical ultimate position of the paper of Edwards and Melville (2011), based on their own evidence was to accept the Wells and Wellington name *W. parnabyi* Wells and Wellington, 1985 (and placing it in a genus of their choice), be it *Diporiphora* as used by them or another, such as the more sensible *Calotella*, and then also accept the existence of at least six other unnamed species as shown by their own molecular results.

Rather than forcing themselves to accept the Wells and Wellington name, Edwards and Melville (2011) came up with

a convoluted set of mental gymnastics to assert that all the divergent species-level lineages should all be subsumed into one big mess that they called *Diporiphora nobbi*.

I should also note that Edwards and Melville (2011) did conclusively show that both “*D. nobbi*” and “*D. nobbi coggeri*” were in fact of the same single lineage within their multi-lineage “*D. nobbi*”, and therefore not even worthy of a subspecies level division. That position is not disagreed with here.

They also named a separate more divergent lineage from Queensland as *C. phaeospinosa* Edwards and Melville, 2011. However that putative taxon as identified by them, did in fact include two quite divergent and allopatric populations, that their own molecular data showed were species-level divergent.

It has recently become apparent that refusal to accept the existence of valid species of agamid in Australia is putting some of them at serious risk of extinction, as seen in Hoser (2019a, 2019b) and with this in mind, it became increasingly urgent that someone actually formally identifies and names the relevant unnamed species-level lineages within the “*nobbi*” complex, sooner rather than later.

With no one else stepping up for the task, I took it upon myself to resolve the matter.

I reiterate that the molecular evidence of Edwards and Melville (2011) showed emphatically that at least 6 other unnamed forms were within the group as well as the fact that *C. parnabyi* was definitely a species-level divergent lineage.

They wrote: “*Divergences within D. nobbi firmly place intraspecific diversification within this species in the late Miocene period (3-8 mya).*”, with their best guess as being 4.1 MYA.

4.1 MYA is certainly species-level divergence for the relevant lineages!

That set the course of the inquiries that followed the publication of Edwards and Melville (2011) and preceded this paper.

The molecular divergences cited by Edwards and Melville (2011) confirmed the validity of the genus *Calotella* Steindachner, 1867, as used by Wells and Wellington (1985).

Claiming a 10.7 MYA divergence between the type species for *Calotella* being *Calotella australis* Steindachner, 1867 and the type species for *Wittenagama* Wells and Wellington, 1985, the genus name as proposed by Wells and Wellington is herein conservatively used as a subgenus for the relevant taxa as formally named this paper, this being done either explicitly or implicitly if the name *Wittenagama* is not actually used (from here on in).

#### MATERIALS AND METHODS

Specimens of putative *C. nobbi* (including recently named forms previously treated as this taxon) were inspected from across the putative range for the complex, from north-east Queensland to north-west Victoria, including dead, live and photos with good locality data.

Consistent differences were noted and ultimately readily matched with relevant species groups as identified by Danielle Edwards and Jane Melville in their paper Edwards and Melville (2011).

Relevant literature was also consulted to confirm the absence of any possible synonym forms or names of the potential newly identified taxa, which did not exist beyond those outlined in the abstract.

Publications relevant to the ultimate taxonomic and nomenclatural conclusions made herein included Brown (2014), Chapple *et al.* (2019), Cogger (2014), Cogger *et al.* (1983), Edwards and Melville (2011), Gray (1842), Hoser (2007, 2012, 2015g, 2017, 2018, 2019a, 2019b, 2022, 2023), Kay *et al.* (2013), Melville and Wilson (2019), Melville *et al.* (2011, 2018, 2019a, 2019b), Michael *et al.* (2011), Murphy and Murphy (2015), Ride *et al.* (1999), Shea and Sadlier (1999), Steindachner (1867), Swan *et al.* (2022), Swanson (1976), Wells and Wellington (1984, 1985), Wilson (2022), Wilson and Knowles (1988), Wilson and Swan (2021), Witten (1972), Witten and Heatwole (1978) and sources cited therein.

## RESULTS

Six unnamed divergent lineages identified by Edwards and Melville (2011) (see fig. 2 on page 536 in that paper) were found to be morphologically separable from one another and so each is formally named in accordance with the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

This brings the total in the species group to nine.

I should also note that none of the previous species descriptions of taxa within the complex, that is Witten (1972), Wells and Wellington (1985) or Edwards and Melville (2011) make reference to the obvious sexual dimorphism in each species in the complex in their formal descriptions.

In the case of Edwards and Melville (2011) in particular, this quite obvious oversight explains why they appeared to be unable to differentiate between the various species their molecular data indicated.

In their assessment of characters in specimens, by jumbling males, with females in all or most of the species they were inspecting, including in their results table, they confused matters and were effectively unable to separate the taxa.

For example their Fig 5, on page 539 is effectively worthless as the alleged differences between the species as indicated may in fact be nothing more than range differences between males of one species versus females of another. The authors did not indicate which sexes their diagrams were of.

Had the later authors split the sexes in their specimens and/or split the sexes and looked at normal adult specimens alive (as in with colour, versus just shrivelled up dead museum animals), they would have soon realized that each of the nine relevant species, including their newly named taxon *D. phaeospinosa* were readily separable from one another and then have been able to formally name the six until now unnamed forms back then.

In summary, the males of all species have a pattern dominated by two thick white, cream or yellowish-white stripes running down the dorsum of the body, near the lateral edge.

Females of all species have a dorsum where the lines on the edge of the dorsal surface are reduced in size, prominence or intensity, or even absent, and the mid dorsal area is prominently marked with alternating dark and light, with the dark sections generally intruding on and breaking the outer whitish lines. The females are generally more drab in colour, although in some species they are distinctly coloured, but different to the males. In the mating season they lack the strong coloured flushes (usually red, pink or orange) on the base of the tail on the flank area that is seen in the adult males.

The formal description of Wells and Wellington (1985) for their species "*Wittenagama parnabyi*" is defective in that while it is accurately diagnostic in terms of separating their taxon from all others in the complex, this is only the case for adult males of their taxon.

Females are coloured differently and would under the diagnosis of Wells and Wellington (1985) be diagnosed as "*C. nobbi*", based on all previous species concepts.

Notwithstanding this defect, their name is available for their taxon and is used herein as correct.

I also show how to separate females of "*Wittenagama parnabyi*" from all other species within the complex as a refinement and improvement of the original Wells and Wellington (1985) diagnosis for the taxon.

This is exactly how science progresses!

All authors, (Wells, Wellington and myself included) make errors and so the errors of the original describers in terms of their first identifications of new species in the complex is not a hanging offence.

Most importantly and to their great credit, Wells and Wellington successfully identified a previously unnamed species at a time when no one else in Australia seemed to have a remote inkling that the species even existed!

Molecular evidence unavailable to them, or anyone else back in 1985 confirmed their claims of a new species in the form of the results of Edwards and Melville (2011) and on that basis alone, the species "*Wittenagama parnabyi*" should have been recognized as a valid species by all Australian herpetologists since (as per Hoser 2007).

However the unfair synonymisation of the Wells and Wellington taxon herein called *Diporiphora (Wittenagama) parnabyi* Wells and Wellington, 1985, has been very improper and unfair to Wells and Wellington.

Shea and Sadlier (1999) were quick to synonymise *C. parnabyi* with *C. nobbi*.

They wrote of "*Wittenagama parnabyi* Wells & Wellington, 1985" the following:

"Although Wells & Wellington mentioned three diagnostic characters for this species (yellow paravertebrals, pink tail, black thoracic patch) at least the first two characters are also present in *Amphibolurus nobbi nobbi*, the taxon they recognised as closest to their species. In the absence of a more rigorous and workable diagnosis, we tentatively synonymise the name.

= *Amphibolurus nobbi nobbi* Witten, 1972, synonymy made in this paper.

However, the fact is that no other specimens of either sex (male or female) in any other species within the *C. nobbi* complex has yellow paravertebral scales!

With Shea and Sadlier, not disputing the factuality of the Wells and Wellington description (they clearly had no idea Wells and Wellington were only looking at males, in life at least), their claim that others in the complex had this character was simply false and they should have known this!

On this basis alone, they should have not rushed to synonymise the taxon.

Of course the question then begs, that with Shea and Sadlier at the Australian Museum at the time they published their paper in 1999, why did they not either 1/ Inspect specimens of putative *C. nobbi* from both type locality and the type locality for *C. parnabyi* themselves to work out the differences and/or use the newly available molecular methods that they had at their fingertips to ascertain whether or not the two putative taxa were sufficiently divergent to be regarded as separate species.

In any event, Edwards and Melville (2011) did just that and allegedly looked at specimens of putative *C. nobbi* from across the range of the putative taxon, including from the type locality of *C. parnabyi* (or should I say, very close to it) as well as type localities for the two previously named subspecies of *C. nobbi*, both in northern New South Wales.

They had molecular data that confirmed that *C. parnabyi* was distinct from *C. nobbi* and still refused to recognise it as a separate taxon.

In a scandalous case of buck-passing they simply continued to pretend the Wells and Wellington species did not exist, because Shea and Sadlier had already (improperly) synonymised it.

In a fairly low-ball attack on Wells and Wellington (1985) they wrote:

"Wells and Wellington (1985) described another species from within the range of *D. nobbi* and ascribed this species to its own genus with the name *Wittenagama parnabyi* based on a single specimen from central Queensland in the vicinity of Alpha. However, this species was later synonymized with *D. nobbi* by Shea and Sadlier (1999)."

The claim that the species description was based on a single specimen is typical of the lies Melville in particular writes to discredit the works of others, with a view to engaging in taxonomic vandalism with their works, or to otherwise improperly impugn the reputations of others she sees as "competition" in her newly occupied space of Australian agamid taxonomy, being a place she seeks to assert a position as a sole credible authority. Wells and Wellington (1985) did not just describe their new species on the basis of a single specimen as falsely alleged by

Melville.

Their original description even listed three type specimens, being one holotype and a pair of paratypes!

Rather than copying the detail of the description by Wells and Wellington here, I simply suggest that before anyone decides to disparage their work, perhaps they should read it first and if intending to criticize it, then at least stick to the facts!

Furthermore in their description, Wells and Wellington (1985) even referred to more specimens of what they said was their new species including for example one depicted in a book!

That was Swanson 1976, (plate 86), which they cited in the same exact form.

Of course if Edwards and Melville were trying to paint Wells and Wellington as a pair of fools who recklessly described a non-species on the basis of sighting just one animal, they did a good job of it.

After all, without consulting the paper of Wells and Wellington (1985) directly, no one would ever know that Edwards and Melville (2011) had told a big lie about the pair in their paper.

There is no evidence either that Danielle Edwards and Jane Melville actually bothered to test the Wells and Wellington diagnosis for their taxon, or to properly prove or disprove whether or not their taxon actually existed.

Now remember that both Melville and Edwards are both employed at tax-payer funded State Museums as reptile curators and so have at their fingertips every relevant specimen held by every State Museum in Australia.

Therefore, properly investigating the Wells and Wellington claim of a new species (*C. parnabyi*) would not have been difficult at all. Had they done that logical and simple task, they would not have had to leave the taxon status in doubt for another decade or longer, or until "Raymond Hoser" came along to sort things out.

Noting that with the resources available to them via the State Government museums that they were tied in with, correctly determining whether or not *C. parnabyi* was valid or otherwise as a species in 2011, was a simple task that should have been properly done then!

Again I note that Edwards and Melville (2011) were equally oblivious to the fact that the Wells and Wellington (1985) description of *C. parnabyi* only applied to males of that taxon, because self evidently they never took more than a cursory look at that taxon for fear of confirming the obvious, in that it was a very divergent species!

Noting the scope of the Wells and Wellington (1985) publication (all of Australia's herpetofauna), the fact that both authors were starved of funds and resources at the time they produced their major works, it is not altogether surprising that Wells and Wellington's original description only applied to adult males of the species, or alternatively that is how it in fact appeared to have been published at the time.

What is of course more disturbing is that two later papers, being Shea and Sadler (1999), followed by Edwards and Melville (2011) while wrongly synonymising the taxon *C. parnabyi* with *C. nobbi* were done without the authors even bothering to inspect specimens available to them, or even working out very quickly that the Wells and Wellington description only applied to males, or for that matter even properly quoting what Wells and Wellington (1985) had written!

Of course the failure of Edwards and Melville (2011) to properly consider sexual dimorphism in the various species in the *C. nobbi* complex, effectively meant that their paper and the results were only half written!

It also explained why in their so-called diagnosis of *C. phaeospinosa* Edwards and Melville, 2011 they had to state "in fact, the two species cannot be distinguished using any single morphometric trait measured.", which in the form they put this information, a herpetologist would have no way of identifying a specimen of their new species absent accurate locality data or

DNA from the very same specimen.

As for the other supposedly morphologically undifferentiable candidate species identified in the phylogenies of Edwards and Melville (2011), I certainly had no difficulty at all in identifying consistently different characteristics between the total of nine taxa upon inspection of specimens from each, as identified in the molecular results of Edwards and Melville (2011), when I looked at them on the basis of adult males or females separately.

Hence the unnamed ones are formally identified herein, along with revised diagnoses of the other previously named forms (by default) in the first and most complete description as published herein.

In terms of each relevant species and the characters that separate them from the others in the *C. nobbi* complex, I have had no choice but to deal with both males and females of each, to ensure that I could have workable diagnoses of each taxon and this reflects in the descriptions that follow.

I note that while the concepts of the genus *Calotella* (as a genus) and the subgenus *Wittenagama* (herein as a subgenus) are different to those previously published by any earlier authors, the closest match to this taxonomy in the past 50 years is in fact Wells and Wellington (1985), who were the same, save for their recognition of *Wittenagama* as a full genus, which may ultimately be the preferred position of herpetologists, including potentially myself.

A divergence of 10 MYA from nearest relatives is regarded as genus-level divergence in other reptiles, although clearly this treatment is not consistent in herpetology at the present time.

The previous is noted simply to show that contrary to the non-stop lampooning that Wells and Wellington get (e.g. Shea and Sadler 1999, Edwards and Melville 2011), both with respect of the *C. nobbi* complex, the reality is that their taxonomy and nomenclature (viz Wells and Wellington, 1984, 1985) has in the fullness of time and access to molecular methods, been shown to be mainly correct.

Furthermore, Wells and Wellington (1985) was a far more accurate representation of the taxonomy and nomenclature of the species complex than the later authors, even though they were heavily government-funded and based at lavish State Government museums with the best resources available at their fingertips.

In spite of this incredible "competitive advantage" in the field of science, the later authors managed to get the taxonomy of the complex horribly wrong!

I note that was versus Wells and Wellington (1985), produced at no expense to the taxpayer and on a shoestring budget, and yet the ultimate taxonomy of Wells and Wellington (1985) has shown the later authors to be sadly lacking in semblance to scientific reality or common sense.

Perhaps the most serious criticism, I could level against Wells and Wellington (1985) with the hindsight I have in 2023, is that in their division of the *C. nobbi* complex, they did not split it far enough.

But note that their paper was written decades ago (1985 it came out) and the pair were lampooned at the time for "oversplitting" putative species!

Had Wells and Wellington (1985) actually split putative *C. nobbi* nine ways, their pair would quite likely to have been publicly executed in the Sydney City Square (Martin Place)!

This historical accuracy and good science in terms of the Wells and Wellington paper in terms of other Australian agamids was itemised by Hoser (2015).

Finally and in case it is not yet made clear, inspection of specimens within the putative *C. nobbi* complex was done "from scratch" in that no species or species limits, synonymies and the like were predetermined.

All specimens were inspected and conclusions made on the basis of what was seen and observed by myself and not on the basis of what Witten (1972), Wells and Wellington (1985), Shea



and Sadlier (1999) or Edwards and Melville (2011) wrote or said. All their claims and counter claims were tested and either supported by the evidence, or refuted by it.

The final position herein of nine species in the complex, three previously named and six named herein for the first time, is the culmination of this work.

Recognition by me of the three (of four) previously named forms is based on the molecular and morphological evidence available. It is not based on any deference or favours to authors, or innate preference of any author over another.

Because of the two papers that have synonymised *C. parnabyi* with *C. nobbi* are relatively recent, I must make it clear that had the evidence not supported recognition of *C. parnabyi* as valid, I too would have declared it a synonym of *C. nobbi*. However the evidence in reverse is irrefutable and so *C. parnabyi* is recognized as valid herein.

I also note that while Jane Melville is a detestable person for her repeated actions of taxonomic vandalism, contempt for the rule of law in her repeated breaches of the Australian Copyright Act 1968 and the *International Code of Zoological Nomenclature* (Ride *et al.* 1999) as well as recklessly and deliberately putting reptile species at risk of extinction (see Hoser 2019a, 2019b), her taxon, *C. phaeospinosa* Edwards and Melville, 2011 is clearly morphologically divergent from others in the *C. nobbi* complex and so I recognise it as valid herein as well.

In 2021, the ICZN in a ruling dated 30 April, stated that immoral actions by authors (including for example Jane Melville) were not subject of regulation by the ICZN (ICZN 2021).

This means that notwithstanding her heinous acts, her nomenclatural actions and names created, if code compliant and taxonomically valid, should be recognized and the name/s used as correct.

I go further and advocate that others use the name *C. phaeospinosa* Edwards and Melville, 2011 as valid and the first ICZN available name for that particular taxon.

#### CONFIRMATION OF NINE SPECIES WITHIN THE COMPLEX

The nine forms identified herein as species are the minimum number of species within the *C. nobbi* complex. It is probably also the maximum number, but this is by no means certain.

Edwards and Melville (2011) in their phylogeny at Fig. 2. on page 536 flag the nine putative species.

However their paper does not provide any morphological basis for recognition of all or most of them.

There is of course the ongoing question as to whether or not their samples are from the taxa they claimed they are taken from.

Hoser (2018) was able to correct the identities of taxa that had previously been misidentified in one or more published phylogenies of Australian monitors.

Similar problems of identification in phylogenies, arising from misidentified samples are so common as to require checking of all such items before making firm taxonomic conclusions. Thorough checking of phylogenies and samples used to create them is something I do with respect of all animal groups I examine.

The checking of the Edwards and Melville (2011) samples implied their samples were what they said they were. That is, they were, by all indications, all of putative *C. nobbi sensu lato* and from the places the samples were alleged as coming from. I do however note that one of the Edwards and Melville (2011) samples was clearly misplaced in error. That being the specimen they placed as being from near Port Macquarie in New South Wales, when in fact it should have been placed about 450 km to the north, near the NSW and Queensland border (they also had wrong co-ordinates for the specimen as well, easily confirmed by way of a Google search for the correct coordinates of "Boonoo Boonoo National Park" in Google).

This misplacement caused the Edwards and Melville (2011) paper to imply that ranges of two putative taxa overlapped

and this may have led the authors or readers to believe that more work was required to ascertain distributional boundaries, before even inspecting physical specimens from given areas, or alternatively that there was admixture between populations that was not in fact occurring.

This would have added to potential uncertainties as to which clade a given specimen actually belonged to.

Once the placement of the Northern New South Wales specimen was corrected, this effectively meant that on the basis of the data in Edwards and Melville (2011), all putative taxa were allopatrically distributed and simultaneously constrained by biogeographical barriers in the form of landforms, soils or vegetation regimes.

This data was then cross-matched with the data from the "Atlas of Living Australia" which contains data on most museum specimens in Australia.

After stripping poor quality records (the majority), but with the remainder still numbering in the many hundreds of samples, it was clear that the ranges of each putative species remained allopatric.

There was of course the issue of potential non-collection, or detection of specimens, including potential intermediates in the intervening "gap" areas.

This issue was overcome with minimal issue on the basis of the following.

The phylogeny of Edwards and Melville (2011) gave no evidence of there being mixture between groups.

But even more importantly was the fact that without exception, each of the nine putative species had a distribution corresponding by known biogeographic zones and habitats forming barriers between one another, similarly constrained by known biogeographical barriers (including landforms, soil types and overlying dirt, rock and/or vegetation) that affect similarly constrained reptiles.

In the case of each of the nine putative species identified herein as full species, I have in the past split species groups across all of the exact same biogeographical barriers.

Therefore on the basis of the preceding, I had absolutely no hesitation whatsoever in formally identifying all nine as full species and naming the six previously unnamed ones.

Now I make mention of the statement in the abstract of Edwards and Melville (2011), which said "Our molecular data also show large divergences among subclades within nominate *D. nobbi* associated with different habitats rather than specific biogeographic barriers.", which is quite simply either incorrect or misleading.

The different habitats themselves ARE the biogeographic barriers.

Had the misplaced sample in New South Wales also been properly placed in their analysis, Edwards and Melville may well have realised that each and every one of their clades conformed to known biogeographical provinces and known cohorts of species within known ecosystems.

The relevant nine species with the *C. nobbi* complex, also herein being the entirety of the subgenus *Wittenagama* Wells and Wellington, 1985, are as follows:

Nominate *C. nobbi* (Witten, 1972) with a type locality of 24 miles, east north-east of Guyra, New South Wales occurs in the New England Region of New South Wales, except the far northern part, extending into the Granite Belt of south-east Queensland, as well as the nearby elevated areas to the south-west including the Warrumbungle Mountains. The form described as *C. nobbi coggeri* (Witten, 1972), with a type locality of the Warrumbungle Mountains, is herein treated as a synonym of nominate *C. nobbi*.

*C. parnabyi* (Wells and Wellington, 1985) with a type locality of 88 km west of Alpha, Queensland, occurs west of the Great Divide in eastern Queensland, generally north of the tropic of Capricorn and east of the black soil areas, extending north to about Charters Towers and Hughenden in north Queensland.

*C. phaeospinosa* (Edwards and Melville, 2011) with a type locality of Bauhinia Station, Queensland, Latitude -25.17 S., Longitude 149.20 E, is a range-restricted species confined to the Expedition National Park (Southern Expedition Range) and the Bigge Range, mid-eastern Queensland.

*C. aah* sp. nov. was formerly treated as a northern population of *C. phaeospinosa*, and is apparently confined to the Blackdown Tableland (Northern Expedition Range) in mid-eastern Queensland. While extremely common where it occurs, it appears to be a range-restricted endemic in that area.

*C. gedyei* sp. nov. is found from the Broadsound Range in the south near Marlborough, Queensland, (the St. Lawrence Gap biogeographical break) extending along the coast and hinterland north to about Cooktown, north Queensland.

*C. ruffellae* sp. nov. occurs south of the St Lawrence Gap in a region commencing at least as far north as Kroombit Tops, National Park, extending south to at least the northern end of the Sunshine Coast in south-east Queensland.

*C. dorsei* sp. nov. appears to be confined to the Granite Belt of far south-east Queensland and immediately adjacent high-elevation areas on the NSW/Queensland border area and limited high altitude regions to the immediate north.

*C. wiradjuri* sp. nov. occurs on elevated wooded sections of the western plains of New South Wales, beyond the western slopes and east of the more arid far western parts of the state in an area generally in a line from West Wyalong in the south, through Parkes and Dubbo and as far north as Bourke in the north-west.

*C. josephburkei* sp. nov. occurs in the Mallee/Spinifex woodlands belt of far south-west New South Wales, north-west Victoria and nearby parts of South Australia.

As already mentioned, all were able to be separated from one another by combinations of colour and markings in terms of adults of each sex.

In terms of the relevant biogeographical barriers separating the forms identified herein as separate species, I note the following.

Putative *C. phaeospinosa* (Edwards and Melville, 2011) is, according to them, distributed in both the north and south Expedition Range in eastern Queensland, generally west and south-west of Rockhampton in Queensland.

There is an obvious north-south-gap in the distribution of their taxon and in this paper they are split, with the hitherto unnamed form from the Blackdown Tableland being formally named as a new morphologically divergent species, *C. aah* sp. nov..

The molecular data of Edwards and Melville (2011) as well as morphological divergence recorded by myself, do on their own provide a compelling case for species-level recognition of the northern population.

Significantly, in Hoser (2016) similarly split a putative gecko species across the exact same biogeographical barrier, probably being the first sibling species pair split across the barrier.

Hoser (2016) again relied upon previously published DNA evidence and consistent morphological divergence.

In that paper Hoser (2016) wrote:

"The species *S. jackyae* sp. nov. is only known from the Blackdown Tableland National Park, south-east Queensland, Australia. The similar species *S. salebrosus* is found about 150 km further south-east in the general vicinity of the type locality, Monto, also in south-east Queensland."

In terms of the north coast of Queensland species, *C. gedyei* sp. nov. and the species *C. ruffellae* sp. nov. both are separated by the St. Lawrence Gap, a well-known biogeographical barrier affecting many reptile taxa.

The species *Cryptophis edwardsi* (Hoser, 2012) as described in Hoser (2022), is constrained in the north by the St. Lawrence Gap and Dawson MacKenzie Gap, around Rockhampton in Queensland in the north and the border ranges barrier in the south.

*C. ruffellae* sp. nov. is separated in the south by the border

ranges biogeographical barrier, within which the upland form *C. dorsei* sp. nov. occurs.

Across the same biogeographical barrier the species pair *Amalosia jacovae* Couper, Keim and Hoskin, 2007 from the Queensland coast and *A. phillipsi* Wells and Wellington, 1984 (in the uplands) are separated by the same zone.

Similarly, the putative gecko species *Diplodactylus vittatus* Gray, 1832 was finally fully split up by Hoser (2023), using both morphological and genetic data.

The newly named NSW / Queensland border Granite belt form, was formally named *D. rosswellingtoni* Hoser, 2023. North of there in Queensland was *D. oxyi* Hoser, 2023 and south of the border ranges in the main New England region of New South Wales, including western outliers, was the type form of *D. vittatus*.

*C. dorsei* sp. nov. in turn is separated from the more southern *C. nobbi* (Witten, 1972), with distributions almost exactly matching the separation between that of *D. vittatus*, and *D. rosswellingtoni* by the same relatively rock-free zone or barrier that passes between Inverell-Glen Innes and north of the Queensland/New South Wales State Border.

Other morphologically different and genetically divergent species pairs split across the same biogeographical barrier are *Uvidicolus covacevichae* Hoser, 2016 as described in Hoser (2016) from the Queensland, New South Wales border, with *U. Sphyrurus* (Ogilby, 1892) being from the southern and central New England region of New South Wales and *Amalosia alexanderdudleyi* Hoser, 2017 as described in Hoser (2017) from the same areas as *U. Sphyrurus* (Ogilby, 1892), with the earlier described *A. phillipsi* Wells and Wellington, 1984 (note their correct genus placement), from the Queensland/New South Wales border area.

The southwest-border between the New England and north-west uplands of New South Wales form *C. nobbi* and the newly named *C. wiradjuri* sp. nov., from the elevated sandy or rocky dirt wooded areas between the eastern hills and the black soils further west is an established biogeographical barrier for many species pairs or complexes.

In terms of the *D. vittatus* complex and based on molecular and morphological data, *D. vittatus* was confined to the lower New England region, mirroring the distribution of *C. nobbi*, while *D. crotalusei* Hoser, 2013 has a distribution that almost exactly matches that of *C. wiradjuri* sp. nov. in the wooded region immediately west of the western slopes, mainly in north-west New South Wales.

The distribution of *C. josephburkei* sp. nov. is similarly constrained within the spinifex woodlands region around the border intersects of far south-west New South Wales, north-west Victoria and adjacent south-east South Australia.

The region and habitat is isolated by more arid and treeless areas to the north, wetter areas to the south as well as east and mountains to the west. The distribution of *C. josephburkei* sp. nov. is almost identical to that of *D. sloppi* Hoser, 2023, and almost certainly constrained by identical biogeographical factors.

#### EGREGIOUS TAXONOMIC VANDALISM BY JANE MELVILLE

The seriousness of the problems caused by taxonomic vandalism cannot be understated. See for example the reviews in Ceriaco *et al.* (2023), Cogger (2014), Cotton (2014), Dubois *et al.* (2019), Hawkeswood (2021), Hoser, (2007a-b, 2009a, 2012a, 2012c, 2013, 2015a-f, 2019a, 2019b), ICZN (1991, 2001, 2021), Mosyakin (2022), Wellington (2015) and sources cited therein.

Jane Melville is a serial offender and as there is a strong likelihood that she will attempt yet more name theft and taxonomic vandalism with respect of the new names within this paper, I shall make a brief mention of some of her previous nefarious actions, so that they remain a part of the scientific (or non-scientific in her case) record, and part of the public record for historical posterity.

This is particularly important noting her penchant for re-writing and faking the record, to imply she is some kind of Saint.

It is in fact quite difficult to keep pace with the actions of Melville and her cohort with respect of stealing works of others and renaming the very same entities in breach of both the Copyright Act Australia, 1968 (Moral Rights Section) and parallel laws in other countries as governed by the Berne Convention, 1886 as well as the flagrant breaches of both mandatory parts of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999) and the voluntary parts (recommendations) as well.

As of mid 2023, her cohort have illegally renamed over 100 reptile taxa over the past 20 years, have recently commenced taxonomic vandalism with respect of endangered species of marsupial and have now also lurched into the spheres of insect taxonomy and botany.

They could accurately be described as a band of taxonomic terrorists or nomenclatural anarchists.

They could also accurately be described as an unscientific mob of thieves.

As was described recently, this cohort, a small but vocal minority, are in effect an expanding pandemic causing chaos in scientific nomenclature and threatening its very existence!

They recruit gullible new followers by offering them a quick ride to fame as a "scientist", by getting them to steal works of others to claim as their own "discovery", rather than to put in the time and effort to make genuine scientific discoveries.

In terms of Jane Melville herself, I note that she has unlawfully coined duplicate names for the following reptile taxa.

*Lophognathus wellingtoni* Hoser, 2015 was unlawfully renamed as *Lophognathus horneri* by Melville (as senior author of a cohort) in 2018 in an online "journal" (Melville *et al.* 2018).

That was a culpable case of taxonomic vandalism and nepotism at the same time!

*Melvillesaurea* Hoser, 2015 was illegally renamed *Tropicagama* Melville *et al.* 2018, similarly published in an online "journal", and has since been plastered all over the internet falsely claiming it is the correct ICZN name for the genus while simultaneously removing evidence that the correct name *Melvillesaurea* Hoser, 2015, even exists, as seen for example at:

<https://reptile-database.reptarium.cz/species?genus=Tropicagama&species=temporalis>

and  
<http://www.wildherps.com/species/A.temporalis.html>

and  
<https://apps.des.qld.gov.au/species-search/details/?id=563>

and  
[http://www.reptilesaustralia.com/lizards/agamids/gowidon\\_temporalis.html](http://www.reptilesaustralia.com/lizards/agamids/gowidon_temporalis.html)

and  
<https://bie.ala.org.au/species/https://biodiversity.org.au/afd/taxa/ecae8005-45f0-4a1d-8d73-3896a5bab6a3>

and countless other examples ...

In an incredibly low act Jane Melville coined an illegal junior synonym name for *Tympanocryptis lineata* Peters, 1863 by renaming it *Tympanocryptis osbornei* in 2019 (see Melville *et al.* 2019a published in an online "journal"). Again this was taxonomic vandalism and nepotism at the same time, involving her mate William Osborne. This illegally coined junior synonym was similarly plastered all over the place, with the simultaneous erasing of a related but morphologically and genetically divergent species *Tympanocryptis telecom* Wells and Wellington, 1985 whenever possible.

See for example at:  
[https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon\\_id=90479](https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=90479)

and  
<https://www.environment.nsw.gov.au/news/nsw-threatened-species-scientific-committee-final-determination-tympanocryptis-osbornei>

and

<https://reptile-database.reptarium.cz/species?genus=Tympanocryptis&species=osbornei>

and  
<https://bie.ala.org.au/species/https://biodiversity.org.au/afd/taxa/42312895-b127-48dc-bcb2-6d1adcf62eb7>

and  
<https://arod.com.au/arod/index.php?q=photographerID%3D71>

and countless other places.  
Melville's act of attempting to rename a species, discovered and named for the first time by Wilhelm Karl Hartwich (or Hartwig) Peters (born 22 April 1815 in Koldenbützel, Germany, died 20 April 1883), namely *Tympanocryptis lineata* Peters, 1863 is particularly egregious, as besides being a combined act of taxonomic vandalism and nepotism in that she again named the taxon after a close friend who has made little significant contributions to herpetology or humanity in general, she has unlawfully renamed a species first named 160 years prior and where the original scientist who named it has no way possible to defend himself against this unscientific incursion into the realms of herpetology.

In case it's been overlooked, Wilhelm Karl Hartwich Peters has been regarded as one of the greatest taxonomists in the history of the biological sciences. He discovered and named hundreds of species of vertebrate, including hundreds of reptile species, being within the top 10 ICZN name authorities in all of history for herpetology.

*Tympanocryptis snakebustersorum* Hoser, 2019, was given the illegally coined synonym *T. petersi* Melville *et al.* 2019.

The illegally coined synonym name was again shopped across the web in the same Nazi-style rewrite of history, in this case being a disgusting rewrite of the scientific record, by pretending that the earlier and correct ICZN name *Tympanocryptis snakebustersorum* Hoser, 2019 simply does not exist.

See for example at:  
[https://bie.ala.org.au/species/ALA\\_DR655\\_1626](https://bie.ala.org.au/species/ALA_DR655_1626)

and  
<https://reptile-database.reptarium.cz/species?genus=Tympanocryptis&species=petersi>

and  
[http://reptilesaustralia.com/lizards/agamids/Tympanocryptis\\_petersi.html](http://reptilesaustralia.com/lizards/agamids/Tympanocryptis_petersi.html)

and countless other places as well.

And you can repeat the same egregious contempt for ethics, the rule of law and the rules of the *International Code of Zoological Nomenclature* that binds all scientists globally, in terms of Melville's, similar scandalous attempts to erase scientific history by renaming the following as well.

*T. optus* Hoser, 2019, was given the illegally coined junior synonym name *T. argillosa* Melville *et al.* 2019.

*T. vodafone* Hoser, 2019 was given the illegally coined junior synonym name *T. tolleyi* Melville *et al.* 2019.

*T. lachlanheffermani* Hoser, 2018 was given the illegally coined junior synonym name *T. rustica* Melville *et al.* 2019.

In other words Jane Melville is a liar and crook in every sense of the word. Any science credentials or good work she may have done is dwarfed by her unscientific and unethical actions in illegally trying to claim credit for discoveries she simply never made!

Her destabilizing of zoological nomenclature for her own egotistical self-aggrandisement is a shocking example that hopefully no one else will try to emulate.

In term of near relatives of the *C. nobbi* complex, Melville's partner in crime Danielle Edwards has not been sitting idly by either!

In 2023, along with the notorious serial taxonomic vandal Mark Hutchinson, she illegally coined junior synonym names for four subspecies of Mallee Dragon that had been properly named in

2020 (Hoser 2020, Hutchinson and Edwards 2023).

These were:

*Ctenophorus (Phthanodon) fordi scottjamesi* Hoser, 2020 was given the illegally coined junior synonym name *Ctenophorus cartiwaru* Edwards and Hutchinson, 2023,

*Ctenophorus (Phthanodon) fordi scottgranti* Hoser, 2020 was given the illegally coined junior synonym name *Ctenophorus ibiri* Edwards and Hutchinson, 2023,

*Ctenophorus (Phthanodon) fordi danielmani* Hoser, 2020 was given the illegally coined junior synonym name *Ctenophorus tjakalpa* Edwards and Hutchinson, 2023,

*Ctenophorus (Phthanodon) fordi maryannmartinekae* Hoser, 2020 was given the illegally coined junior synonym name *Ctenophorus tuniluki* Edwards and Hutchinson, 2023.

As to why Hutchinson and Edwards (2023) would choose to elevate four previously described subspecies, each with a divergence of less than 1 MYA from their nearest previously named relatives, is a question that needs to be asked of them, but obviously I don't think that decision was particularly sensible either!

In terms of her co-offender, Mark Hutchinson, just think "Bassiana Hutchinson *et al.* 1990" which was a failed attempt to erase *Acritoscincus* Wells and Wellington 1985 from the scientific record and claim credit for discovering that genus.

That was just one of several similar examples involving Mark Hutchinson, all thankfully formally squashed by the ICZN (1991) as detailed in Hoser (2007) and Cogger (2014).

As done by Jane Melville, Danielle Edwards and associates in crime, Mark Hutchinson or others acting on his behalf, also aggressively went about erasing the correct ICZN names from the internet and ensuring that the only names seen by almost everyone was their own illegally coined non-ICZN junior synonyms.

Of course they dishonestly marketed them falsely as the correct ICZN names and that being the basis of their own (faked) discoveries.

So why do these people do this?

It is all about scamming big cash grants from government for more of their fake research.

They do this by claiming to have already made heaps of (other people's) "discoveries", justifying the hand outs!

Corporate and government bodies see their track record of "discoveries" as being a good bet for more discoveries in the future and throw their cash at them.

In fact the actions of people faking "discoveries" by stealing the work of others and renaming taxa is nothing more than grants fraud!

We are talking many millions of dollars in government and corporate hand outs here, all being done at a time when species are disappearing faster than ever and numerous reptile species remain undiscovered, unnamed, uncatalogued and absent of any conservation actions by governments due to alleged lack of funds.

A grant fraud scamming member of the cohort, Fred Kraus scammed millions of dollars from the USA Government to simply rename six New Guinea geckos that had been formally named some years prior.

Kraus justified his lavish lifestyle by falsely claiming to have discovered the six species of geckos himself!

Normally people who scam money from governments go to jail, but so far at least, Fred Kraus remains a free man.

The destructiveness of creation of illegal synonyms has been a problem for some years going back to the late 1980's, but Jane Melville, Danielle Edwards and the rest of the Wolfgang Wüster gang of thieves, have taken all this to a level never seen before as outlined by Ceriaco *et al.* (2023), Cogger (2014), Cotton (2014), Dubois *et al.* (2019), Hawkeswood (2021), Hoser, (2007a-b, 2009a, 2012a, 2012c, 2013, 2015a-f, 2019a, 2019b),

ICZN (1991, 2001, 2021), Mosyakin (2022), Wellington (2015) and sources cited therein.

#### NOTES ON THE SCIENTIFIC 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).

This includes if Latinisation is wrong, apparent spelling mistakes and so on.

Any online citations within this paper, are not as a rule cited in the references part of this paper and have the same most recent viewing and checking date of 10 August 2023 (at which time they were still online as cited).

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

However in terms of the species formally named within this paper, both males and females are dealt with separately at times. It should be noted that adult males and females in all relevant species are sexually dimorphic.

While numerous texts and references were consulted prior to publication of this paper, the criteria used to separate the relevant subspecies 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.

Photos of species referred to within the formal descriptions (within publications and/or online) also have characters that conform to the diagnostic characters as stated in the descriptions.

In the unlikely event that someone seeks to synonymise forms formally named herein, the name to be used in the first instance is that which appears first in this paper by way of description and page priority as listed in the abstract keywords.

Some material within descriptions is repeated to ensure each fully complies with the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

#### CONSERVATION

The following taxa are formally named in accordance with the rules of ICZN as published in the *International Code of Zoological Nomenclature* (Ride *et al.* 1999). I do not use the alternative illegal nomenclature of the Wolfgang Wüster gang, with their ever changing claims, as detailed in a blog document known as Wüster (2012), rebadged as Kaiser *et al.* (2013) (cited herein), and as frequently amended since.

I also do not support the other illegal actions of the cohort, including thefts of live reptiles from wildlife displays, attempted theft of ICZN name authority by way of plagiarism of earlier papers and acts of taxonomic vandalism, unlawful telephone threats to kill (as confirmed in the law courts), physical and sexual violence against vulnerable women and children (as confirmed in the law courts), scientific fraud, running thousands of fake social media accounts for the purposes of spreading hate and lies (as confirmed in the law courts), scamming money from funding bodies on false pretexts and other unlawful activity, as detailed by Goodman (2019), Hoser (2009, 2012a-b, 2013a-b, 2015a-f, 2016a, 2016b, 2019a-b) and sources cited therein.

In case it has not already been made clear, I note that in the 5 years preceding this publication, Australian law courts have found against members of the Wolfgang Wüster gang for acts of theft of snakes, criminal damage to property, intellectual property

theft, trademark infringement, copyright infringement, making false complaints to government authorities to instigate illegal armed raids, running thousands of fake social media accounts for illegal activities, an unlawful attempt to defraud the Accor Hotels Group, unlawfully shooting native aboriginals (that is allowed of some people within Australia as of 2023), supporting international terrorist groups including ISIS, perjury and other serious criminal actions. Penalties have included fines, jail, numerous court restraining orders, as well as payment of damages and restitution (e.g. Goodman 2019).

Significantly the unlawful actions by the Wolfgang Wüster gang have serious negative conservation implications.

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

Also refer to the relevant comments within Hoser (1989, 1991, 1993, 1996 and 2007).

Therefore attempts by taxonomic vandals like the Wolfgang Wüster gang via Kaiser (2012a, 2012b, 2013, 2014a, 2014b) and Kaiser *et al.* (2013) (as frequently amended and embellished, e.g. Rhodin *et al.* 2015, Thiele *et al.* 2020, Hammer and Thiele 2021) to unlawfully suppress the recognition of these taxa on the basis they have a personal dislike for the person who formally named it/them should be resisted (e.g. Ceriaco *et al.* 2023, Cogger 2014, Dubois *et al.* 2019, Hawkeswood, 2021, Mosyakin 2022 and Wellington 2015).

Claims by the Wüster gang against this paper and the descriptions herein will no doubt be no different to those the gang have made previously, all of which were discredited long ago as outlined by Ceriaco *et al.* (2023), Cogger (2014), Cotton (2014), Dubois *et al.* (2019), Hawkeswood (2021), Hoser, (2007a-b, 2009a, 2012a, 2012c, 2013, 2015a-f, 2019a, 2019b), ICZN (1991, 2001, 2021), Mosyakin (2022), Wellington (2015) and sources cited therein.

#### **CALOTELLA (WITTENAGAMA) GEDYEI SP. NOV.**

**LSIDurn:lsid:zoobank.org:act:2DA8C384-00D7-487F-A497-06BC4B7DBA75**

**Holotype:** A preserved female specimen at the Queensland Museum, Brisbane, Queensland, Australia, specimen number J82745 collected from the Old Sawmill Site, Kirrama, north Queensland, Australia, Latitude -18.153611 S., Longitude 145.683333 E.

This government-owned facility allows access to its holdings.

**Paratypes:** Two preserved specimens at the Queensland Museum, Brisbane, Queensland, Australia, 1/ Specimen number J75454 collected from Kirrama, north Queensland, Australia, Latitude -18.15 S., Longitude 145.616667 E., and 2/ Specimen number J58946 collected from Dipyard Creek, South of Ravenshoe, north Queensland, Australia, Latitude -17.983333 S., Longitude 145.55 E.

**Diagnosis:** Until now, putative *Calotella (Wittenagama) nobbi* (Witten, 1972) has been treated as a single species by most authors, usually placed in the genera *Amphibolurus* Wagler, 1830 (*sensu* Witten, 1972, Cogger *et al.* 1983), or *Diporiphora* Gray, 1842 (*sensu* Edwards and Melville, 2011, Cogger 2014, Brown 2014, Wilson and Swan (2021), with Wells and Wellington (1985) erecting the genus *Wittenagama* Wells and Wellington, 1985 for the species and to date being the only authors to have used this placement.

*Calotella* Steindachner, 1867, type species *Calotella australis* Steindachner, 1867 is herein regarded as the phylogenetically correct genus-level placement, that genus also being used as valid by Wells and Wellington (1985) for the type species and associated taxa.

*Wittenagama* is herein used as a subgenus for the relevant taxa herein.

Four forms within *C. nobbi* or associated with it have been named to date, with three recognized as valid species. However as the species concepts are redefined herein, to accommodate

another six newly named forms within, all nine having originally been treated as putative *C. nobbi*, all are defined and diagnosed herein.

Nominate *C. nobbi* (Witten, 1972) with a type locality of 24 miles, east north-east of Guyra, New South Wales occurs in the New England Region of New South Wales, except the far northern part, extending into the Granite Belt of south-east Queensland, as well as the nearby elevated areas to the south-west including the Warrumbungle Mountains. The form described as *C. nobbi coggeri* (Witten, 1972), with a type locality of the Warrumbungle Mountains, is herein treated as a synonym of nominate *C. nobbi*.

*C. parnabyi* (Wells and Wellington, 1985) with a type locality of 88 km west of Alpha, Queensland, occurs west of the Great Divide in eastern Queensland, generally north of the tropic of Capricorn and east of the black soil areas, extending north to about Charters Towers, Hughenden in north Queensland.

*C. phaeospinosa* (Edwards and Melville, 2011) with a type locality of Bauhinia Station, Queensland, Latitude -25.17 S., Longitude 149.20 E, is a range-restricted species confined to the Expedition National Park (Southern Expedition Range) and the Bigge Range, mid-eastern Queensland.

*C. aah* sp. nov. was formerly treated as a northern population of *C. phaeospinosa*, and is apparently confined to the Blackdown Tableland (Northern Expedition Range) in mid-eastern Queensland. While extremely common where it occurs, it appears to be a range-restricted endemic to the area.

*C. gedyei* sp. nov. is found from the Broadsound Range in the south near Marlborough, Queensland, (the St. Lawrence Gap biogeographical break) extending along the coast and hinterland north to about Cooktown, north Queensland.

*C. ruffellae* sp. nov. occurs south of the St Lawrence Gap (Queensland) in a region commencing at least as far north as Kroombit Tops, National Park, extending south to at least the northern end of the Sunshine Coast in south-east Queensland.

*C. dorsei* sp. nov. appears to be confined to the Granite Belt of far south-east Queensland and immediately adjacent high-elevation areas on the NSW/Queensland border area and limited high altitude regions to the immediate north.

*C. wiradjuri* sp. nov. occurs on elevated wooded sections of the western plains of New South Wales, beyond the western slopes and east of the more arid far western parts of the state in an area generally in a line from West Wyalong in the south, through Parkes and Dubbo and as far north as Bourke in the north-west.

*C. josephburkei* sp. nov. occurs in the Mallee/Spinifex woodlands belt of far south-west New South Wales, north-west Victoria and nearby parts of South Australia.

The nine species can be most easily separated from one another by different combinations of colour and markings.

The nine species are separated from one another by the following unique combinations of characters outlined in terms of adult specimens of normal health and condition in an unstressed state, with males defined as seen in the breeding season, below:

*C. nobbi* males have a greyish head with either no obvious markings or alternatively faded and indistinct. The dorsolateral lines on the upper surface of the body are creamish-white in colour and the border is more-or-less straight on either side. The dorsum is otherwise dark grey and with faint indistinct spots or areas of brownish-grey. The upper 2/3 of the flank is similarly coloured. Below, this the lower third of the flank is whitish, with grey mottling and an obvious yellow flush, this flush extending along the entire lower flank and not more intense either anteriorly or posteriorly. The yellow flush may be moderate to faint, but the lower flank is never a deep yellow.

The anterior third of the tail is mottled greyish on top, on the lighter background, it is whitish on the side and all with an obvious pink flush, of moderate intensity. That is, the flush is obvious, but not making the tail boldly pink. It is best described as greyish-pink. Posterior to this, the tail is greyish to white in colour and without any pink flush. The anterior flank is blackish in

colour, but not significantly darker than the posterior parts (upper 2/3).

Iris is a creamy beige colour.

*C. nobbi* females give an overview as being a generally drab grey lizard.

There are no signs of any dorsolateral stripes running down the back of the lizard.

Markings on the head are either absent or indistinct, including the optical-auricular line.

Upper labials are whitish and unmarked with most of the area between the eye, tip of snout and upper labials being whitish or cream in colour.

Along the back are four ridges of enlarged blunt-edged spines (each scale), but these lack any different colouration as compared to scales nearby.

The dorsum has extremely faint patterning in the form of rectangles running from the spine to the raised scales on the dorsolateral line, in turn separated by wider lighter areas (but of similar greyish-brown colour).

Below the dorsolateral line there is a new series of blotches, which combined occupy most of the upper half of the flank, with the lighter borders both indistinct and thin, because the next dark blotch intrudes on it.

While the lower half of the flank is generally a dirty grey colour, some but not all scales have semi-distinct light tips.

On the upper surface of the anterior limbs are about three semi-distinct bars, each created by a series of black-tipped scales across the limb.

The anterior half of the tail is greyish in colour but with about ten lighter rings, beyond which the tail is a generally dull greyish-brown in colour.

Iris is a fairly bold orange-brown colour, being the one aspect of the lizard that is not generally a drab greyish in general colour.

*C. nobbi* in life is depicted in Brown (2014), page 671 right side, third image down (male) as well as online at:

<https://www.inaturalist.org/observations/148501088> (male)

and

<https://www.inaturalist.org/observations/103270301> (male)

and

<https://www.inaturalist.org/observations/103236121> (male)

and

<https://www.inaturalist.org/observations/149895746> (female).

*C. parnabyi* males are perhaps the most divergent within the entire *C. nobbi* species complex.

Males are readily separated from all other species in the complex by the unique combination of having a bright canary yellow rinse across most of the anterior upper body. This includes the head, which is bright yellow in a line above the snout-nostril-eye, which continues down the back of the dorsum to the pelvic girdle. This gives this species the unique yellow paravertebrals referred to in the original description of Wells and Wellington (1985) and is alone in diagnosing males of this species from any other in the *C. nobbi* complex.

The bright yellow upper surfaces of the head of males, not overwritten with grey or other markings, readily separates the males of this species from all others.

The two dorsolateral lines have extremely straight outer edges and are wholly infused with deep yellow, making them appear as yellow stripes, rather than being white or creamish as in most of the other species. This yellow in the dorsolateral lines includes at least a faded yellow rinse anteriorly, although in many specimens this lesser amount of yellow anteriorly is noticeable as compared to that on the stripes further down the body. The general (faded) dorsal markings form a reticulatum, when inspected closely.

The upper 2/3 of the flanks are dark greyish-black and with little specks or markings, save for a few yellowish, or yellow tipped scales, either scattered or in small clusters. Upper surfaces of

limbs lack obvious markings and are yellowish for the forelimbs, and yellowish-grey for the hind limbs. The tail is whitish on the upper surface, greyish on the upper flanks and wholly infused with a whitish pink along most of its length, with the distal end being just brownish in colour.

Upper labials, ear and below the chin are all white in colour.

Iris is brown.

The adult female *C. parnabyi* is a light brownish-grey lizard with a head that is light brown on the upper surfaces, a moderately distinct line from eye to ear, white upper labials, sometimes marked or spotted with brown.

The back has two distinct dorsolateral lines, with 5 or 6 pairs of dark entering from the upper edge. these dark markings are in the form of irregularly shaped spots on either side of the mid-dorsal line (not that there in fact any line as such in the mid-dorsal line, this being identified as a location and not a marking).

Other than the dark patches just mentioned the dorsum is generally unmarked, save for an extremely faint outline of a line down the mid-dorsum. It is otherwise an even brownish-grey in colour. The upper 2/3 of the flank is a light brown colour, below that is white with scattered brown-grey spots or peppering. Upper surfaces of the limbs are brownish with semi-distinct darker or lighter specks or small markings. Fingers and toes are generally barred darker and lighter.

The back of each hind limb has a broken dark line, bordering the brown upper and white lower surface, this line continuing onto the flank of the anterior tail, after which it breaks into a series of spots running down the brownish-grey tail. The tail has lighter cross-bands along its entire length.

Iris is greyish-beige in colour.

*C. parnabyi* in life is depicted in life in Melville and Wilson (2019) on page 258 (male) and online at:

<https://www.inaturalist.org/observations/97519668> (male)

and

<https://www.inaturalist.org/observations/97519653> (male)

and

<https://www.inaturalist.org/observations/101968035> (male)

and

<https://www.inaturalist.org/observations/97519667> (male)

and

<https://www.inaturalist.org/observations/109626229> (female).

*C. gedyei* sp. nov. males have a generally dark greyish-brown upper body.

The head is greyish and with semi distinct markings, including obvious dark grey peppering on a greyish head, a well-defined line from eye to ear, dark grey ear, off-white upper labials and lower parts of head whitish and heavily peppered grey (the gular region).

The dorsolateral lines are relatively wide. The light part of the lower flanks rises somewhat to be about half, or a little more than half, way up the side in the middle of the flank, meaning the darker area above reduced in relative area as compared to other species in the *C. nobbi* complex.

The middle of the dorsum is generally a brownish patter, with a vaguely distinct pattern of dark blackish patches running from spine to dorsolateral lines, but not intruding into them. These patches are narrower than the intervening lighter areas, (being a dark brown colour). The dark patches running from the spine are squarish in shape, but narrow at the flank edge, although the border with the dorsolateral line is still squarish at the adjoining edge. Flanks are in part a continuation of the dorsum pattern, but the similarity of the two colours involved makes the whole side appear to be of one colour and any markings are indistinct.

There is a light yellow flush on the lower flank, posterior to the axilla of the forelimb, running both up and posterior from this point. It causes the dark colouration of the dorsum to lighten where this flush is, but this is barely noticeable.

What is noticeable is that the white dorsolateral lines transition to light yellow from just behind the front limb to the end of the body, becoming white again at the base of the tail, where it then becomes effectively overwhelmed by a salmon pink wash through the main part of the tail. In turn the tail is a dull salmon pink colour with scattered black smudges or irregularly shaped spots on the sides or top of the tail. Upper surfaces of both fore and hind limbs have scattered irregular black markings, sometimes configured to form semi-distinct bands.

Notable is that the dorsolateral stripes are white anteriorly, becoming yellow and then white again, versus with at least some yellow rinse anteriorly in *C. panabyi*.

There is a very dull, but barely noticeable slightly greyish line running down the spine.

Pupil is orange-brown on top and greyish-below.

*C. gedyei* sp. nov. females are readily separated from females of all other species in the complex by the following characters:

There are well-defined thin, yellow or white dorsolateral lines running down the body.

The head is a brownish-grey colour with darker peppering and a well-defined line from eye to ear, that is mainly dark in colour.

The mid-line of the dorsum has a thick grey line running down it. On either side of that is a well-defined and obvious alternating series of dark blackish spots of squarish-shape, but not of regular shape, separated by light reddish-brown interspaces of similar size.

While there is a semi-distinct line bordering the upper and lower flanks, both are of similar colouration being whitish in background, but heavily peppered with grey and dull orange-red, with the relative ratios of each depending on the individual lizard. The darker markings along the dorsum continue in a reduced and more further spaced manner down the upper surface of the anterior half of the tail. The tail is otherwise of a mainly brownish colour. Upper surfaces of both forelimbs and hind limbs are moderately distinctly banded.

Iris is beige-yellow or dull orangeish in colour.

*C. gedyei* sp. nov. is depicted in life in Melville and Wilson (2019) on page 73 at bottom (male) and online at:

<https://www.inaturalist.org/observations/58322177> (male)

and

<https://www.inaturalist.org/observations/88359745> (female).

*C. ruffellae* sp. nov. males are a yellowish-grey-brown lizard best diagnosed as follows:

head is greyish without distinctive markings or peppering. The line from eye to ear is barely noticeable and is narrow anteriorly, widening like a triangle posteriorly. Upper labials are also light grey. The dorsolateral stripes are a light yellow along their entire length. The lower edge is smooth, but the upper edge is jagged, this being caused by the obvious interruption by dark triangles from the dorsal side. These triangles (point facing the midline of the body) are on either side of the midline with the bases interrupting the dorsolateral lines.

The triangles are not exact in shape. They are blackish in colour. Otherwise the colouration of the back is mainly dark brown.

Along the midline is a dull dark grey line, not significantly distinguishable from the adjoining pigment.

Flanks are yellowish-brown-grey in colour from top to bottom, this being created by dull grey peppering on an equally dull yellowish brown background. 2/3 of the way down the flank is a well-defined and narrow yellow line that separates upper and lower flank, although both are of similar colour. The tail is mainly dark grey with irregularly shaped and well-spaced lighter patches running down the top of the tail. These are infused with a whitish-pink colour, but this pinkish-white rinse only occurs at the anterior third of the tail.

Iris is beige in colour.

*C. ruffellae* sp. nov. females are mainly reddish-brown on top and on the flanks.

The dorsum also has a series of about 7 pairs of grey squarish shaped blotches, on either side of the spine, on the body. The rest of the dorsum and the entirety of the upper flank is a dull reddish-brown colouration. There is a thin and well-defined greyish line separating the upper and lower parts of the flanks, this being about 23% of the way down either side of the lizard. Below this the skin is heavily tubercled and mainly greyish-white, with infusions of reddish brown from the top line. Upper surfaces of limbs are also brownish and with limited flecks, bands or markings, all of which are either semi-distinct or barely noticeable. Exceptional to this is the back of the hind limbs, which are well marked and defined, especially with respect of dark upper and light lower surfaces, which continues onto the anterior part of the tail before the markings fade again. The tail itself is mainly yellowish-grey in colour with alternating indistinct reddish markings that may or may not form rings.

The upper surfaces of the head are more brownish than reddish and this includes the snout and below the eye. Upper labials are quite dark.

Lower labials are heavily peppered grey/brown although the gular region is pure white. The line from eye to ear is of even width and prominent.

Iris is light grey.

*C. ruffellae* sp. nov. in life is depicted online at:

<https://www.inaturalist.org/observations/176708599> (male)

and

<https://www.inaturalist.org/observations/154054190> (male)

and

<https://www.inaturalist.org/observations/99184001> (female)

and

<https://www.inaturalist.org/observations/150178157> (female).

*C. dorsei* sp. nov. males have a head that is light grey on top, with a well-defined line from eye to ear, cream below the eye and including the upper labials and an immaculately whitish gular region. The dorsolateral lines are white, but with a slight yellowish tinge in the middle part of the dorsum. Lower edge is straight and upper edge is also nearly completely straight.

Behind the axilla of the forelimb is a strong yellow flush that fades rapidly along the lower surface of the otherwise mainly white lower flank, so that it is completely white by the time one reaches the hind limb.

This generally white lower flank occupies just under half the surface of the flank.

In the mid part of this white area is limited brown peppering.

The anterior third of the tail is flushed a bright maroon pink colour. Latter two thirds of the tail is essentially a greyish-brown colour and without any obvious markings. There are no obvious markings on the upper surfaces of the limbs, including the back parts of the hind-limbs.

On the upper surface of the dorsum are semi-distinct dark squares or triangles that run in pairs from the midline to the dorsolateral stripes, but do not cross or intrude into them. The midline has a very faint greyish overwrite in the form of a line, that is only noticeable on close inspection.

Iris is a dark yellow-brown.

Female *C. dorsei* sp. nov. are also a well patterned lizard.

They are diagnosed as follows: dorsum ranges from reddish brown generally to greyish, but invariably includes a series of joined or separated triangles running from the midline of the dorsum to the flanks, where the white to yellow dorsolateral lines are well broken by the intrusions of the pointed end of the triangle (the base is against the midline of the dorsum). The top half of the flank is of the same background colour as the dorsum, whereupon it switches to white, peppered with the dorsal colour. This interface is not demarcated by any line of any form or colour, but rather the transition is sudden, from the colour reddish or grey to white.

The line from eye to ear is well defined and separates white

above and below, with a second similar line radiating from the upper posterior of the eye.

The top of the head is dark, but without any obvious peppering or markings beyond those mentioned. The area between the snout, eye and including the upper labials are all white, as is the chin and gular region. Upper surfaces of the front and rear limbs are dark in colour but punctuated with white bands on the forelimbs and obvious white markings on the hind limbs.

The tail is marked with light blotches on top anteriorly with dark on the sides, becoming brownish-grey posteriorly and without obvious markings.

There is a barely distinct grey smudge or overwrite down the vertebral line of the body.

Iris is a dark reddish brown in colour.

*C. dorsei* sp. nov. in life is depicted in Brown (2014) on page 671, second down on left is a male and third down on left is a female; in Wilson (2022) page 217, top left (male) and Melville and Wilson (2019) on pages 257 and 259 (males). The species is also depicted in life online at:

<https://www.inaturalist.org/observations/148520503> (male) and

<https://www.inaturalist.org/observations/103998294> (male) and

<https://www.inaturalist.org/observations/72001834> (female).

*C. wiradjuri* sp. nov. males are generally greyish coloured lizards with a greyish dorsum, cream coloured dorsolateral stripes, boldly defined on the outer edge and not quite so on the inner edge.

The dorsal pattern of mainly light blotches etched dark on the outer edges and including down the vertebral line is relatively prominent. Markings on the tail are barely noticeable and the light pink flush on the tail runs most of the length of it, but becoming a dull orange or orange-grey posteriorly.

Head markings are faded or absent, but there is typically a yellow or orange ring of some kind either around the eye, or at least an area of yellow or orange above the eye.

Upper surfaces of the limbs are brownish-yellow in colour, but the distal parts and toes are noticeably a beige or yellow colour.

Markings on the tail if present are barely distinct and if present, usually in the form of wide white and darker bands at the distal end.

Iris is orange-yellow in colour.

Female *C. wiradjuri* sp. nov. are similar in most respects to female *C. dorsei* sp. nov. as outlined above, but separated from that taxon by obvious dark spots or markings (not peppering) on the upper surfaces of the head, an absence of obvious cross bands on the upper surfaces of the forelimbs and the demarcation between dark upper surface of the flank and whitish underside being in the form of an obvious line with at least one added border, this usually being a black edge at the end of the darker upper flank, and sometimes a similar black edge forming a line at the lower boundary of the white demarcation.

The upper surface of the tail is light with slightly darker colour on the flanks, these forming dark tipped triangular intrusions on the upper surface.

Iris is light grey on the bottom and light dull orange-brown on top.

*C. wiradjuri* sp. nov. is depicted in life in Cogger (2014), page 733 (female), as well as online at:

<https://www.inaturalist.org/observations/103397281> (male) and

<https://www.inaturalist.org/observations/103499257> (female) and

<https://www.inaturalist.org/observations/81410631> (female).

*C. josephburkei* sp. nov. males are a generally drab grey lizard on top. They are readily separated from males of all other species by the noticeably wider dorsolateral stripes that are cream in colour combined with a lower lateral stripe of the same

colour and width as the dorsolateral lines, demarcated with the grey upper flank on top and below by a well defined thick grey line, or line defined by a zone of dense peppering in the form of a line on the upper edge and fading below it.

Head is plain grey with either no visible markings or those that are, being very indistinct and of similar colour to the surrounding areas. Limbs are generally unmarked or if so, very faintly, the exception to this being the back parts of the upper surfaces of the hind limbs, including the anterior flanks of the tail. Ear is dark grey to black.

The entire tail is generally a whitish grey colour and any pink flush anteriorly is extremely feint if detectable at all and in most animals is seen as a white, rather than pink flush.

Labial area of the head is white, including lower labials, but the gular region rapidly becomes peppered grey.

Iris is a light yellow-orange colour.

Female *C. josephburkei* sp. nov. are also a generally dull greyish coloured lizard. Like males, they also have thick dorsolateral cream or white lines on the body. But in the case of females these are intruded on the upper edge by a well defined dark edged series of about five triangular intrusions on the mid and lower dorsum of the body. Otherwise the central part of the dorsum is generally grey in colour. The intrusions into the dorsolateral lines are formed as extensions from the mid-dorsal area, but are brownish, rather than grey as seen in the mid-dorsal area itself, giving them the appearance of brown triangles intersecting the lighter dorsolateral stripes. The outer edge of the mid dorsal zone that borders the light dorsolateral lines is faintly brown edged.

The triangular intrusions mentioned before, continue onto the top and flanks of the anterior part of the tail, in the form of small triangles or diamonds. The tail is otherwise a brownish grey colour, but with broad semi-distinct rings on the posterior half. Labials are whitish-grey as are the under-surfaces of the anterior of the head.

*C. josephburkei* sp. nov. is depicted in life in Brown (2014) on page 671, bottom right (male), Melville and Wilson (2019) page 256, bottom right (male, not breeding colours) and online at:

<https://www.inaturalist.org/observations/135353121> (male) and

<https://www.inaturalist.org/observations/151265589> (male) and

<https://www.inaturalist.org/observations/141494310> (male) and

<https://www.inaturalist.org/observations/125137902> (male) and

<https://www.inaturalist.org/observations/159087699> (female) and

<https://www.inaturalist.org/observations/69292668> (female).

*C. aah* sp. nov. males are readily separated from all other species in the *C. nobbi* complex by the presence of a dark, black coloured line from eye to ear and including the entirety of the ear, being black, dorsolateral lines that are yellow, with a fairly even lower edge and jagged upper edge, black chin and gular scales, upper part of the flank is black to dark brown along the upper half to two thirds of the flank, bounded below by a well defined yellow line (thinner than the dorsolateral ones) and bounded below that by a deep range-red, which may be brown edged towards the yellow line above.

The tail is mainly light on top and with deep reddish orange on the sides for the anterior quarter, beyond which is a series of near joined lighter blotches on the upper surface and mainly darker on the sides.

Labials are whitish grey as are nearby scales on the side of the head. The top of the head is an ill-defined mixture of a grey and brown colouration, being much the same down the middle of the dorsum, there being more grey along the midline and more brown towards the outer edges.



Iris is light orange.

There is a moderately well-defined dark grey line running down the vertebral line of the back and terminating just past the pelvic girdle.

Female *C. aah sp. nov.* do not have the unbroken dorsolateral stripes of the males.

In females the dorsum has a combination of wide creamy-white blotches, roughly square in shape, extending from the greyish midline, interspersed with narrower black sections. Towards the dorsolateral line, the creamy-white blotches widen and in turn tend to make the darker sections triangular tipped. Along the line of the flank (being an area as opposed to a physical line), the markings abruptly stop and there is merely a zone of reddish-brown, with black smudging or peppering occupying the upper flank.

In most specimens the widened outer edges of the lighter blotches do not completely cut off the darker interspaces, meaning that there is no view of triangles on the dorsum. However in some specimens the lighter blotches do merge and there is a view of well-defined grey triangles along the mid dorsal line, with the points being bound by yellow on the outer edges.

While this may result in a continuous zone of yellow along the dorsolateral line, this is in no way like the well defined dorsolateral lines in the males, that are relatively straight edged along both edges and not having the obvious triangle intrusions.

About 2/3 down the flank is a well defined (always) white line of moderate thickness, thinly bound with black or dark grey, top and bottom, below which the reddish-brown colour continues.

The line from eye to ear and beyond is brown in colour, although the ear itself is usually greyish in colour.

Iris is beige in colour.

*C. aah sp. nov.* in life is depicted in Brown (2014) on page 671 (male top right and female top left) and online at: <https://www.inaturalist.org/observations/177044877> (male)

and

<https://www.flickr.com/photos/65796382@N05/36918228993/> (male)

and

<https://www.flickr.com/photos/euprepiosaur/8471986271/> (male)

and

<https://www.inaturalist.org/observations/136492220> (female)

and

<https://www.inaturalist.org/observations/151563909> (female).

*C. phaeospinosa* is similar in most respects to *C. aah sp. nov.* as detailed above and unless stated otherwise below, the diagnosis of this species matches that of *C. aah sp. nov.*

Male *C. phaeospinosa* are readily separated from *C. aah sp. nov.* by the line from eye to ear and beyond being relatively ill-defined and often broken, not being black in colour, but rather a medium grey instead and distinct of this taxon is that darker areas of the upper body and flanks are usually heavily spotted white (also not seen in *C. aah sp. nov.*), the spotting being faded in aged specimens. Also male *C. phaeospinosa* lacks the strong reddish colour of the lower flank, instead being less strongly flushed and a dull yellow-orange colour instead. The white line of the lower flank is narrow, often ill-defined or absent.

Female *C. phaeospinosa* is similar in most respects to *C. aah sp. nov.* as detailed above and unless stated otherwise below, the diagnosis of this species matches that of *C. aah sp. nov.*

Female *C. phaeospinosa* are generally a yellowish-grey lizard as opposed to the more reddish colours seen in *C. aah sp. nov.*. The whitish line on the lower flank is ill-defined, broken or absent and often greyish, rather than white in colour. Markings on the tail are generally a combination of greyish and yellow (mainly greyish) versus greyish and reddish-orange in female *C. aah sp. nov.*

Notwithstanding the genetic divergence between *C. phaeospinosa* and *C. aah sp. nov.*, probably the biggest driver of

colouration differences between these two taxa is the colour of the rock substrate in the respective areas they occur in and the natural selection that has arisen as a result.

*C. phaeospinosa* in life is depicted online at:

<https://www.inaturalist.org/observations/143459143> (male)

and

<https://www.inaturalist.org/observations/119187909> (immature male).

The nine above described species, being the entirety of the subgenus *Wittenagama* Wells and Wellington, 1985 are separated from the nominate subgenus within *Calotella* Steindachner, 1867, type species *Calotella australis* Steindachner, 1867 by the presence of 1-8 femoral pores on either side of the vent, versus none in *Calotella*.

Species within *Calotella* are separated from the morphologically similar species within the genus *Diporiphora* Gray, 1842 by the following combination of characters: Keels of the dorsal scales on the posterior part of the body converge on the vertebral line; gular and ventral scales (excluding chin shields) are keeled; gular fold present; dorsal scales are heterogenous, including a longitudinal series of enlarged scales along the outer edge of the paravertebrals; vertebral scales are roughly the same size as the inner rows of enlarged dorsal scales.

Species within the preceding named genera and subgenera are separated from all other Australian agamids by the following:

The presence of a body without massive conical spines all over it, the spines being larger than the eye or a massive spiny hump on the nape; no loose frill of skin around the neck; femoral pores present in males (*Wittenagama* and *Diporiphora* but not the nominate subgenus *Calotella*); tail not strongly laterally compressed with a strongly differentiated dorsal keel; with or without a series of enlarged scales on the back along the vertebral line (the preceding was modified from Cogger 2014).

**Distribution:** *C. gedyei sp. nov.* is found from the Broadsound Range in the south near Marlborough, Queensland, (the St. Lawrence Gap biogeographical break) extending along the coast and hinterland north to about Cooktown, north Queensland.

**Etymology:** *C. gedyei sp. nov.* is named in honour of Andrew Gedye of Aloomba, north Queensland, formerly of Bentleigh Park, north Queensland and before that, Cheltenham, Victoria (all in Australia) in recognition of many decades of valuable contributions to herpetology and wildlife conservation in Australia.

**CALOTELLA (WITTENAGAMA) RUFFELLAE SP. NOV.**

**LSID**Durn:lsid:zoobank.org:act:0459031A-E1D0-4564-CBD6-CBDD420D6CA1

**Holotype:** A preserved specimen at the National Museum of Victoria, Melbourne, Victoria, Australia, specimen number D74132 collected from just south-east of Maryborough, Queensland, Australia on the road to Tin Can Bay, Latitude -25.6047 S., Longitude 152.812 E.

This government-owned facility allows access to its holdings.

**Paratype:** A preserved specimen at the national Museum of Victoria, Melbourne, Victoria, Australia, specimen number D74133 collected from just south-east of Maryborough, Queensland, Australia on the road to Tin Can Bay, Latitude -25.6047 S., Longitude 152.812 E.

**Diagnosis:** Until now, putative *Calotella (Wittenagama) nobbi* (Witten, 1972) has been treated as a single species by most authors, usually placed in the genera *Amphibolurus* Wagler, 1830 (*sensu* Witten, 1972, Cogger *et al.* 1983), or *Diporiphora* Gray, 1842 (*sensu* Edwards and Melville, 2011, Cogger 2014, Brown 2014, Wilson and Swan (2021), with Wells and Wellington (1985) erecting the genus *Wittenagama* Wells and Wellington, 1985 for the species and to date being the only authors to have used this placement.

*Calotella* Steindachner, 1867, type species *Calotella australis* Steindachner, 1867 is herein regarded as the phylogenetically correct genus-level placement, that genus also being used as valid by Wells and Wellington (1985) for the type species and

associated taxa.

*Wittenagama* is herein used as a subgenus for the relevant taxa herein.

Four forms within *C. nobbi* or associated with it have been named to date, with three recognized as valid species as detailed in the description of *C. gedyei* sp. nov. above.

This paper formally names six other forms, making a total of nine for the species complex and subgenus *Wittenagama* as recognized herein.

*C. ruffellae* sp. nov. occurs south of the St Lawrence Gap (Queensland) in a region commencing at least as far north as Kroombit Tops, National Park, extending south to at least the northern end of the Sunshine Coast in south-east Queensland.

*C. ruffellae* sp. nov. is separated from the eight other species in the subgenus *Wittenagama* Wells and Wellington, 1985 by the following unique combination of characters, defined herein for each sex and in terms of both referring to normal adults in breeding season.

*C. ruffellae* sp. nov. males are a yellowish-grey-brown lizard best diagnosed as follows:

Head is greyish without distinctive markings or peppering. The line from eye to ear is barely noticeable and is narrow anteriorly, widening like a triangle posteriorly. Upper labials also light grey. The dorsolateral stripes are a light yellow along their entire length. The lower edge is smooth, but the upper edge is jagged, this being caused by the obvious interruption by dark triangles from the dorsal side. These triangles (point facing the midline of the body) are on either side of the midline with the bases interrupting the dorsolateral lines.

The triangles are not exact in shape. They are blackish in colour. Otherwise the colouration of the back is mainly dark brown.

Along the midline is a dull dark grey line, not significantly distinguishable from the adjoining pigment.

Flanks are yellowish-brown-grey in colour from top to bottom, this being created by dull grey peppering on an equally dull yellowish brown background. 2/3 of the way down the flank is a well-defined and narrow yellow line that separates upper and lower flank, although both are of similar colour. The tail is mainly dark grey with irregularly shaped and well-spaced lighter patches running down the top of the tail. These are infused with a whitish-pink colour, but this pinkish-white rinse only occurs at the anterior third of the tail.

Iris is beige in colour.

*C. ruffellae* sp. nov. females are mainly reddish-brown on top and on the flanks.

The dorsum also has a series of about 7 pairs of grey squarish shaped blotches, on either side of the spine, on the body. The rest of the dorsum and the entirety of the upper flank is a dull reddish-brown colouration. There is a thin and well-defined greyish line separating the upper and lower parts of the flanks, this being about 23/ of the way down either side of the lizard. Below this the skin is heavily tubercled and mainly greyish-white, with infusions of reddish brown from the top line. Upper surfaces of limbs are also brownish and with limited flecks, bands or markings, all of which are either semi-distinct or barely noticeable. Exceptional to this is the back of the hind limbs, which are well marked and defined, especially with respect of dark upper and light lower surfaces, which continues onto the anterior part of the tail before the markings fade again. The tail itself is mainly yellowish-grey in colour with alternating indistinct reddish markings that may or may not form rings.

The upper surfaces of the head are more brownish than reddish and this includes the snout and below the eye. Upper labials are quite dark.

Lower labials are heavily peppered grey/brown although the gular region is pure white. The line from eye to ear is of even width and prominent.

Iris is light grey.

*C. ruffellae* sp. nov. in life is depicted online at:

<https://www.inaturalist.org/observations/176708599> (male) and

<https://www.inaturalist.org/observations/154054190> (male) and

<https://www.inaturalist.org/observations/99184001> (female) and

<https://www.inaturalist.org/observations/150178157> (female).

For separation of the other eight species in the subgenus *Wittenagama* Wells and Wellington, 1985, please refer to the diagnosis for *C. gedyei* sp. nov. in this paper, the relevant information being a formal part of this species description.

The nine above described species, being the entirety of the subgenus *Wittenagama* Wells and Wellington, 1985 are separated from the nominate subgenus within *Calotella* Steindachner, 1867, type species *Calotella australis* Steindachner, by the presence of 1-8 femoral pores on either side of the vent, versus none in *Calotella*.

Species within *Calotella* are separated from the morphologically similar species within the genus *Diporiphora* Gray, 1842 by the following combination of characters: Keels of the dorsal scales on the posterior part of the body converge on the vertebral line; gular and ventral scales (excluding chin shields) are keeled; gular fold present; dorsal scales are heterogenous, including a longitudinal series of enlarged scales along the outer edge of the paravertebrals; vertebral scales are roughly the same size as the inner rows of enlarged dorsal scales.

Species within the preceding named genera and subgenera are separated from all other Australian agamids by the following:

The presence of a body without massive conical spines all over it, the spines being larger than the eye or a massive spiny hump on the nape; no loose frill of skin around the neck; femoral pores present in males (*Wittenagama* and *Diporiphora* but not the nominate subgenus *Calotella*); tail not strongly laterally compressed with a strongly differentiated dorsal keel; with or without a series of enlarged scales on the back along the vertebral line (the preceding was modified from Cogger 2014).

**Distribution:** *C. ruffellae* sp. nov. occurs south of the St Lawrence Gap (Queensland) in a region commencing at least as far north as Kroombit Tops, National Park, extending south to at least the northern end of the Sunshine Coast in south-east Queensland.

**Etymology:** *C. ruffellae* sp. nov. is named in honour of Natasha Ruffell, formerly of Werribee, Bendigo and Nhill in Victoria, Australia but now of Childers, Queensland, Australia in recognition of her contributions to herpetology in Australia.

**CALOTELLA (WITTENAGAMA) DORSEI SP. NOV.**

**LSIDurn:** [lsid:zoobank.org:act:69EC8AC9-1DDD-471F-AB43-4B203D43D2B5](https://zoobank.org/act:69EC8AC9-1DDD-471F-AB43-4B203D43D2B5)

**Holotype:** A preserved specimen at the Australian Museum, Sydney, New South Wales, Australia, specimen number R.152341 collected from Falls Road, Boonoo Boonoo National Park, New South Wales, Australia, Latitude -28.8107 S., Longitude 152.12693 E.

This government-owned facility allows access to its holdings.

**Paratypes:** Four preserved specimens at the Queensland Museum, Brisbane, Queensland, Australia, being 1/ Specimen number J30683 collected from Aztec Temples, near Stanthorpe, Queensland, Australia, Latitude -28.833333 S., Longitude 152.016667 E., 2/ Specimen number J28652, collected in the Girraween area, near Wyberba, Queensland, Australia, Latitude -28.833333 S., Longitude 151.916667 E., 3/ Specimen number J22756 collected at Girraween National Park, via Stanthorpe, Queensland, Australia, Latitude -28.833333 S., Longitude 151.916667 E., 4/ Specimen number J23902, collected from a private property adjoining Girraween National Park, Queensland, Australia, Latitude -28.85 S., Longitude 151.9 E.

**Diagnosis:** Until now, putative *Calotella (Wittenagama) nobbi* (Witten, 1972) has been treated as a single species by most authors, usually placed in the genera *Amphibolurus* Wagler, 1830 (*sensu* Witten, 1972, Cogger *et al.* 1983), or *Diporiphora* Gray, 1842 (*sensu* Edwards and Melville, 2011, Cogger 2014, Brown 2014, Wilson and Swan (2021), with Wells and Wellington (1985) erecting the genus *Wittenagama* Wells and Wellington, 1985 for the species and to date being the only authors to have used this placement.

*Calotella* Steindachner, 1867, type species *Calotella australis* Steindachner, 1867 is herein regarded as the phylogenetically correct genus-level placement, that genus also being used as valid by Wells and Wellington (1985) for the type species and associated taxa.

*Wittenagama* is herein used as a subgenus for the relevant taxa herein.

Four forms within *C. nobbi* or associated with it have been named to date, with three recognized as valid species as detailed in the description of *C. gedyei sp. nov.* above.

This paper formally names six other forms, making a total of nine for the species complex and subgenus *Wittenagama* as recognized herein.

*C. dorsei sp. nov.* appears to be confined to the Granite Belt of far south-east Queensland and immediately adjacent high-elevation areas on the NSW/Queensland border area and limited high altitude regions to the immediate north.

*C. dorsei sp. nov.* is separated from the eight other species in the subgenus *Wittenagama* Wells and Wellington, 1985 by the following unique combination of characters, defined herein for each sex and in terms of both referring to normal adults in breeding season.

*C. dorsei sp. nov.* males have a head that is light grey on top, with a well-defined line from eye to ear, cream below the eye and including the upper labials and an immaculately whitish gular region. The dorsolateral lines are white, but with a slight yellowish tinge in the middle part of the dorsum. Lower edge is straight and upper edge is also nearly completely straight.

Behind the axilla of the forelimb is a strong yellow flush that fades rapidly along the lower surface of the otherwise mainly white lower flank, so that it is completely white by the time one reaches the hind limb.

This generally white lower flank occupies just under half the surface of the flank.

In the mid part of this white area is limited brown peppering.

The anterior third of the tail is flushed a bright maroon pink colour. Latter two thirds of the tail is essentially a greyish-brown colour and without any obvious markings. There are no obvious markings on the upper surfaces of the limbs, including the back parts of the hind-limbs.

On the upper surface of the dorsum are semi-distinct dark squares or triangles that run in pairs from the midline to the dorsolateral stripes, but do not cross or intrude into them. The midline has a very faint greyish overwrite in the form of a line, that is only noticeable on close inspection.

Iris is a dark yellow-brown.

Female *C. dorsei sp. nov.* are also a well patterned lizard.

They are diagnosed as follows: dorsum ranges from reddish brown generally to greyish, but invariably includes a series of joined or separated triangles running from the midline of the dorsum to the flanks, where the white to yellow dorsolateral lines are well broken by the intrusions of the pointed end of the triangle (the base is against the midline of the dorsum). The top half of the flank is of the same background colour as the dorsum, whereupon is switches to white, peppered the dorsal colour.

This interface is demarcated by any line of any form or colour, but rather the transition is sudden, from the colour reddish or grey to white.

The line from eye to ear is well defined and separates white above and below, with a second similar line radiating from the

upper posterior of the eye.

The top of the head is dark, but without any obvious peppering or markings beyond those mentioned. The area between the snout, eye and including the upper labials are all white as is the chin and gular region. Upper surfaces of the front and rear limbs are dark in colour but punctuated with white bands on the forelimbs and obvious white markings on the hind limbs.

The tail is marked with light blotches on top anteriorly with dark on the sides, becoming brownish-grey posteriorly and without obvious markings.

There is a barely distinct grey smudge or overwrite down the middle of the spine of the body.

Iris is a dark reddish brown in colour.

*C. dorsei sp. nov.* in life is depicted in Brown (2014) on page 671, second down on left is a male and third down on left is a female; in Wilson (2022) page 217, top left (male) and Melville and Wilson (2019) on pages 257 and 259 (males). The species is also depicted in life online at:

<https://www.inaturalist.org/observations/148520503> (male)

and

<https://www.inaturalist.org/observations/103998294> (male)

and

<https://www.inaturalist.org/observations/72001834> (female).

For separation of the other eight species in the subgenus *Wittenagama* Wells and Wellington, 1985, please refer to the diagnosis for *C. gedyei sp. nov.* in this paper, the relevant information being a formal part of this species description.

The nine above described species, being the entirety of the subgenus *Wittenagama* Wells and Wellington, 1985 are separated from the nominate subgenus within *Calotella* Steindachner, 1867, type species *Calotella australis* Steindachner, 1867, by the presence of 1-8 femoral pores on either side of the vent, versus none in *Calotella*.

Species within *Calotella* are separated from the morphologically similar species within the genus *Diporiphora* Gray, 1842 by the following combination of characters: Keels of the dorsal scales on the posterior part of the body converge on the vertebral line; gular and ventral scales (excluding chin shields) are keeled; gular fold present; dorsal scales are heterogenous, including a longitudinal series of enlarged scales along the outer edge of the paravertebrals; vertebral scales are roughly the same size as the inner rows of enlarged dorsal scales.

Species within the preceding named genera and subgenera are separated from all other Australian agamids by the following:

The presence of a body without massive conical spines all over it, the spines being larger than the eye or a massive spiny hump on the nape; no loose frill of skin around the neck; femoral pores present in males (*Wittenagama* and *Diporiphora* but not the nominate subgenus *Calotella*); tail not strongly laterally compressed with a strongly differentiated dorsal keel; with or without a series of enlarged scales on the back along the vertebral line (the preceding was modified from Cogger 2014).

**Distribution:** *C. dorsei sp. nov.* appears to be confined to the Granite Belt of far south-east Queensland and immediately adjacent high-elevation areas on the NSW/Queensland border area and limited high altitude regions to the immediate north.

**Etymology:** *C. dorsei sp. nov.* is named in honour of Marc Dorse of Middle Ridge (Toowoomba), southern Queensland, Australia in recognition of decades of contributions to herpetology in Australia, including being the first person in the world to breed in captivity the endangered Manning River Saw-Shelled turtle *Wollumbina purvis* Wells and Wellington, 1985.

Note that the genus name *Myuchelys*, Thomson and Georges, 2009, sometimes applied to this species is an illegally coined, non-ICZN junior synonym of *Wollumbina* Wells, 2007 created by the Wolfgang Wüster gang of thieves in breach of the Australian Copyright Act, 1968 and the Berne Convention, 1886 and therefore should not be used.

**CALOTELLA (WITTENAGAMA) WIRADJURI SP. NOV.**

**LSIDurn:lsid:zoobank.org:act:00DDA48C-C049-4ED4-A697-1121426F28B8**

**Holotype:** A preserved specimen at the Australian Museum, Sydney, New South Wales, Australia, specimen number R.156632 collected from Yarra Property, 35km from Mount Hope on the Euabalong Road, New South Wales, Australia, Latitude -32.94666 S., Longitude 146.19221 E.

This government-owned facility allows access to its holdings.

**Paratypes:** Four preserved specimens at the Australian Museum, Sydney, New South Wales, Australia, specimen numbers R.156633-6 all collected from Yarra Property, 35km from Mount Hope on the Euabalong Road, New South Wales, Australia, Latitude -32.94666 S., Longitude 146.19221 E.

**Diagnosis:** Until now, putative *Calotella (Wittenagama) nobbi* (Witten, 1972) has been treated as a single species by most authors, usually placed in the genera *Amphibolurus* Wagler, 1830 (*sensu* Witten, 1972, Cogger *et al.* 1983), or *Diporiphora* Gray, 1842 (*sensu* Edwards and Melville, 2011, Cogger 2014, Brown 2014, Wilson and Swan (2021), with Wells and Wellington (1985) erecting the genus *Wittenagama* Wells and Wellington, 1985 for the species and to date being the only authors to have used this placement.

*Calotella* Steindachner, 1867, type species *Calotella australis* Steindachner, 1867 is herein regarded as the phylogenetically correct genus-level placement, that genus also being used as valid by Wells and Wellington (1985) for the type species and associated taxa.

*Wittenagama* is herein used as a subgenus for the relevant taxa herein.

Four forms within *C. nobbi* or associated with it have been named to date, with three recognized as valid species as detailed in the description of *C. gedyei* sp. nov. above.

This paper formally names six other forms, making a total of nine for the species complex and subgenus *Wittenagama* as recognized herein.

*C. dorsei* sp. nov. appears to be confined to the Granite Belt of far south-east Queensland and immediately adjacent high-elevation areas on the NSW/Queensland border area and limited high altitude regions to the immediate north.

The morphologically similar *C. wiradjuri* sp. nov. occurs on elevated wooded sections of the western plains of New South Wales, beyond the western slopes and east of the more arid far western parts of the state in an area generally in a line from West Wyalong in the south, through Parkes and Dubbo and as far north as just south of Bourke in the north-west.

*C. wiradjuri* sp. nov. and *C. dorsei* sp. nov. are separated from the eight other species in the subgenus *Wittenagama* Wells and Wellington, 1985 by the following unique combination of characters, defined herein for each sex and in terms of both referring to normal adults in breeding season.

*C. dorsei* sp. nov. males have a head that is light grey on top, with a well-defined line from eye to ear, cream below the eye and including the upper labials and an immaculately whitish gular region. The dorsolateral lines are white, but with a slight yellowish tinge in the middle part of the dorsum. Lower edge is straight and upper edge is also nearly completely straight.

Behind the axilla of the forelimb is a strong yellow flush that fades rapidly along the lower surface of the otherwise mainly white lower flank, so that it is completely white by the time one reaches the hind limb.

This generally white lower flank occupies just under half the surface of the flank.

In the mid part of this white area is limited brown peppering.

The anterior third of the tail is flushed a bright maroon pink colour. Latter two thirds of the tail is essentially a greyish-brown colour and without any obvious markings. There are no obvious markings on the upper surfaces of the limbs, including the back parts of the hind-limbs.

On the upper surface of the dorsum are semi-distinct dark squares or triangles that run in pairs from the midline to the dorsolateral stripes, but do not cross or intrude into them. The midline has a very faint greyish overwrite in the form of a line, that is only noticeable on close inspection.

Iris is a dark yellow-brown.

Female *C. dorsei* sp. nov. are also a well patterned lizard.

They are diagnosed as follows: dorsum ranges from reddish brown generally to greyish, but invariably includes a series of joined or separated triangles running from the midline of the dorsum to the flanks, where the white to yellow dorsolateral lines are well broken by the intrusions of the pointed end of the triangle (the base is against the midline of the dorsum). The top half of the flank is of the same background colour as the dorsum, whereupon it switches to white, peppered the dorsal colour.

This interface is demarcated by any line of any form or colour, but rather the transition is sudden, from the colour reddish or grey to white.

The line from eye to ear is well defined and separates white above and below, with a second similar line radiating from the upper posterior of the eye.

The top of the head is dark, but without any obvious peppering or markings beyond those mentioned. The area between the snout, eye and including the upper labials are all white as is the chin and gular region. Upper surfaces of the front and rear limbs are dark in colour but punctuated with white bands on the forelimbs and obvious white markings on the hind limbs.

The tail is marked with light blotches on top anteriorly with dark on the sides, becoming brownish-grey posteriorly and without obvious markings.

There is a barely distinct grey smudge or overwrite down the middle of the spine of the body.

Iris is a dark reddish brown in colour.

*C. dorsei* sp. nov. in life is depicted in Brown (2014) on page 671, second down on left is a male and third down on left is a female as well as Wilson (2022) page 217, top left (male). The species is also depicted in life online at:

<https://www.inaturalist.org/observations/148520503> (male)

and

<https://www.inaturalist.org/observations/103998294> (male)

and

<https://www.inaturalist.org/observations/72001834> (female).

*C. wiradjuri* sp. nov. males are generally greyish coloured lizards with a greyish dorsum, cream coloured dorsolateral stripes, boldly defined on the outer edge and not quite so on the inner edge.

The dorsal pattern of mainly light blotches etched dark on the outer edges and including down the midline is relatively prominent. Markings on the tail are barely noticeable and the light pink flush on the tail runs most of the length of it, but becoming a dull orange or orange grey posteriorly.

Head markings are faded or absent, but there is typically a yellow or orange ring of some kind either around the eye, or at least an area of yellow or orange above the eye.

Upper surfaces of the limbs are brownish-yellow in colour, but the distal parts and toes are noticeably a beige or yellow colour.

Markings on the tail if present are barely distinct and if present, usually in the form of wide white and darker bands at the distal end.

Iris is orange-yellow in colour.

Female *C. wiradjuri* sp. nov. are similar in most respects to female *C. dorsei* sp. nov. at outlined above, but separated from that taxon by obvious dark spots or markings (not peppering) on the upper surfaces of the head, an absence of obvious cross bands on the upper surfaces of the forelimbs and the demarcation between dark upper surface of the flank and whitish underside being in the form of an obvious line with at least one

added border, this usually being a black edge at the end of the darker upper flank, and sometimes a similar black edge forming a line at the lower boundary of the white demarcation.

The upper surface of the tail is light with slightly darker on the flanks, these forming dark tipped triangular intrusions on the upper surface.

Iris is light grey on the bottom and light dull orange brown on top.

*C. wiradjuri* sp. nov. is depicted in life in Cogger (2014), page 733 (female), as well as online at:

<https://www.inaturalist.org/observations/103397281> (male) and

<https://www.inaturalist.org/observations/103499257> (female) and

<https://www.inaturalist.org/observations/81410631> (female)

For separation of the other eight species in the subgenus *Wittenagama* Wells and Wellington, 1985, please refer to the diagnosis for *C. gedyei* sp. nov. in this paper, the relevant information being a formal part of this species description.

The nine above described species, being the entirety of the subgenus *Wittenagama* Wells and Wellington, 1985 are separated from the nominate subgenus within *Calotella* Steindachner, 1867, type species *Calotella australis* Steindachner, by the presence of 1-8 femoral pores on either side of the vent, versus none in *Calotella*.

Species within *Calotella* are separated from the morphologically similar species within the genus *Diporiphora* Gray, 1842 by the following combination of characters: Keels of the dorsal scales on the posterior part of the body converge on the vertebral line; gular and ventral scales (excluding chin shields) are keeled; gular fold present; dorsal scales are heterogenous, including a longitudinal series of enlarged scales along the outer edge of the paravertebrals; vertebral scales are roughly the same size as the inner rows of enlarged dorsal scales.

Species within the preceding named genera and subgenera are separated from all other Australian agamids by the following:

The presence of a body without massive conical spines all over it, the spines being larger than the eye or a massive spiny hump on the nape; no loose frill of skin around the neck; femoral pores present in males (*Wittenagama* and *Diporiphora* but not the nominate subgenus *Calotella*); tail not strongly laterally compressed with a strongly differentiated dorsal keel; with or without a series of enlarged scales on the back along the vertebral line (the preceding was modified from Cogger 2014).

**Distribution:** *C. wiradjuri* sp. nov. occurs on elevated wooded sections of the western plains of New South Wales, beyond the western slopes and east of the more arid far western parts of the state in an area generally in a line from West Wyalong in the south, through Parkes and Dubbo and as far north as just south of Bourke in the north-west.

**Etymology:** *C. wiradjuri* sp. nov. is named honour of the Wiradjuri people who are the largest Aboriginal group in central New South Wales, by area and population. Before being shot, killed and killed with biological weapons in the form of smallpox infected blankets, and that was before they were forcibly evicted from their land by the British King's and Queen's armies, these Aboriginal Australians occupied an area in central New South Wales that was almost identical to the known range of this species. Based on human remains found at the nearby Lake Mungo, they managed to cohabit the region with the species for at least 40K years without wiping it out.

**CALOTELLA (WITTENAGAMA) JOSEPHBURKEI SP. NOV.**

**LSID**Durn:lsid:zoobank.org:act:0F6A87A2-9E60-41EB-8DA2-2A10D31B3134

**Holotype:** A preserved female specimen at the National Museum of Victoria, Melbourne, Victoria, Australia, specimen number D71317 collected from Meridian track, Wyperfeld National Park, Big Desert, Victoria, Australia, Latitude -35.4728 S., Longitude 141.991 E.

This government-owned facility allows access to its holdings.

**Paratypes:** 1/ Five preserved specimens at the National Museum of Victoria, Melbourne, Victoria, Australia, specimen numbers D71343-7 collected from Rocket Lake Road, Murray-Sunset National Park, Victoria, Australia, Latitude -34.7598 S., Longitude 141.776 E., and 2/ Four preserved specimens at the National Museum of Victoria, Melbourne, Victoria, Australia, specimen numbers D71318-D71321 collected from Wyperfeld National Park, Big Desert, Victoria, Australia, Latitude -35.4728 S., Longitude 141.991 E.

**Diagnosis:** Until now, putative *Calotella (Wittenagama) nobbi* (Witten, 1972) has been treated as a single species by most authors, usually placed in the genera *Amphibolurus* Wagler, 1830 (*sensu* Witten, 1972, Cogger *et al.* 1983), or *Diporiphora* Gray, 1842 (*sensu* Edwards and Melville, 2011, Cogger 2014, Brown 2014, Wilson and Swan (2021), with Wells and Wellington (1985) erecting the genus *Wittenagama* Wells and Wellington, 1985 for the species and to date being the only authors to have used this placement.

*Calotella* Steindachner, 1867, type species *Calotella australis* Steindachner, 1867 is herein regarded as the phylogenetically correct genus-level placement, that genus also being used as valid by Wells and Wellington (1985) for the type species and associated taxa.

*Wittenagama* is herein used as a subgenus for the relevant taxa herein.

Four forms within *C. nobbi* or associated with it have been named to date, with three recognized as valid species as detailed in the description of *C. gedyei* sp. nov. above.

This paper formally names six other forms, making a total of nine for the species complex and subgenus *Wittenagama* as recognized herein.

*C. josephburkei* sp. nov. occurs in the Mallee/Spinifex woodlands belt of far south-west New South Wales, north-west Victoria and nearby parts of South Australia.

The nine species can be most easily separated from one another by different combinations of colour and markings.

*C. josephburkei* sp. nov. are separated from the eight other species in the subgenus *Wittenagama* Wells and Wellington, 1985 by the following unique combination of characters, defined herein for each sex and in terms of both referring to normal adults in breeding season.

*C. josephburkei* sp. nov. males are a generally drab grey lizard on top.

They are readily separated from males of all other species by the noticeably wider dorsolateral stripes that are cream in colour combined with a lower lateral stripe of the same colour and width as the dorsolateral lines, demarcated with the grey upper flank on top and below by a well defined thick grey line, or line defined by a zone of dense peppering in the form of a line on the upper edge and fading below it.

Head is plain grey with either no visible markings or those that are, being very indistinct and of similar colour to the surrounding areas. Limbs are generally unmarked or if so, very faintly, the exception to this being the back parts of the upper surfaces of the hind limbs, including the anterior flanks of the tail. Ear is dark grey to black.

The entire tail is generally a whitish grey colour and any pink flush anteriorly is extremely feint if detectable at all and in most animals is seen as a white, rather than pink flush.

Labial area of the head is white, including lower labials, but the gular region rapidly becomes peppered grey.

Iris is a light yellow-orange colour.

Female *C. josephburkei* sp. nov. are also a generally dull greyish coloured lizard.

Like males, they also have thick dorsolateral cream or white lines on the body. But in the case of females these are intruded on the upper edge by a well defined dark edged series of about five triangular intrusions on the mid and lower dorsum of the body. Otherwise the central part of the dorsum is generally grey

in colour. The intrusions into the dorsolateral lines are formed as extensions from the mid-dorsal area, but are brownish, rather than grey as seen in the mid-dorsal area itself, giving them the appearance of brown triangles intersecting the lighter dorsolateral stripes.

The outer edge of the mid dorsal zone that borders the light dorsolateral lines is faintly brown edged.

The triangular intrusions mentioned before, continue onto the top and flanks of the anterior part of the tail, in the form of small triangles or diamonds. The tail is otherwise a brownish grey colour, but with broad semi-distinct rings on the posterior half.

Labials are whitish-grey as are the under-surfaces of the anterior of the head.

*C. josephburkei* sp. nov. is depicted in life in Brown (2014) on page 671, bottom right (male), Melville and Wilson (2019) page 256, bottom right (male, not breeding colours) and online at:

<https://www.inaturalist.org/observations/135353121> (male)

and

<https://www.inaturalist.org/observations/151265589> (male)

and

<https://www.inaturalist.org/observations/141494310> (male)

and

<https://www.inaturalist.org/observations/125137902> (male)

and

<https://www.inaturalist.org/observations/159087699> (female)

and

<https://www.inaturalist.org/observations/69292668> (female)

For separation of the other eight species in the subgenus *Wittenagama* Wells and Wellington, 1985, please refer to the diagnosis for *C. gedyei* sp. nov. in this paper, the relevant information being a formal part of this species description.

The nine above described species, being the entirety of the subgenus *Wittenagama* Wells and Wellington, 1985 are separated from the nominate subgenus within *Calotella* Steindachner, 1867, type species *Calotella australis* Steindachner, 1867 by the presence of 1-8 femoral pores on either side of the vent, versus none in *Calotella*.

Species within *Calotella* are separated from the morphologically similar species within the genus *Diporiphora* Gray, 1842 by the following combination of characters: Keels of the dorsal scales on the posterior part of the body converge on the vertebral line; gular and ventral scales (excluding chin shields) are keeled; gular fold present; dorsal scales are heterogenous, including a longitudinal series of enlarged scales along the outer edge of the paravertebrals; vertebral scales are roughly the same size as the inner rows of enlarged dorsal scales.

Species within the preceding named genera and subgenera are separated from all other Australian agamids by the following:

The presence of a body without massive conical spines all over it, the spines being larger than the eye or a massive spiny hump on the nape; no loose frill of skin around the neck; femoral pores present in males (*Wittenagama* and *Diporiphora* but not the nominate subgenus *Calotella*); tail not strongly laterally compressed with a strongly differentiated dorsal keel; with or without a series of enlarged scales on the back along the vertebral line (the preceding was modified from Cogger 2014).

**Distribution:** *C. josephburkei* sp. nov. occurs in the Mallee/Spinifex woodlands belt of far south-west New South Wales, north-west Victoria and nearby parts of South Australia.

**Etymology:** *C. josephburkei* sp. nov. is named in honour of Joseph Burke, criminal lawyer, based in Melbourne, Victoria, Australia in recognition of his efforts in fighting the endemic corruption in the Victoria Police and the cocaine addicted judiciary of judges, magistrates and court staff, who are beholden to the corrupt police who supply them with this highly addictive hard drug.

For details see Fraser (2007).

#### **CALOTELLA (WITTENAGAMA) AAH SP. NOV.**

LSIDurn:lsid:zoobank.org:act:FDDC40A1-39E3-43F2-8EBD-E1BF9DAEAFDC

**Holotype:** A preserved specimen at the Australian Museum, Sydney, New South Wales, Australia, specimen number R.151842, collected from Rainbow Falls, Blackdown Tableland, Queensland, Australia, Latitude -23.7911 S., Longitude 149.09388 E.

This government-owned facility allows access to its holdings.

**Paratypes:** Three preserved specimens at the Australian Museum, Sydney, New South Wales, Australia, specimen numbers R.151843-5, collected from the Blackdown Tableland area, Queensland, Australia, Latitude -23.7911 S., Longitude 149.09388 E.

**Diagnosis:** Until now, putative *Calotella (Wittenagama) nobbi* (Witten, 1972) has been treated as a single species by most authors, usually placed in the genera *Amphibolurus* Wagler, 1830 (*sensu* Witten, 1972, Cogger *et al.* 1983), or *Diporiphora* Gray, 1842 (*sensu* Edwards and Melville, 2011, Cogger 2014, Brown 2014, Wilson and Swan (2021), with Wells and Wellington (1985) erecting the genus *Wittenagama* Wells and Wellington, 1985 for the species and to date being the only authors to have used this placement.

*Calotella* Steindachner, 1867, type species *Calotella australis* Steindachner, 1867 is herein regarded as the phylogenetically correct genus-level placement, that genus also being used as valid by Wells and Wellington (1985) for the type species and associated taxa.

*Wittenagama* is herein used as a subgenus for the relevant taxa herein.

Four forms within *C. nobbi* or associated with it have been named to date, with three recognized as valid species as detailed in the description of *C. gedyei* sp. nov. above.

This paper formally names six other forms, making a total of nine for the species complex and subgenus *Wittenagama* as recognized herein.

*C. phaeospinosa* (Edwards and Melville, 2011) with a type locality of Bauhinia Station, Queensland, Latitude -25.17 S., Longitude 149.20 E, is a range-restricted species confined to the Expedition National Park (Southern Expedition Range) and the Bigge Range, mid-eastern Queensland.

*C. aah* sp. nov. was formerly treated as a northern population of *C. phaeospinosa*, and is apparently confined to the Blackdown Tableland (Northern Expedition Range) in mid-eastern Queensland. While extremely common where it occurs, it appears to be a range-restricted endemic to the area.

*C. aah* sp. nov. are separated from the eight other species in the subgenus *Wittenagama* Wells and Wellington, 1985 by the following unique combination of characters, defined herein for each sex and in terms of both referring to normal adults in breeding season.

*C. aah* sp. nov. males are readily separated from all other species in the *C. nobbi* complex by the presence of a dark, black coloured line from eye to ear and including the entirety of the ear, being black, dorsolateral lines that are yellow, with a fairly even lower edge and jagged upper edge, black chin and gular scales, upper part of the flank is black to dark brown along the upper half to two thirds of the flank, bounded below by a well defined yellow line (thinner than the dorsolateral ones) and bounded below that by a deep range-red, which may be brown edged towards the yellow line above.

The tail is mainly light on top and with deep reddish orange on the sides for the anterior quarter, beyond which is a series of near joined lighter blotches on the upper surface and mainly darker on the sides.

Labials are whitish grey as are nearby scales on the side of the head. The top of the head is an ill-defined mixture of a grey and brown colouration, being much the same down the middle of the dorsum, there being more grey along the midline and more

brown towards the outer edges.

Iris is light orange.

There is a moderately well-defined dark grey line running down the midline of the back and terminating just past the pelvic girdle.

Female *C. aah* sp. nov. do not have the unbroken dorsolateral stripes of the males.

In females the dorsum has a combination of wide creamy-white blotches, roughly square in shape, extending from the greyish midline, interspersed with narrower black sections. Towards the dorsolateral line, the creamy-white blotches widen and in turn tend to make the darker sections triangular tipped. Along the line of the flank (being an area as opposed to a physical line), the markings abruptly stop and there is merely a zone of reddish-brown, with black smudging or peppering occupying the upper flank.

In most specimens the widened outer edges of the lighter blotches do not completely cut off the darker interspaces, meaning that there is no view of triangles on the dorsum. However in some specimens the lighter blotches do merge and there is a view of well-defined grey triangles along the mid dorsal line, with the points being mound by yellow on the outer edges.

While this may result in a continuous zone of yellow along the dorsolateral line, this is in no way like the well defined dorsolateral lines in the males that are relatively straight edged along both edges and not having the obvious triangle intrusions.

About 2/3 down the flank is a well defined (always) white line of moderate thickness, thinly bound with black or dark grey, top and bottom, below which the reddish-brown colour continues.

The line from eye to ear and beyond is brown in colour, although the ear itself is usually greyish in colour.

Iris is beige in colour.

*C. aah* sp. nov. in life is depicted in Brown (2014) on page 671 (male top right and female top left) and online at:

<https://www.inaturalist.org/observations/177044877> (male)

and

<https://www.flickr.com/photos/65796382@N05/36918228993/> (male)

and

<https://www.flickr.com/photos/euprepiosaur/8471986271/> (male)

and

<https://www.inaturalist.org/observations/136492220> (female)

and

<https://www.inaturalist.org/observations/151563909> (female).

*C. phaeospinosa* is similar in most respects to *C. aah* sp. nov. as detailed above and unless stated otherwise below, the diagnosis of this species matches that of *C. aah* sp. nov..

Male *C. phaeospinosa* are readily separated from *C. aah* sp. nov. by the line from eye to ear and beyond being relatively ill-defined and often broken, not being black in colour, but rather a medium grey instead and distinct of this taxon is that darker areas of the upper body and flanks are usually heavily spotted white (not seen in *C. aah* sp. nov.), the spotting being faded in aged specimens. Also male *C. phaeospinosa* lacks the strong reddish colour of the lower flank, instead being less strongly flushed and a dull yellow-orange colour instead. The white line of the lower flank is narrow, often ill-defined or absent.

Female *C. phaeospinosa* is similar in most respects to *C. aah* sp. nov. as detailed above and unless stated otherwise below, the diagnosis of this species matches that of *C. aah* sp. nov..

Female *C. phaeospinosa* are generally a yellowish-grey lizard as opposed to the more reddish colours seen in *C. aah* sp. nov.. The whitish line on the lower flank is ill-defined, broken or absent and often greyish, rather than white in colour. Markings on the tail are generally a combination of greyish and yellow (mainly greyish) versus greyish and reddish-orange in female *C. aah* sp. nov..

Notwithstanding the genetic divergence between *C. phaeospinosa* and *C. aah* sp. nov., probably the biggest driver of

colouration differences between these two taxa is the colour of the rock substrate in the respective areas they occur in and the natural selection that has arisen as a result.

*C. phaeospinosa* in life is depicted online at:

<https://www.inaturalist.org/observations/143459143> (male)

and

<https://www.inaturalist.org/observations/119187909> (immature male).

For separation of the other eight species in the subgenus *Wittenagama* Wells and Wellington, 1985, please refer to the diagnosis for *C. gedyei* sp. nov. in this paper, the relevant information being a formal part of this species description.

The nine above described species, being the entirety of the subgenus *Wittenagama* Wells and Wellington, 1985 are separated from the nominate subgenus within *Calotella* Steindachner, 1867, type species *Calotella australis* Steindachner, by the presence of 1-8 femoral pores on either side of the vent, versus none in *Calotella*.

Species within *Calotella* are separated from the morphologically similar species within the genus *Diporiphora* Gray, 1842 by the following combination of characters: Keels of the dorsal scales on the posterior part of the body converge on the vertebral line; gular and ventral scales (excluding chin shields) are keeled; gular fold present; dorsal scales are heterogenous, including a longitudinal series of enlarged scales along the outer edge of the paravertebrals; vertebral scales are roughly the same size as the inner rows of enlarged dorsal scales.

Species within the preceding named genera and subgenera are separated from all other Australian agamids by the following:

The presence of a body without massive conical spines all over it, the spines being larger than the eye or a massive spiny hump on the nape; no loose frill of skin around the neck; femoral pores present in males (*Wittenagama* and *Diporiphora* but not the nominate subgenus *Calotella*); tail not strongly laterally compressed with a strongly differentiated dorsal keel; with or without a series of enlarged scales on the back along the vertebral line (the preceding was modified from Cogger 2014).

**Distribution:** *C. aah* sp. nov. was formerly treated as a northern population of *C. phaeospinosa*, and is apparently confined to the Blackdown Tableland (Northern Expedition Range) in mid-eastern Queensland. While extremely common where it occurs, it appears to be a range-restricted endemic to the area.

*C. phaeospinosa* (Edwards and Melville, 2011) with a type locality of Bauhinia Station, Queensland, Latitude -25.17 S., Longitude 149.20 E, closely related to *C. aah* sp. nov. is a range-restricted species apparently confined to the Expedition National Park (Southern Expedition Range) and the Bigge Range, mid-eastern Queensland.

**Etymology:** *C. aah* sp. nov. is named in honour of Paul Woolf, long-term president of the Herpetological Society of Queensland Incorporated in recognition of his many services to herpetology in Australia and elsewhere.

When collecting this taxon, he saw one scamper up a tree and he yelled "aah" as he ran for it, giving the species it's simple to remember scientific name.

I suggest a common name as the "Aah Lizard".

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CONFLICTS OF INTEREST - NONE.

**The Australian burrowing skinks of the genus *Hemiergus* Wagler, 1830 *sensu lato* reviewed, including a newly named genus, and new species-level taxa.**

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**ABSTRACT**

The burrowing skinks of the genus *Hemiergus* Wagler, 1830 have been subject of considerable scrutiny by herpetologists over the past 200 years.

Wells and Wellington (1985, 1985) made a determined effort at reclassifying the genus as recognized at the time, including the formal splitting off of divergent forms into other genera and also naming of new species. More recently Cogger (2014) and Wilson and Swan (2021) recognized the same seven species within putative *Hemiergus*, with the most recently named species in the group recognized by them being *H. millewae* Coventry, 1976.

Being aware that the taxonomic actions of Wells and Wellington (1984, 1985) were largely correct with respect to *Hemiergus sensu lato*, including by way of being supported by more recent molecular studies (e.g. Reeder and Reichert 2011 or Skinner *et al.* 2013), a genus wide review was conducted.

In summary, *Hemiergus sensu lato* is divided so that the genera *Chelomeles* Duméril and Bibron, 1839 (type species *Chelomeles quadrilineatus* Duméril and Bibron, 1839), *Arenicolascincus* Wells and Wellington, 1985 (type species *Hemiergus millewae* Coventry, 1976), *Patheticoscincus* Wells and Wellington, 1984 (type species *Lygosoma australis* Gray, 1839), *Eroticoscincus* Wells and Wellington, 1984, (type species *Lygosoma graciloides* Lönnberg and Andersson, 1913) and *Anepischetosia* Wells and Wellington, 1985 (type species *Siaphos maccoyi* Lucas and Frost, 1894) are all recognised as distinct genera on the basis of ancient divergence exceeding more than 10 MYA.

In each case these numbers are based on the results of Skinner *et al.* (2013) or similar studies.

*Anepischetosia* the only one of the preceding genera widely recognized by other authors in recent years other than the monotypic *Eroticoscincus*, was dealt with in detail by Hoser (2022) in which a total of 5 species were formally recognized, including two named by Wells and Wellington (1985) and another pair by Hoser (2022).

In addition to the preceding, a new genus, *Grantscincus* *gen. nov.* is erected for the *Lygosoma* (*Hemiergus*) *initiale* Werner, 1910 species complex based on a divergence of about 17 MYA from nearest related species based on the findings of Skinner *et al.* (2013).

Within *Hemiergus sensu lato* the group of seven widely recognized species is significantly expanded, including by way of resurrection of available names for divergent taxa as well as the formal description of new species for nine divergent forms for which there are no available names.

**Keywords:** Taxonomy; nomenclature; Australia; skink; lizard; *Hemiergus*; *Lygosoma*; *Anepischetosia*; *Patheticoscincus*; *Eroticoscincus*; *Arenicolascincus*; *talbingoensis*; *decresiensis*; *initialis*; *brookeri*; *maccoyi*; *millewae*; *peroni*; *gracilipes*; *australis*; *quadrilineatum*; *continentis*; *tridactyla*; *davisi*; *lami*; *namatjira*; new genus; *Grantscincus*; new species; *scottgrantii*; *keilleri*; *pailsorum*; *kaputarensis*; *dorsei*; *awe*; *bonfire*; *wha*; *agh*.

## INTRODUCTION

The burrowing skinks of the genus *Hemiergus* Wagler, 1830 have been subject of considerable scrutiny by herpetologists over the past 200 years.

Found across southern Australia, including in large numbers close to the capital cities of Sydney, Melbourne, Adelaide and Perth, the relatively small number of recognized species are a familiar sight to herpetologists in Australia.

Due to their relative abundance, small size and the general difficulty of telling populations apart, there has never been a serious review of the genus *Hemiergus* Wagler, 1830 *sensu lato* as a whole.

Wells and Wellington (1985, 1985) perhaps made the most determined effort to date at reclassifying the genus as recognized at any time, including the formal splitting off of divergent forms into other genera and also naming of at least two new species.

I note that in line with a general attempt by the Richard Shine cohort (including the Wolfgang Wuster gang of thieves) to suppress uptake of the Wells and Wellington taxonomy and nomenclature, the only major taxonomic act with respect of *Hemiergus sensu lato* by Wells and Wellington to have gained any acceptance among publishing herpetologists has been recognition of the genus *Anepischetosia* Wells and Wellington, 1985, for the divergent taxon, *Siaphos maccoyi* Lucas and Frost, 1894.

That arose as a result of Cogger including this genus as monotypic in Cogger (2014) and then being followed without question by all publishing herpetologists since.

Treated as a monotypic genus, by others to 2023, Wells and Wellington (1985) did in fact describe two further species in New South Wales, previously treated as northern populations of *H. maccoyi* (*sensu* Cogger *et al.* 1983).

Like sheep, all publishing herpetologists in Australia have without question accepted the unscientific Shine *et al.* doctrine of pretending that the relevant Wells and Wellington species did not exist.

Hoser (2022) was forced to publish a review of *Anepischetosia* Wells and Wellington, 1985, after finding what was obviously a divergent taxon in the same genus in the Otway Ranges of south-west Victoria.

Following inspection of specimens from across the known range of the genus *Anepischetosia*, Hoser (2022) in fact named two new species from western Victoria and also recognized the two morphologically divergent forms named by Wells and Wellington some decades earlier.

To this extent, *Anepischetosia* Wells and Wellington, 1985 has already been dealt with and is therefore not subject of this paper.

I note here that the Hoser (2022) assessment of *Anepischetosia* was done without any input from Wells and Wellington and the only thing that mattered in that paper was getting the taxonomy correct.

In terms of nomenclature, the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999) applied and this dictated the appropriate names applied to each taxon identified.

I also mention that the two species taxa within *Anepischetosia* formally named by Wells and Wellington in 1985, were so obviously divergent to the type species in the genus that they should have been widely accepted by all relevant publishing herpetologists from 1985 onwards.

They would have been accepted by any taxonomist or half-decent herpetologist who even went so far as to make a cursory inspection of the three putative taxa.

It is a shocking indictment on the level of control by a bunch of non-scientists with respect of Australian herpetology and names of taxa (or lack of them) and a similar indictment on the lack of scientific method by others in the field of herpetology in not questioning everything they are told with respect of reptiles and their names, but instead accepting without question what they

are told, no matter how obviously incorrect that information is.

More recently than Wells and Wellington (1984 and 1985), Cogger (2014) and Wilson and Swan (2021) each recognized the same seven species within putative *Hemiergus* Wagler, 1830 (with a type species of *Tridactylus decreasiensis* Cuvier, 1829) with the most recently named species in the group recognized by the later authors being *H. millewae* Coventry, 1976.

Being aware that the taxonomic actions of Wells and Wellington (1984, 1985) were largely correct with respect to *Hemiergus sensu lato*, including by way of being supported by more recent molecular studies, (e.g. Reeder and Reichert 2011, Skinner *et al.* 2013 or Pyron *et al.* 2013) a genus wide review was conducted.

Based on the molecular results in tables in Figs 1 and 2 of Skinner *et al.* (2013), the following generic assignments were apparent, based on divergences indicated.

In short, it made sense to divide *Hemiergus sensu lato* so that the genera *Chelomeles* Duméril and Bibron, 1839 (type species *Chelomeles quadrilineatus* Duméril and Bibron, 1839), *Arenicolascincus* Wells and Wellington, 1985 (type species *Hemiergus millewae* Coventry, 1976), *Patheticoscincus* Wells and Wellington, 1984 (type species *Lygosoma australis* Gray, 1839), *Eroticoscincus* Wells and Wellington, 1984, (type species *Lygosoma graciloides* Lönnberg and Andersson, 1913) and *Anepischetosia* Wells and Wellington, 1985 (type species *Siaphos maccoyi* Lucas and Frost, 1894) are all recognised as distinct genera on the basis of ancient divergence exceeding more than 10 MYA.

This is in the main part based on the results of Skinner *et al.* (2013) combined with obvious morphological divergences of the said taxa.

As already stated, *Anepischetosia* Wells and Wellington, 1985, the only one of the preceding genera widely recognized by other authors in recent years other than *Eroticoscincus* was dealt with in detail by Hoser (2022) in which a total of 5 species were formally recognized.

In addition to the preceding, a new genus, was indicated by Skinner *et al.* (2013) for the *Lygosoma* (*Hemiergus*) *initiale* Werner, 1910 species complex based on an estimated divergence of about 17 MYA from nearest related species.

Hence the erection in this paper of *Grantscincus gen. nov.* for that species group.

Within *Hemiergus sensu lato* the group of seven widely recognized species was known by me to be a serious underestimate of the species diversity in the group.

Scattered populations of morphologically divergent specimens within given putative species were being treated as one taxon, when self-evidently this was not going to be likely.

Wells and Wellington (1985) formally named two divergent populations, one of which is self-evidently a separate and valid species.

That one, *Arenicolascincus lami* Wells and Wellington, 1985, related to *A. millawae* Coventry, 1976 from south-west Victoria, has been improperly ignored by herpetologists in Australia since the date of description.

Shine and Wuster, through their mouthpiece Peter Uetz and their controlled "The Reptile Data Base", falsely allege that *Arenicolascincus lami* Wells and Wellington, 1985 is a "*nomen nudum*".

The statement is a lie.

*Nomen Nudum* is defined in the *International Code of Zoological Nomenclature* (Ride *et al.* 1999) as when a name cannot be applied to a given taxon. Because Wells and Wellington (1985) had a type specimen for their species, it cannot possibly be a *nomen nudum*!

The Peter Uetz "The Reptile Data Base" claims to be the "go to" complete bibliography of herpetological names. However it routinely censors out names and authors who are not in his own cohort, including of course Wells, Wellington, Hoser and over 1000 Russian authors and papers, the latter group erased from

their version of herpetological history and science because in 2022 Russian President Vladimir Putin decided to invade Ukraine and so Uetz decided to punish all Russian scientists, living and deceased and their associates as his way to fight the war.

Uetz also noted that the associated erasure of non-Russian scientists from his database, that is the co-authors, was “collateral damage” and he never apologised for this.

In fact a year after the ban, Uetz stood his ground publicly, declaring that his censored version of “The Reptile Database” was in his eyes perfect.

The other *Hemiergus* species of note formally named by Wells and Wellington (1985) was their taxon *H. namatjira*, from the Granite country of New South Wales, immediately west of the Blue Mountains, which until then had been treated as a population of *H. decresiensis* (type locality of Kangaroo Island, South Australia) or more recently a population of *H. talbingoensis* (Copland, 1946), with a type locality of Talbingo, southern New South Wales.

There is not much comparative DNA available for any of *H. decresiensis*, *H. talbingoensis* or *H. namatjira*, or for that matter the associated taxon, *H. davisii* Copland, 1946 from the New England Region of New South Wales, although Reeder and Reichert (2011) do provide some in their Fig. 3, which supports a three-way split of eastern “*H. decresiensis*” into *H. talbingoensis*, *H. namatjira* and *H. davisii* Copland, 1946.

Furthermore, based on molecular studies of other small skinks in the highlands of New South Wales, for example, the *Pseudemoia spenceri* Lucas and Frost, 1894 complex as detailed by Hoser (2022) or the *Woolfscincus saxatilis* Cogger, 1960 complex as detailed by Hoser (2018), it is reasonable to expect that putative “*H. decresiensis*” from the west of the Blue Mountains are of a different species to specimens from the Bindabella Ranges / Snowy Mountains to the south or for that matter putative “*H. decresiensis*”, AKA *H. davisii* from the New England region to the north.

Copland (1946) also found and itemised differences between the central and southern highlands specimens of his taxon *H. talbingoensis*, implying more than one species being involved.

Therefore each of *H. decresiensis*, *H. talbingoensis*, *H. namatjira* and *H. davisii* are recognized herein as valid species-level taxa. The putative species *H. continentis* Copland, 1946 from Myponga, South Australia (SA), is the only form with a strong possibility of being conspecific with *H. decresiensis* (type locality of Kangaroo Island, SA), based on the molecular evidence of Reeder and Reichert (2011).

Now the evidence cited here is not new and on the basis of it, I note that the Wells and Wellington taxon *H. namatjira* should have been accepted by other herpetologists long before this paper was published and/or certainly in preference to recognition of for example *H. continentis*. I note however that in Australia, authors such as Wilson and Swan (2021), part of the anti Wells and Wellington cohort, recognize *H. continentis* (as a subspecies), but steadfastly pretend that *H. namatjira* does not even exist!

Put simply, on the basis of the readily available and published scientific evidence, there is no scientific basis to not accept *H. namatjira*, which says a lot about many so-called herpetologists operating within Australia.

It also shows that the claims of Kaiser *et al.* (2013) against Hoser, Wells and Wellington, are best directed at Kaiser *et al.* themselves and all who are duped by them.

I note also that there are at least two other separate and isolated populations of putative *H. decresiensis* in western Victoria, which are also morphologically divergent and came under investigation as this paper was being prepared.

I also had the privilege of inspecting specimens in the southern Flinders Ranges of South Australia when doing a snake catching course and filming in recent years and similar with respect to the populations in the Granite Belt of far southern Queensland, all of

which appeared to be divergent in form.

As part of this audit, I also inspected specimens from outlying sites such as Mount Kaputar in north-west New South Wales. Specimens were observed live *in situ* in the wild, also via photos with locality information and dead specimens. The ultimate conclusion that they were unnamed species was hard to contradict in most cases.

The zones of absence surrounding these populations does not appear to be recent in a geological sense (dated at 2.5-2.8 MYA on the eastern edge of the central Victorian population, (which in any event appears morphologically more like South Australian animals), being the date of the formation of the basalt plains on the eastern edge of their known occurrence) and in terms of the isolated western population corroborates the idea of high site fidelity in this species complex combined with an inability to cross hotter flatter areas without rocky substrates. This again implies long-term isolation.

Among publishing herpetologists, there has also been considerable confusion as to the species assignment of the central Victorian animals. Some authors have placed them within *H. decresiensis*, while others have placed them within *H. talbingoensis*.

A similar situation worth investigating existed with the northernmost (southern Queensland) population of putative “*H. decresiensis*” from the Stanthorpe area (including Amiens) and environs, being split from the main New England Population to the south of Glen Innes / Inverell line, with similarly affected species complexes (e.g. *Uvidicolus* Oliver and Bauer, 2011 geckos as detailed by Hoser, 2016, *Amalasia* Wells and Wellington, 1984 geckos as detailed by Hoser 2017 and *Egernia* Gray, 1838 skinks as detailed by Hoser 2018) having been separated by relatively rock free zones for periods sufficient to allow allopatric speciation. As already mentioned, Mount Kaputar’s population was also flagged for investigation.

All seven species within *Hemiergus* Wagler, 1830 *sensu lato*, as recognised by Cogger (2014) and Wilson and Swan (2021) were audited to confirm the validity of the species and any secondary populations that may have been formally named.

Where populations were found to be divergent and no names available, the intention was to formally name them as new.

#### MATERIALS AND METHODS

Specimens of all species within *Hemiergus* Wagler, 1830 *sensu lato*, as recognised by Cogger (2014) and Wilson and Swan (2021) were inspected from all parts of their known distributions. They were checked for morphological divergences and/or obvious biogeographical barriers separating the populations, including those flagged in the introduction. Specimens inspected included dead and live specimens as well as quality images with good locality data.

Molecular studies involving species within *Hemiergus* Wagler, 1830 *sensu lato* and other similarly distributed reptiles and frogs from southern Australia (noting that this genus in effect occupies southern Australia only), were also reviewed to flag likely speciation points for wide-ranging putative taxa.

Published references and taxonomic treatments relevant to the preceding taxa were reviewed and those relevant to the taxonomic conclusions in this paper included Boulenger (1887), Bush (1981), Cogger (2014), Cogger *et al.* (1983), Copland (1946), Coventry (1976), Cuvier (1829), Duméril and Bibron (1839), Farquhar (2020), Fitzinger (1826), Ford (1963), Glauert (1960), Gray (1831, 1839), Greenbaum (2000), Greer (1985), Hoser (2018, 2022), Hutchinson *et al.* (2021), Kinghorn (1924), Lucas and Frost (1894, 1902), Mecke *et al.* (2009), Pyron *et al.* (2013), Rabosky *et al.* (2014), Reeder (2003), Reeder and Reichert (2011), Ride *et al.* (1999), Shea *et al.* (2017), Singhal *et al.* (2018), Smith (1939), Smith (1927, 1937), Smyth (1968), Steindachner (1870), Storr (1967, 1975), Storr *et al.* (1981), Wagler (1830), Wells and Wellington (1984, 1985), Werner (1910), Wilson and Swan (2021) and sources cited therein.

## RESULTS

As already mentioned, *Hemiergis* Wagler, 1830 *sensu lato* was broken up into several genera as indicated before based largely on morphological divergence and molecular divergence as shown in Skinner *et al.* (2013).

Within this group, the following arrangement was determined.

*Hemiergis* Wagler, 1830 includes each of *H. decresiensis* (the type species), *H. talbingoensis*, *H. namatjira*, *H. davisii* as well as the newly named species from Western Victoria, being *H. keilleri* *sp. nov.* and *H. pailsorum* *sp. nov.*, *H. dorsei* *sp. nov.* from far southern Queensland in the high altitude Granite Belt around Stanthorpe, *H. kaputarensis* *sp. nov.* from north-west New South Wales and *H. awe* *sp. nov.* from the Wilpena Pound area of the Flinders Ranges in South Australia.

*H. continentis* is not supported by the molecular evidence of Reeder and Reichert (2011), even though it is morphologically separable from the type form of *H. decresiensis* which is found proximally to it. For this reason, the putative taxon is tentatively treated as valid in this paper and noting that at the present time, both *H. decresiensis* and *H. continentis* are evolving separately and as if being separate species.

Reeder and Reichert (2011) also indicated greater divergence of specimens further north in South Australia (see Fig. 3), supporting the identification of Wilpena Pound specimens as a separate and valid species and so they are formally named herein as *H. awe* *sp. nov.*

In terms of the populations of putative "*H. decresiensis*" from central and western Victoria, the following points are noted. They are geographically disjunct from their nearest proximal populations further east.

The separation for the main population in hills north-west of Ballarat is the basalt plains running north and north-west of Melbourne, which is unsuitable habitat and occupied by the competing burrowing species *Lerista bougainvillii* (Gray, 1839).

The age of that plain in the relevant area has been dated at between 2.5 and 2.8 MYA which is sufficient time for speciation to occur across that barrier and so I have no hesitation in naming the affected population as a new species.

The same applies for the isolated population further west at Mount Arapiles-Tooan State Park, also separated by a flat zone of wholly unsuitable and unpassable habitat.

In terms of the populations in the New England region of NSW and Queensland, the following is noted.

The distribution of *Hemiergis* in the area and also further south, inland from the NSW Central Coast is almost identical to that of geckoes in the genus *Amalosia* Wells and Wellington, 1984.

Hoser (2017) in summing up, stated:

"*Amalosia alexanderdudleyi* *sp. nov.* is found in the lower New England Tableland in New South Wales, Australia in a region generally bounded by the Hunter Valley in the south and a broad line running from Inverell in the West, across to Glen Innes in the east. The uplands region north of here has the morphologically similar *A. phillipsi* Wells and Wellington, 1985, while *A. lesueurii* is confined to the sandstone regions of Sydney, including the mountains to the west and south of Sydney."

Predating the paper of Hoser (2017) was molecular data confirming the divergence of the proximal species *Amalosia alexanderdudleyi* Hoser, 2017 and *A. phillipsi* Wells and Wellington, 1985.

While *Hemiergis* in hillier parts of northern and central New South Wales appears more strictly confined to granite country as opposed to sandstones (where the species *S. equalis* Gray 1825 occurs instead), the above still effectively applies to the relevant species. The relevant barrier in the New England region is a zone of relatively rock free uplands, north of the Glen Innes/Inverell line, that is in effect unpassable by rock-dwelling lizards and so has formed a barrier between populations north and south of there allowing speciation to occur.

Another example of similarly constrained sibling species is

the species pair *Uvidicolus covacevichae* Hoser, 2016 from Girraween, Queensland and nearby, combined with *Uvidicolus sphyrrurus* (Ogilby, 1892) from northern New South Wales (but of the form from south of Glen Innes / Inverell), as detailed by Hoser (2016).

It is thus an inescapable conclusion that the northernmost population of putative "*H. decresiensis*" is in fact an unnamed species and therefore is also named herein as *H. dorsei* *sp. nov.*. Morphologically divergent outlier populations from the Mount Kaputar volcanic escarpment in north-west New South Wales and that from Wilpena Pound in South Australia are also formally named as new species.

*Chelomeles* Duméril and Bibron, 1839 (type species *Chelomeles quadrilineatus* Duméril and Bibron, 1839), also includes the species *C. peronii* (Gray, 1831) and *C. tridactylum* (Boulenger, 1915).

*Arenicolascincus* Wells and Wellington, 1985, type species *Hemiergis millewae* Coventry, 1976, with a type locality of western Victoria includes the taxon *A. lami* Wells and Wellington, 1985, from south-west Australia. A population from the Eyre Peninsula, South Australia is also formally named as a new species *A. bonfire* *sp. nov.*, as is an outlier population from the Barrier Range in New South Wales, Australia formally named as *A. wha* *sp. nov.*

*Patheticoscincus* Wells and Wellington, 1984, with a type species *Lygosoma australis* Gray, 1839, with a type locality of Albany, Western Australia is split into two quite divergent species.

The morphologically divergent, *P. agh* *sp. nov.* occurs on the west coast of south-west Australia. The type form from Albany, West Australia occupies nearby parts of the southern coast of south-west Western Australia.

It is somewhat surprising that until now, no one has suggested that these two divergent forms are of different species in the face of quite significant differences between the two populations.

The genus *Patheticoscincus* is recognized herein on the basis the type species has a divergence of about 13 MYA from its nearest relative other than the related new form described in this paper, based on a number of recently published phylogenies cited herein including Skinner *et al.* (2013).

The correct and first available name for the species *Lygosoma australis* Gray, 1839 is used. In error a number of authors use the name *P. gracilipes* (Steindachner, 1870).

I note that a full reading of the fourth edition of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999) including in particular all of Article 59, confirms that the correct name for the species is the original "*Lygosoma australis* Gray, 1839" and not the later "*Hinulia gracilipes* Steindachner, 1870".

*Erotoscincus* Wells and Wellington, 1984, (type species *Lygosoma graciloides* Lönnberg and Andersson, 1913) maybe a species complex, but is herein treated as monotypic.

*Anepischetosia* Wells and Wellington, 1985 (type species *Siaphos maccoyi* Lucas and Frost, 1894)

was dealt with in detail by Hoser (2022) in which a total of 5 species were formally recognized.

*Grantscincus* *gen. nov.*, is erected for the species *Lygosoma (Hemiergis) initiale* Werner, 1910, with a type locality of Lion Mill, Western Australia. Also recognized in this genus is *G. brookeri* (Storr, 1975) from south-east South Australia.

Three other forms were investigated to see if they were worth giving taxonomic recognition to.

These were the form from the mid south-coastal area of Western Australia, one from the western Nullarbor area, generally west of Ceduna, South Australia and another from the eastern Eyre Peninsula, South Australia. Only the last of the trio was determined to be worthy of taxonomic recognition.

All appeared to be morphologically divergent, but the molecular evidence was not convincing in terms of the two more eastern populations.

### 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 of names 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 (Ride *et al.* 1999 and ICZN 2012).

Material downloaded from the internet and cited anywhere in this paper was downloaded and checked most recently as of 28 April 2023, unless otherwise stated and were accurate in terms of the context cited herein as of that date.

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

While numerous texts and references were consulted prior to publication of this paper, the criteria used to separate the relevant species 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.

In the unlikely event any "first reviser" seeks to merge two or more newly named taxa into one, then the name to be retained is that which is first by page priority as listed in the abstract keywords.

### CONSERVATION

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

Therefore attempts by taxonomic vandals like the Wolfgang Wüster gang via Kaiser (2012a, 2012b, 2013, 2014a, 2014b) and Kaiser *et al.* (2013) (as frequently amended and embellished, e.g. Rhodin *et al.* 2015, Thiele *et al.* 2020, Hammer and Thiele 2021) to unlawfully suppress the recognition of these taxa on the basis they have a personal dislike for the person who formally named it should be resisted (e.g. Ceriaco *et al.* 2023, Cogger 2014, Dubois *et al.* 2019, Mosyakin 2022 and Wellington 2015). Claims by the Wüster gang against this paper and the descriptions herein will no doubt be no different to those the gang have made previously, all of which were discredited long ago as outlined by Ceriaco *et al.* (2023), Cogger (2014), Cotton (2014), Dubois *et al.* (2019), Hawkeswood (2021), Hoser, (2007a-b, 2009, 2012a, 2012b, 2013, 2015a-f, 2019a, 2019b), ICZN (1991, 2001, 2012, 2021), Mosyakin (2022), Wellington (2015) and sources cited therein.

Some material within descriptions is repeated to ensure each fully complies with the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

### GRANTSCINCUS GEN. NOV.

LSIDurn:lsid:zoobank.org:act:3B86A2FB-9159-4692-997F-8462EF4985C0

**Type species:** *Lygosoma (Hemiergus) initiale* Werner, 1910.

**Diagnosis:** *Grantoscincus gen. nov.* is a genus of small, slender smooth-scaled skinks occurring from coastal southern Australia, from the Eyre Peninsula west to near Perth.

Species within *Grantoscincus gen. nov.* are separated from other morphologically similar species within *Hemiergus* Wagler, 1830 *sensu* Cogger 2014, by having no prefrontals (except in *G. Scottgranti sp. nov.*), versus their presence on all other species. They also are characterised and separated from the other species within *Hemiergus* Wagler, 1830 *sensu* Cogger 2014, by the following unique combination of characters: Five fingers; a scaly lower eyelid with an opaque scaly disc; 11 or less lamellae

under the fourth toes; supralabials are separated from the eye by a series of subocular scales.

Species within *Hemiergus* Wagler, 1830 *sensu* Cogger 2014 including *Grantoscincus gen. nov.* are separated from all other Australian skinks by the following character combination:

Short limbs which fail to overlap by several scale rows when adpressed; no supranasals; small to moderate nasals, that are usually separated; parietal shields in contact behind the interparietal; lower eyelid moveable, with a transparent disc; ear opening usually absent, but usually determined by a depression; enlarged pre-anals.

**Distribution:** *Grantoscincus gen. nov.* occur in coastal southern Australia, from the Eyre Peninsula, South Australia, west to near Perth, Western Australia.

**Etymology:** Named in honour of Scott Grant of Whyalla, South Australia, Australia, the former owner of the Whyalla Fauna Park, in recognition of his many years of working for wildlife conservation in Australia.

Ultimately, he was shut down by the South Australian Government, including the government-owned Adelaide Zoo, who wanted no competition in the "wildlife business".

**Content:** *Grantoscincus initialis* (Werner, 1910) (type species); *G. brookeri* (Storr, 1975); *G. scottgranti sp. nov.* (this paper).

### GRANTSCINCUS SCOTTGRANTI SP. NOV.

LSIDurn:lsid:zoobank.org:act:D61EFAA5-755B-4151-A387-B633B09B751B

**Holotype:** A preserved specimen at the South Australian Museum, Adelaide, South Australia, Australia, specimen number R57519 collected from 23.5 km North, north-east of Sheoak Hill, South Australia, Australia, Latitude -33.1864 S., Longitude 136.9775 E.

This government-owned facility allows access to its holdings.

**Paratypes:** Three preserved specimens at the South Australian Museum, Adelaide, South Australia, Australia, 1/ Specimen number R57641 collected from 20.5 km west, north-west of Mount Middleback, South Australia, Australia, Latitude -33.2025 S., Longitude 136.9156 E., 2/ Specimen number R57632 collected from 18.7 km west, north-west of Iron Duchess, South Australia, Australia, Latitude -33.2231 S., Longitude 136.9308 E., 3/ Specimen number R57649 collected from 21.1 km west, north-west of Mount Middleback, South Australia, Australia, Latitude -33.2092 S., Longitude 136.9097 E.

**Diagnosis:** *Grantoscincus scottgranti sp. nov.* is differentiated from *G. initialis* (Werner, 1910) by the absence of a well-defined black band on the upper margin of the flank, as in an absence of a black border between the grey of the flank and brown of the dorsum.

*G. scottgranti sp. nov.* is differentiated from *G. brookeri* (Storr, 1975) by the presence of prefrontals, less numerous nuchals and larger adult size.

*G. initialis* is dark grey on the flanks and dark brown above, and in west coast of Western Australia specimens, is usually a deep or reddish chocolate brown above. *G. brookeri* is generally a medium brownish colour all over and with black peppering on the dorsum and in particular the upper flanks. Unlike in *B. initialis*, there is no well-defined black boundary at the top of the upper flank.

*G. scottgranti sp. nov.* is a medium brown above, with the black peppering coalesced to form tiny spots forming longitudinal lines running down the dorsum. Flanks are a greyish brown becoming whitish at the lower margin. On the (original) tail blackish dots form a stripe down the midline which is not the case in the other two species.

The three preceding species form the entirety of *Grantoscincus gen. nov.*

*Grantoscincus gen. nov.* is a genus of small, slender smooth-scaled skinks occurring from coastal southern Australia, from the Eyre Peninsula, west to near Perth.

Species within *Grantoscincus gen. nov.* are separated from other

morphologically similar species within *Hemiergus* Wagler, 1830 *sensu* Cogger 2014, by having no prefrontals (except in *G. Scottgranti* sp. nov.), versus their presence on all other species. They also are characterised and separated from the other species within *Hemiergus* Wagler, 1830 *sensu* Cogger 2014, by the following unique combination of characters: Five fingers; a scaly lower eyelid with an opaque scaly disc; 11 or less lamellae under the fourth toes; supralabials are separated from the eye by a series of subocular scales.

Species within *Hemiergus* Wagler, 1830 *sensu* Cogger 2014 including *Grantscincus* gen. nov. are separated from all other Australian skinks by the following character combination: Short limbs which fail to overlap by several scale rows when adpressed; no supranasals; small to moderate nasals, that are usually separated; parietal shields in contact behind the interparietal; lower eyelid moveable, with a transparent disc; ear opening usually absent, but usually determined by a depression; enlarged pre-anals.

**Distribution:** *G. scottgranti* sp. nov. appears to be confined to the north-eastern Eyre Peninsula in South Australia, Australia in an area bounded by Whyalla in the north-east, Kimba in the north-west and the Blue Range in the south.

**Etymology:** The species *Grantscincus scottgranti* sp. nov. is named in honour of Scott Grant of Whyalla, South Australia, Australia, the former owner of the Whyalla Fauna Park, in recognition of his many years of working for wildlife conservation in Australia.

Ultimately, he was shut down by the South Australian Government, including the government-owned monopolistic Adelaide Zoo, who decided that they wanted no competition in the "wildlife business".

#### HEMIERGIS KEILLERI SP. NOV.

LSIDurn:lsid:zoobank.org:act:8D8002B5-1F14-4290-8984-C7F7F39D0F6C

**Holotype:** A preserved specimen at the National Museum of Victoria, Melbourne, Victoria, Australia, specimen number D39593 collected from the vicinity of the Ben Nevis Fire Tower in the Pyrenees Ranges, Victoria, Australia, Latitude -37.23 S., Longitude 143.2 E.

This government-owned facility allows access to its holdings.

**Paratypes:** Nine preserved specimens at the National Museum of Victoria, Melbourne, Victoria, Australia, specimen numbers D39594, D39595, D39596, D55284, D55285, D55286, D55287, D55288, D55292, all collected from the vicinity of the Ben Nevis Fire Tower in the Pyrenees Ranges, Victoria, Australia, Latitude -37.23 S., Longitude 143.2 E.

**Diagnosis:** *Hemiergus keilleri* sp. nov., *H. pailsorum* sp. nov., *H. kaputarensis* sp. nov., *H. dorsei* sp. nov. and *H. awe* sp. nov. are five of several species until now treated by most authors as populations of the well-known species *H. decresiensis* (Cuvier, 1829), a putative taxon until now treated as occupying the arc from south-east Queensland to south-east South Australia, mainly, but not always tied to cooler areas and granite type rock areas. This means the relevant species are usually found in uplands in the northern parts of the general distribution (i.e. northern New South Wales, far south Queensland, more northern parts of South Australia in the Flinders Ranges), while extending to lower altitude areas further south (e.g. Kangaroo Island in South Australia).

It is uncertain if the climatic factors, substrates, competing species or a combination of these are the main factors constraining extant distributions of and movements of the relevant species.

In terms of *H. keilleri* sp. nov. and each of the other relevant species, it is important to spell out the differences between each as essential parts of this diagnosis.

*H. decresiensis* is herein confined to Kangaroo Island, South Australia.

The morphologically similar putative taxon (herein treated as a

full species, but only tentatively), *H. continentis* (Copland, 1946) is herein restricted to nearby parts of south-east South Australia, generally in the region including the Adelaide Hills, with the bulk of the population found between Victor Harbour in the south and Burra in the north, with the population not extending any further east than the Coorong in the south, or beyond the Murray River further north.

*H. awe* sp. nov. is the divergent taxon found in the cooler parts of the Flinders Ranges around Wilpena Pound and potentially other nearby locations.

*H. pailsorum* sp. nov. is the isolated population found in the Mount Arapiles area west of the Grampians in western Victoria.

*H. keilleri* sp. nov. is found in association with the granitic hills from Mount Kerang (Wedderburn) in the north, south through the associated granite hills to the connected Pyrenees and Mount Buangor ranges (around Beaufort), all in western Victoria, Australia.

*H. talbingoensis* (Copland, 1946) is the species found in the Granite belt of the western side of the Great Dividing Range from near Yea in central Victoria, generally north and east of there to about Goulburn in New South Wales.

*H. namatjira* Wells and Wellington, 1985 is found generally north of Goulburn in New South Wales, north to about Mudgee and the Hunter Valley in New South Wales.

*H. davisii* (Copland, 1946) is found north of the Hunter Valley in the New England region, generally south of the line between Inverell and Glen Innes.

*H. kaputarensis* sp. nov. is an isolated, range-restricted morphologically divergent taxon confined to the high altitude Kaputar Range, north-west New South Wales, being some 70 km from the nearest population of *H. davisii* to the east.

*H. dorsei* sp. nov. is a range restricted taxon confined to the high altitude Granite Belt, around Stanthorpe in far southern Queensland, separated by a relatively rock-free zone from *H. davisii* to the south.

The preceding species are separated from one another by the following unique suites of characters:

*H. decresiensis* has 24-26 midbody scale rows; is light greyish brown on the dorsal surface and greyish on the flanks. Black peppering on the back barely tends to form dorso-linear stripes. The black border extending along the upper flank is thick.

*H. continentis* has 24-26 midbody scale rows; and is a dark grey brown lizard, being this colour both dorsally and on most of the flanks, although the lower flanks are more whitish in colour. Black peppering on the back barely tends to form dorso-linear stripes. The black border extending along the upper flank is very thin and with an ill-defined lower boundary.

*H. awe* sp. nov. is similar in most respects to *H. continentis* detailed above, but is separated from that form by being more chocolate brown in dorsal colour and similar on the flanks, including the lower flanks which remain brownish and the fact that the black border extending along the upper flank has a well defined upper and lower edge.

*H. pailsorum* sp. nov. has 24-26 midbody scale rows; it is light brown on the dorsum and creamish on the flanks. There is a thick black line forming the border of the upper flank, which extends unbroken along the entire length of the (original) tail. Dorsally there is spotting composed of scattered moderate sized black spots, tending to form semi-distinct and broken lines. While black spots or peppering are on the centre of most scales on the dorsum in the other species in the complex, *H. pailsorum* sp. nov. is unusual in that this is not quite the case, with black spotting tending to be scattered, especially at the anterior part of the dorsum. Lower labials are strongly barred. There are no scattered white spots or flecks on the side of the original tail.

*H. keilleri* sp. nov. has 24-26 midbody scale rows; is a dark brownish to brownish grey on the dorsal surface. The black line at the top of the flank has a lower boundary that is often, but not always poorly defined, below which is a light brownish or

grey colouration before becoming lighter at the lower edge of the flank. On the upper surface the dark spotting at the centre of each scale is reasonably large and well defined to give the lizard an appearance of having moderately well-defined lines running down the dorsum, the spotting itself being slightly broken. There are scattered white spots or flecks on the side of the tail. Lower labials are either all brownish or grey or otherwise strongly etched around the edges brownish-grey and white in the centres.

*H. talbingoensis* has 22 midbody scale rows; the dorsum is a dark brown colour and a brownish-grey on the lower flank; the black line of the upper flank is very wide, with a poorly defined lower edge.

Dorsally the dark spotting or markings are typically either blurred or broken, especially on the posterior part of the body, meaning the appearance of stripes on the dorsum is often not there or only at the anterior part of the body. Striping of any form from the dorsum does not continue onto the tail. Upper and lower labials are a mixture of white and brownish, mainly brownish, but without any obvious patterning or markings.

*H. namatjira* has 20 midbody scale rows (rarely 18 or 22); is a boldly marked lizard, with well-defined black lines running down the dorsum of the body and continuing down the tail where they break to become lines of well-defined blackish spots. The black line on the top of the lateral edge of the flank is thin and well-defined. Mid and lower flank is whitish-grey. Upper labials are mainly dark, with white bars. The dorsum itself is a light beige-brown colour.

*H. davisii* is similar in most respects to *H. namatjira* above, but separated from *H. namatjira* by having a moderately thick line on the upper edge of the flank, below which is whitish grey and then below that another moderately thick black line on the mid to lower flank, which tends to break at the posterior end. This lower line is unique to this species and the morphologically similar *H. dorsei* sp. nov.. The dorsum itself is a beige-grey colour. The head is a light grey colour with only limited black peppering.

*H. dorsei* sp. nov. is similar in most respects to *H. davisii* above, but separated from that species by the increased amount of black pigment on the upper surface of the head, especially towards the snout, and the fact that the pair of black lines running down the dorsum are thicker and more prominent. The anterior of the body also has a strong and lighter brownish tinge (as compared to the lower part of the body); the light scales (or parts of them) that are between the black lines running down either side of the midline are of a slightly different colour to those outside these lines, which is apparently unique to this species. Adults observed appear to be more thick set in build than seen in *H. davisii* or for that matter any other species in the complex.

*H. kaputarensis* sp. nov. has 20 midbody scale rows; it is a lizard that appears to be a plain brown colour when viewed at a distance; stripes on the dorsum are either faded or absent and usually dark brown rather than blackish in colour, meaning that they often appear to blend in with the surrounding scale colouration, although some aberrant specimens are very boldly striped with unusually thick stripes. While the dorsum is invariably brownish in colour, the upper surface of the head is a darker brown or grey colour, but does not appear blackish towards the snout, have any obvious marks or flecks or rapid colour change at any point. Upper and lower labials are also brownish, but with small white centres. Sides of the tail are boldly dark flecked at the anterior end.

All the preceding species *H. decresiensis* (Cuvier, 1829), *H. continentis* (Copland, 1946), *H. awe* sp. nov., *H. pailsorum* sp. nov., *H. keilleri* sp. nov., *H. talbingoensis* (Copland, 1946), *H. namatjira* Wells and Wellington, 1985, *H. davisii* (Copland, 1946), *H. kaputarensis* sp. nov. and *H. dorsei* sp. nov. being the entirety of the genus *Hemiergus* Wagler, 1830 as defined in this paper, are separated from all other species within *Hemiergus sensu* Cogger (2014), being the genera *Chelomeles* Duméril and Bibron, 1839 (type species *Chelomeles quadrilineatus* Duméril and Bibron, 1839), *Arenicolascincus* Wells and Wellington,

1985 (type species *Hemiergus millewae* Coventry, 1976), *Patheticoscincus* Wells and Wellington, 1984 (type species *Lygosoma australis* Gray, 1839), *Eroticoscincus* Wells and Wellington, 1984, (type species *Lygosoma graciloides* Lönnberg and Andersson, 1913) and *Anepischetosia* Wells and Wellington, 1985 (type species *Siaphos maccoyi* Lucas and Frost, 1894) by having tridactyle limbs with second toes only being slightly longer than the third (versus much longer in the genus *Chelomeles* Duméril and Bibron, 1839).

All the preceding genera are separated from all other Australian skinks by the following suite of characters: Parietal shields in contact behind the interparietal; lower eyelid is movable with a transparent disc; limbs short, usually separated by at least several scale lengths when adpressed;

supranasals usually absent; nasals small to moderate and usually separated; fingers 2-5, toes 2-5; ear opening is either small or in specimens with five fingers and five toes is hidden. They are cryptozoic, fossorial, small, slender, smooth-scaled skinks (modified and corrected from Cogger 2014).

*H. decresiensis* in life is depicted Wilson and Swan (2021) on page 341 at top right and online at:

<https://www.inaturalist.org/observations/73883044>

and

<https://www.inaturalist.org/observations/73882340>

and

<https://www.inaturalist.org/observations/6880996>

*H. continentis* in life is depicted in Wilson and Swan (2021) on page 341 at top left and online at:

<https://www.inaturalist.org/observations/100106076>

and

<https://www.flickr.com/photos/128497936@N03/50183308686/>

and

<https://www.flickr.com/photos/stephenmahony/52860519424/>

and

<https://www.flickr.com/photos/126237772@N07/31545804293/>

and

<https://www.flickr.com/photos/126237772@N07/31514451484/>

and

<https://www.flickr.com/photos/ryanfrancis/52020686868/>

*H. pailsorum* sp. nov. is depicted in life online at:

<https://www.flickr.com/photos/126237772@N07/49903278286/>

and

<https://www.flickr.com/photos/127392361@N04/49903286101/>

and

<https://www.inaturalist.org/observations/153528278>

*H. keilleri* sp. nov. is depicted in life online at:

<https://www.flickr.com/photos/68921296@N06/7991310532/>

and

<https://www.flickr.com/photos/68921296@N06/7991299111/>

and

<https://www.inaturalist.org/observations/37502548>

and

<https://www.inaturalist.org/observations/144710964>

and

<https://www.inaturalist.org/observations/64154617>

and

<https://www.inaturalist.org/observations/64229366>

*H. talbingoensis* is depicted in life in Wilson and Swan (2021) on page 345 at bottom and online at:

[https://www.flickr.com/photos/ken\\_griffiths\\_photography/40306479154/](https://www.flickr.com/photos/ken_griffiths_photography/40306479154/)

and

<https://www.inaturalist.org/observations/99854026>

and

<https://www.inaturalist.org/observations/119837457>



and  
<https://www.flickr.com/photos/189037423@N06/51288445179/>  
 and  
<https://www.flickr.com/photos/189037423@N06/51288445169/>  
*H. namatjira* is depicted in life in Hoser (1989) on page 98 at middle left, Cogger (2014) on page 577 at bottom, Swan *et al.* (2022) on page 172 top and online at:  
<https://www.flickr.com/photos/shaneblackfnq/18604715978/>  
 and  
<https://www.inaturalist.org/observations/57303146>  
 and  
<https://www.inaturalist.org/observations/8410443>  
*H. davisii* is depicted in life in Wilson and Swan (2021) on page 343 middle right and online at:  
<https://www.flickr.com/photos/126237772@N07/47509260012/>  
 and  
<https://www.inaturalist.org/observations/130747870>  
 and  
<https://www.inaturalist.org/observations/134584279>  
 and  
<https://www.inaturalist.org/observations/130597944>  
*H. kaputarensis sp. nov.* is depicted in life online at:  
<https://www.flickr.com/photos/171250498@N08/51282573293/>  
 and  
<https://www.flickr.com/photos/ryanfrancis/40026976514/>  
 and  
[https://www.flickr.com/photos/zimny\\_anders/52903501674/](https://www.flickr.com/photos/zimny_anders/52903501674/)  
 and  
<https://www.inaturalist.org/observations/69663574>  
 and  
<https://www.inaturalist.org/observations/42467274>  
 and  
<https://www.inaturalist.org/observations/61527956>

**Distribution:** *H. keilleri sp. nov.* is found in association with the granitic hills from Mount Kerang (Wedderburn) in the north, south through the associated hills to the connected Pyrenees and Mount Buangor ranges (around Beaufort), all in western Victoria, Australia.

**Etymology:** Named in honour of Darren Keiller, trading as Snake Catcher Geelong, in recognition for his services to wildlife conservation in Victoria over some decades.

#### HEMIERGIS PAILSORUM SP. NOV.

**LSID**Durn:lsid:zoobank.org:act:37609A39-A69A-452A-80BA-60DAEEDB7AE8

**Holotype:** A preserved adult female specimen at the National Museum of Victoria, Melbourne, Victoria, Australia, specimen number D5431 collected from Mt. Arapiles, Victoria, Australia, Latitude -36.77 S., Longitude 141.85 E.

This government-owned facility allows access to its holdings.

**Paratypes:** 37 preserved specimens at the National Museum of Victoria, Melbourne, Victoria, Australia, specimen numbers D13937, D33433, D44862, D54300, D54302, D54305, D54306, D54310, D54314, D54316, D54317, D54318, D54320, D54321, D54322, D54325, D54329, D54337, D55846, D55848, D55850, D67108, D67110, D67112, D67113, D67124, D67125, D67129, D67131, D67135, D67137, D67140, D67141, D67149, D67155, D67160, D67144 all collected from Mt. Arapiles, Victoria, Australia, Latitude -36.77 S., Longitude 141.85 E.

**Diagnosis:** *Hemiergis keilleri sp. nov.*, *H. pailsorum sp. nov.*, *H. kaputarensis sp. nov.*, *H. dorsei sp. nov.* and *H. awe sp. nov.* are five of several species until now treated by most authors as populations of the well-known species *H. decresiensis* (Cuvier, 1829), a putative taxon until now treated as occupying the arc from south-east Queensland to south-east South Australia, mainly, but not always tied to cooler areas and granite type rock areas. This means the relevant species are usually found in uplands in the northern parts of the general distribution (i.e.

northern New South Wales, far south Queensland, more northern parts of South Australia in the Flinders Ranges), while extending to lower altitude areas further south (e.g. Kangaroo Island in South Australia).

It is uncertain if the climatic factors, substrates, competing species or a combination of these are the main factors constraining extant distributions of and movements of the relevant species.

In terms of *H. keilleri sp. nov.* and each of the other relevant species, it is important to spell out the differences between each as essential parts of this diagnosis.

*H. decresiensis* is herein confined to Kangaroo Island, South Australia.

The morphologically similar putative taxon (herein treated as a full species, but only tentatively), *H. continentis* (Copland, 1946) is herein restricted to nearby parts of south-east South Australia, generally in the region including the Adelaide Hills, with the bulk of the population found between Victor Harbour in the south and Burra in the north, with the population not extending any further east than the Coorong in the south, or beyond the Murray River further north.

*H. awe sp. nov.* is the divergent taxon found in the cooler parts of the Flinders Ranges around Wilpena Pound and potentially other nearby locations.

*H. pailsorum sp. nov.* is the isolated population found in the Mount Arapiles area west of the Grampians in western Victoria.

*H. keilleri sp. nov.* is found in association with the granitic hills from Mount Kerang (Wedderburn) in the north, south through the associated hills to the connected Pyrenees and Mount Buangor ranges (around Beaufort), all in western Victoria, Australia.

*H. talbingoensis* (Copland, 1946) is the species found in the Granite belt of the western side of the Great Dividing Range from near Yea in central Victoria, generally north and east of there to about Goulburn in New South Wales.

*H. namatjira* Wells and Wellington, 1985 is found generally north of Goulburn in New South Wales, north to about Mudgee and the Hunter Valley in New South Wales.

*H. davisii* (Copland, 1946) is found north of the Hunter Valley in the New England region, generally south of the line between Inverell and Glen Innes.

*H. kaputarensis sp. nov.* is an isolated, range-restricted morphologically divergent taxon confined to the high altitude Kaputar Range, north-west New South Wales, being some 70 km from the nearest population of *H. davisii* to the east.

*H. dorsei sp. nov.* is a range restricted taxon confined to the high altitude Granite Belt, around Stanthorpe in far southern Queensland, separated by a relatively rock-free zone from *H. davisii* to the south.

The preceding species are separated from one another by the following suites of characters:

*H. decresiensis* has 24-26 midbody scale rows; is light greyish brown on the dorsal surface and greyish on the flanks. Black peppering on the back barely tends to form dorso-linear stripes. The black border extending along the upper flank is thick.

*H. continentis* has 24-26 midbody scale rows; and is a dark grey brown lizard, being this colour both dorsally and on most of the flanks, although the lower flanks are more whitish in colour. Black peppering on the back barely tends to form dorso-linear stripes. The black border extending along the upper flank is very thin and with an ill-defined lower boundary.

*H. awe sp. nov.* is similar in most respects to *H. continentis* detailed above, but is separated from that form by being more chocolate brown in dorsal colour and similar on the flanks, including the lower flanks which remain brownish and the fact that the black border extending along the upper flank has a well defined upper and lower edge.

*H. pailsorum sp. nov.* has 24-26 midbody scale rows; it is light brown on the dorsum and creamish on the flanks. There is a

thick black line forming the border of the upper flank, which extends unbroken along the entire length of the (original) tail. Dorsally there is spotting composed of scattered moderate sized black spots, tending to form semi-distinct and broken lines. While black spots or peppering are on the centre of most scales on the dorsum in the other species in the complex, *H. pailsorum* sp. nov. is unusual in that this is not quite the case, with black spotting tending to be scattered, especially at the anterior part of the dorsum. Lower labials are strongly barred. There are no scattered white spots or flecks on the side of the tail.

*H. keilleri* sp. nov. has 24-26 midbody scale rows; is a dark brownish to brownish grey on the dorsal surface. The black line at the top of the flank has a lower boundary that is often, but not always poorly defined, below which is a light brownish or grey colouration before becoming lighter at the lower edge of the flank. On the upper surface the dark spotting at the centre of each scale is reasonably large and well defined to give the lizard an appearance of having moderately well-defined lines running down the dorsum, the spotting itself being slightly broken. There are scattered white spots or flecks on the side of the tail. Lower labials are either all brownish or grey or otherwise strongly etched around the edges brownish-grey and white in the centres.

*H. talbingoensis* has 22 midbody scale rows; the dorsum is a dark brown colour and a brownish-grey on the lower flank; the black line of the upper flank is very wide, with a poorly defined lower edge.

Dorsally the dark spotting or markings are typically either blurred or broken, especially on the posterior part of the body, meaning the appearance of stripes on the dorsum is often not there or only at the anterior part of the body. Striping of any form from the dorsum does not continue onto the tail. Upper and lower labials are a mixture of white and brownish, mainly brownish, but without any obvious patterning or markings.

*H. namatjira* has 20 midbody scale rows (rarely 18 or 22); is a boldly marked lizard, with well-defined black lines running down the dorsum of the body and continuing down the tail where they break to become lines of well-defined blackish spots. The black line on the top of the lateral edge of the flank is thin and well-defined. Mid and lower flank is whitish-grey. Upper labials are mainly dark, with white bars. The dorsum itself is a light beige-brown colour.

*H. davisii* is similar in most respects to *H. namatjira* above, but separated from *H. namatjira* by having a moderately thick line on the upper edge of the flank, below which is whitish grey and then below that another moderately thick black line on the mid to lower flank, which tends to break at the posterior end. This lower line is unique to this species and the morphologically similar *H. dorseyi* sp. nov.. The dorsum itself is a beige-grey colour. The head is a light grey colour with only limited black peppering.

*H. dorseyi* sp. nov. is similar in most respects to *H. davisii* above, but separated from that species by the increased amount of black pigment on the upper surface of the head, especially towards the snout, and the fact that the pair of black lines running down the dorsum are thicker and more prominent. The anterior of the body also has a strong and lighter brownish tinge (as compared to the lower part of the body); the light scales (or parts of them) that are between the black lines running down either side of the midline are of a slightly different colour to those outside these lines, which is apparently unique to this species. Adults observed appear to be more thick set in build than seen in *H. davisii* or for that matter any other species in the complex.

*H. kaputarensis* sp. nov. has 20 midbody scale rows; it is a lizard that appears to be a plain brown colour when viewed at a distance; stripes on the dorsum are either faded or absent and usually dark brown rather than blackish in colour, meaning that they often appear to blend in with the surrounding scale colouration, although some aberrant specimens are very boldly striped with unusually thick stripes. While the dorsum is invariably brownish in colour, the upper surface of the head is a darker brown or grey colour, but does not appear blackish

towards the snout, have any obvious marks or flecks or rapid colour change at any point. Upper and lower labials are also brownish, but with small white centres. Sides of the tail are boldly dark flecked at the anterior end.

All the preceding species *H. decresiensis* (Cuvier, 1829), *H. continentis* (Copland, 1946), *H. awe* sp. nov., *H. pailsorum* sp. nov., *H. keilleri* sp. nov., *H. talbingoensis* (Copland, 1946), *H. namatjira* Wells and Wellington, 1985, *H. davisii* (Copland, 1946), *H. kaputarensis* sp. nov. and *H. dorseyi* sp. nov. being the entirety of the genus *Hemiergis* Wagler, 1830 as defined in this paper, are separated from all other species within *Hemiergis sensu* Cogger (2014), being the genera *Chelomeles* Duméril and Bibron, 1839 (type species *Chelomeles quadrilineatus* Duméril and Bibron, 1839), *Arenicolascincus* Wells and Wellington, 1985 (type species *Hemiergis millewae* Coventry, 1976), *Patheticoscincus* Wells and Wellington, 1984 (type species *Lygosoma australis* Gray, 1839), *Eroticoscincus* Wells and Wellington, 1984, (type species *Lygosoma graciloides* Lönnberg and Andersson, 1913) and *Anepischetosia* Wells and Wellington, 1985 (type species *Siaphos maccoyi* Lucas and Frost, 1894) by having tridactyle limbs with second toes only being slightly longer than the third (versus much longer in the genus *Chelomeles* Duméril and Bibron, 1839).

All the preceding genera are separated from all other Australian skinks by the following suite of characters: Parietal shields in contact behind the interparietal; lower eyelid is movable with a transparent disc; limbs short, usually separated by at least several scale lengths when adpressed;

supranasals usually absent; nasals small to moderate and usually separated; fingers 2-5, toes 2-5; ear opening is either small or in specimens with five fingers and five toes is hidden. They are cryptozoic, fossorial, small, slender, smooth-scaled skinks (modified and corrected from Cogger 2014).

*H. decresiensis* in life is depicted Wilson and Swan (2021) on page 341 at top right and online at:

<https://www.inaturalist.org/observations/73883044>

and

<https://www.inaturalist.org/observations/73882340>

and

<https://www.inaturalist.org/observations/6880996>

*H. continentis* in life is depicted in Wilson and Swan (2021) on page 341 at top left and online at:

<https://www.inaturalist.org/observations/100106076>

and

<https://www.flickr.com/photos/128497936@N03/50183308686/>

and

<https://www.flickr.com/photos/stephenmahony/52860519424/>

and

<https://www.flickr.com/photos/126237772@N07/31545804293/>

and

<https://www.flickr.com/photos/126237772@N07/31514451484/>

and

<https://www.flickr.com/photos/ryanfrancis/52020686868/>

*H. pailsorum* sp. nov. is depicted in life online at:

<https://www.flickr.com/photos/126237772@N07/49903278286/>

and

<https://www.flickr.com/photos/127392361@N04/49903286101/>

and

<https://www.inaturalist.org/observations/153528278>

*H. keilleri* sp. nov. is depicted in life online at:

<https://www.flickr.com/photos/68921296@N06/7991310532/>

and

<https://www.flickr.com/photos/68921296@N06/7991299111/>

and

<https://www.inaturalist.org/observations/37502548>

and

<https://www.inaturalist.org/observations/144710964>

and

<https://www.inaturalist.org/observations/64154617>

and

<https://www.inaturalist.org/observations/64229366>

*H. talbingoensis* is depicted in life in Wilson and Swan (2021) on page 345 at bottom and online at:

[https://www.flickr.com/photos/ken\\_griffiths\\_photography/40306479154/](https://www.flickr.com/photos/ken_griffiths_photography/40306479154/)

and

<https://www.inaturalist.org/observations/99854026>

and

<https://www.inaturalist.org/observations/119837457>

and

<https://www.flickr.com/photos/189037423@N06/51288445179/>

and

<https://www.flickr.com/photos/189037423@N06/51288445169/>

*H. namatjira* is depicted in life in Hoser (1989) on page 98 at

middle left, Cogger (2014) on page 577 at bottom, Swan *et al.*

(2022) on page 172 top and online at:

<https://www.flickr.com/photos/shaneblackfnq/18604715978/>

and

<https://www.inaturalist.org/observations/57303146>

and

<https://www.inaturalist.org/observations/8410443>

*H. davisii* is depicted in life in Wilson and Swan (2021) on page 343 middle right and online at:

<https://www.flickr.com/photos/126237772@N07/47509260012/>

and

<https://www.inaturalist.org/observations/130747870>

and

<https://www.inaturalist.org/observations/134584279>

and

<https://www.inaturalist.org/observations/130597944>

*H. kaputarensis* sp. nov. is depicted in life online at:

<https://www.flickr.com/photos/171250498@N08/51282573293/>

and

<https://www.flickr.com/photos/ryanfrancis/40026976514/>

and

[https://www.flickr.com/photos/zimny\\_anders/52903501674/](https://www.flickr.com/photos/zimny_anders/52903501674/)

and

<https://www.inaturalist.org/observations/69663574>

and

<https://www.inaturalist.org/observations/42467274>

and

<https://www.inaturalist.org/observations/61527956>

**Distribution:** *H. pailsorum* sp. nov. is only known from the immediate vicinity of Mount Arapiles, Victoria, Australia and appears restricted to this location. While very abundant at this location, heavily surveyed nearby areas have not yielded specimens of this taxon.

Therefore it should be monitored closely as a vulnerable taxon.

**Etymology:** Named in honour of Roy and Lynn Pails of Ballarat, Victoria, Australia, owners of "Pails for Scales" wildlife conservation, in recognition of their fantastic services to wildlife conservation by both Roy and Lynn over some decades.

**HEMIERGIS KAPUTARENSIS SP. NOV.**

**LSID**Durn:lsid:zoobank.org:act:4F28DDFC-F98D-4756-9167-C71F909DACE1

**Holotype:** A live specimen depicted in a photo uploaded to the photo sharing site "flickr.com" on 1 July 2021, posted at: <https://www.flickr.com/photos/171250498@N08/51282573293/> collected from Mount Kaputar National Park, NSW, Australia, and remaining online at the time this paper was published in 2023.

**Paratypes:** Two live specimens depicted in photos uploaded to

the photo sharing site "flickr.com" at:

<https://www.flickr.com/photos/ryanfrancis/40026976514/>

and

[https://www.flickr.com/photos/zimny\\_anders/52903501674/](https://www.flickr.com/photos/zimny_anders/52903501674/)

and remaining online at the time this paper was published in 2023.

All the three preceding referred to images can be found at online archives, (e.g. "wayback machine") even if deleted from their hosted site pages at any time.

**Diagnosis:** *Hemiergis keilleri* sp. nov., *H. pailsorum* sp. nov., *H. kaputarensis* sp. nov., *H. dorsei* sp. nov. and *H. awe* sp. nov. are five of several species until now treated by most authors as populations of the well-known species *H. decresiensis* (Cuvier, 1829), a putative taxon until now treated as occupying the arc from south-east Queensland to south-east South Australia, mainly, but not always tied to cooler areas and granite type rock areas. This means the relevant species are usually found in uplands in the northern parts of the general distribution (i.e. northern New South Wales, far south Queensland, more northern parts of South Australia in the Flinders Ranges), while extending to lower altitude areas further south (e.g. Kangaroo Island in South Australia).

It is uncertain if the climatic factors, substrates, competing species or a combination of these are the main factors constraining extant distributions of and movements of the relevant species.

In terms of *H. keilleri* sp. nov. and each of the other relevant species, it is important to spell out the differences between each as essential parts of this diagnosis.

*H. decresiensis* is herein confined to Kangaroo Island, South Australia.

The morphologically similar putative taxon (herein treated as a full species, but only tentatively), *H. continentis* (Copland, 1946) is herein restricted to nearby parts of south-east South Australia, generally in the region including the Adelaide Hills, with the bulk of the population found between Victor Harbour in the south and Burra in the north, with the population not extending any further east than the Coorong in the south, or beyond the Murray River further north.

*H. awe* sp. nov. is the divergent taxon found in the cooler parts of the Flinders Ranges around Wilpena Pound and potentially other nearby locations.

*H. pailsorum* sp. nov. is the isolated population found in the Mount Arapiles area west of the Grampians in western Victoria.

*H. keilleri* sp. nov. is found in association with the granitic hills from Mount Kerang (Wedderburn) in the north, south through the associated hills to the connected Pyrenees and Mount Buangor ranges (around Beaufort), all in western Victoria, Australia.

*H. talbingoensis* (Copland, 1946) is the species found in the Granite belt of the western side of the Great Dividing Range from near Yea in central Victoria, generally north and east of there to about Goulburn in New South Wales.

*H. namatjira* Wells and Wellington, 1985 is found generally north of Goulburn in New South Wales, north to about Mudgee and the Hunter Valley in New South Wales.

*H. davisii* (Copland, 1946) is found north of the Hunter Valley in the New England region, generally south of the line between Inverell and Glen Innes.

*H. kaputarensis* sp. nov. is an isolated, range-restricted morphologically divergent taxon confined to the high altitude Kaputar Range, north-west New South Wales, being some 70 km from the nearest population of *H. davisii* to the east.

*H. dorsei* sp. nov. is a range restricted taxon confined to the high altitude Granite Belt, around Stanthorpe in far southern Queensland, separated by a relatively rock-free zone from *H. davisii* to the south.

The preceding species are separated from one another by the following suites of characters:

*H. decresiensis* has 24-26 midbody scale rows; is light greyish brown on the dorsal surface and greyish on the flanks. Black peppering on the back barely tends to form dorso-linear stripes. The black border extending along the upper flank is thick.

*H. continentis* has 24-26 midbody scale rows; and is a dark grey brown lizard, being this colour both dorsally and on most of the flanks, although the lower flanks are more whitish in colour. Black peppering on the back barely tends to form dorso-linear stripes. The black border extending along the upper flank is very thin and with an ill-defined lower boundary.

*H. awe* sp. nov. is similar in most respects to *H. continentis* detailed above, but is separated from that form by being more chocolate brown in dorsal colour and similar on the flanks, including the lower flanks which remain brownish and the fact that the black border extending along the upper flank has a well defined upper and lower edge.

*H. pailsorum* sp. nov. has 24-26 midbody scale rows; it is light brown on the dorsum and creamish on the flanks. There is a thick black line forming the border of the upper flank, which extends unbroken along the entire length of the (original) tail. Dorsally there is spotting composed of scattered moderate sized black spots, tending to form semi-distinct and broken lines. While black spots or peppering are on the centre of most scales on the dorsum in the other species in the complex, *H. pailsorum* sp. nov. is unusual in that this is not quite the case, with black spotting tending to be scattered, especially at the anterior part of the dorsum. Lower labials are strongly barred. There are no scattered white spots or flecks on the side of the tail.

*H. keilleri* sp. nov. has 24-26 midbody scale rows; is a dark brownish to brownish grey on the dorsal surface. The black line at the top of the flank has a lower boundary that is often, but not always poorly defined, below which is a light brownish or grey colouration before becoming lighter at the lower edge of the flank. On the upper surface the dark spotting at the centre of each scale is reasonably large and well defined to give the lizard an appearance of having moderately well-defined lines running down the dorsum, the spotting itself being slightly broken. There are scattered white spots or flecks on the side of the tail. Lower labials are either all brownish or grey or otherwise strongly etched around the edges brownish-grey and white in the centres.

*H. talbingoensis* has 22 midbody scale rows; the dorsum is a dark brown colour and a brownish-grey on the lower flank; the black line of the upper flank is very wide, with a poorly defined lower edge.

Dorsally the dark spotting or markings are typically either blurred or broken, especially on the posterior part of the body, meaning the appearance of stripes on the dorsum is often not there or only at the anterior part of the body. Striping of any form from the dorsum does not continue onto the tail. Upper and lower labials are a mixture of white and brownish, mainly brownish, but without any obvious patterning or markings.

*H. namatjira* has 20 midbody scale rows (rarely 18 or 22); is a boldly marked lizard, with well-defined black lines running down the dorsum of the body and continuing down the tail where they break to become lines of well-defined blackish spots. The black line on the top of the lateral edge of the flank is thin and well-defined. Mid and lower flank is whitish-grey. Upper labials are mainly dark, with white bars. The dorsum itself is a light beige-brown colour.

*H. davisii* is similar in most respects to *H. namatjira* above, but separated from *H. namatjira* by having a moderately thick line on the upper edge of the flank, below which is whitish grey and then below that another moderately thick black line on the mid to lower flank, which tends to break at the posterior end. This lower line is unique to this species and the morphologically similar *H. dorsei* sp. nov.. The dorsum itself is a beige-grey colour. The head is a light grey colour with only limited black peppering.

*H. dorsei* sp. nov. is similar in most respects to *H. davisii* above, but separated from that species by the increased amount of black pigment on the upper surface of the head, especially

towards the snout, and the fact that the pair of black lines running down the dorsum are thicker and more prominent. The anterior of the body also has a strong and lighter brownish tinge (as compared to the lower part of the body); the light scales (or parts of them) that are between the black lines running down either side of the midline are of a slightly different colour to those outside these lines, which is apparently unique to this species. Adults observed appear to be more thick set in build than seen in *H. davisii* or for that matter any other species in the complex.

*H. kaputarensis* sp. nov. has 20 midbody scale rows; it is a lizard that appears to be a plain brown colour when viewed at a distance; stripes on the dorsum are either faded or absent and usually dark brown rather than blackish in colour, meaning that they often appear to blend in with the surrounding scale colouration, although some aberrant specimens are very boldly striped with unusually thick stripes.

While the dorsum is invariably brownish in colour, the upper surface of the head is a darker brown or grey colour, but does not appear blackish towards the snout, have any obvious marks or flecks or rapid colour change at any point. Upper and lower labials are also brownish, but with small white centres. Sides of the tail are boldly dark flecked at the anterior end.

All the preceding species *H. decresiensis* (Cuvier, 1829), *H. continentis* (Copland, 1946), *H. awe* sp. nov., *H. pailsorum* sp. nov., *H. keilleri* sp. nov., *H. talbingoensis* (Copland, 1946), *H. namatjira* Wells and Wellington, 1985, *H. davisii* (Copland, 1946), *H. kaputarensis* sp. nov. and *H. dorsei* sp. nov. being the entirety of the genus *Hemiergus* Wagler, 1830 as defined in this paper, are separated from all other species within *Hemiergus sensu* Cogger (2014), being the genera *Chelomeles* Duméril and Bibron, 1839 (type species *Chelomeles quadrilineatus* Duméril and Bibron, 1839), *Arenicolascincus* Wells and Wellington, 1985 (type species *Hemiergus millewae* Coventry, 1976), *Patheticoscincus* Wells and Wellington, 1984 (type species *Lygosoma australis* Gray, 1839), *Eroticoscincus* Wells and Wellington, 1984, (type species *Lygosoma graciloides* Lönnberg and Andersson, 1913) and *Anepischetosia* Wells and Wellington, 1985 (type species *Siaphos maccoyi* Lucas and Frost, 1894) by having tridactyle limbs with second toes only being slightly longer than the third (versus much longer in the genus *Chelomeles* Duméril and Bibron, 1839).

All the preceding genera are separated from all other Australian skinks by the following suite of characters: Parietal shields in contact behind the interparietal; lower eyelid is movable with a transparent disc; limbs short, usually separated by at least several scale lengths when adpressed;

supranasals usually absent; nasals small to moderate and usually separated; fingers 2-5, toes 2-5; ear opening is either small or in specimens with five fingers and five toes is hidden. They are cryptozoic, fossorial, small, slender, smooth-scaled skinks (modified and corrected from Cogger 2014).

*H. decresiensis* in life is depicted Wilson and Swan (2021) on page 341 at top right and online at:

<https://www.inaturalist.org/observations/73883044>

and

<https://www.inaturalist.org/observations/73882340>

and

<https://www.inaturalist.org/observations/6880996>

*H. continentis* in life is depicted in Wilson and Swan (2021) on page 341 at top left and online at:

<https://www.inaturalist.org/observations/100106076>

and

<https://www.flickr.com/photos/128497936@N03/50183308686/>

and

<https://www.flickr.com/photos/stephenmahony/52860519424/>

and

<https://www.flickr.com/photos/126237772@N07/31545804293/>

and

<https://www.flickr.com/photos/126237772@N07/31514451484/>  
 and  
<https://www.flickr.com/photos/ryanfrancis/52020686868/>  
*H. pailsorum* sp. nov. is depicted in life online at:  
<https://www.flickr.com/photos/126237772@N07/49903278286/>  
 and  
<https://www.flickr.com/photos/127392361@N04/49903286101/>  
 and  
<https://www.inaturalist.org/observations/153528278>  
*H. keilleri* sp. nov. is depicted in life online at:  
<https://www.flickr.com/photos/68921296@N06/7991310532/>  
 and  
<https://www.flickr.com/photos/68921296@N06/7991299111/>  
 and  
<https://www.inaturalist.org/observations/37502548>  
 and  
<https://www.inaturalist.org/observations/144710964>  
 and  
<https://www.inaturalist.org/observations/64154617>  
 and  
<https://www.inaturalist.org/observations/64229366>  
*H. talbingoensis* is depicted in life in Wilson and Swan (2021) on page 345 at bottom and online at:  
[https://www.flickr.com/photos/ken\\_griffiths\\_photography/40306479154/](https://www.flickr.com/photos/ken_griffiths_photography/40306479154/)  
 and  
<https://www.inaturalist.org/observations/99854026>  
 and  
<https://www.inaturalist.org/observations/119837457>  
 and  
<https://www.flickr.com/photos/189037423@N06/51288445179/>  
 and  
<https://www.flickr.com/photos/189037423@N06/51288445169/>  
*H. namatjira* is depicted in life in Hoser (1989) on page 98 at middle left, Cogger (2014) on page 577 at bottom, Swan *et al.* (2022) on page 172 top and online at:  
<https://www.flickr.com/photos/shaneblackfnq/18604715978/>  
 and  
<https://www.inaturalist.org/observations/57303146>  
 and  
<https://www.inaturalist.org/observations/8410443>  
*H. davisii* is depicted in life in Wilson and Swan (2021) on page 343 middle right and online at:  
<https://www.flickr.com/photos/126237772@N07/47509260012/>  
 and  
<https://www.inaturalist.org/observations/130747870>  
 and  
<https://www.inaturalist.org/observations/134584279>  
 and  
<https://www.inaturalist.org/observations/130597944>  
*H. kaputarensis* sp. nov. is depicted in life online at:  
<https://www.flickr.com/photos/171250498@N08/51282573293/>  
 and  
<https://www.flickr.com/photos/ryanfrancis/40026976514/>  
 and  
[https://www.flickr.com/photos/zimny\\_anders/52903501674/](https://www.flickr.com/photos/zimny_anders/52903501674/)  
 and  
<https://www.inaturalist.org/observations/69663574>  
 and  
<https://www.inaturalist.org/observations/42467274>  
 and  
<https://www.inaturalist.org/observations/61527956>  
**Distribution:** *H. kaputarensis* sp. nov. is only known from the immediate vicinity of Mount Kaputar in New South Wales,

Australia and appears restricted to this locality. While very abundant at this location, heavily surveyed nearby areas (flat areas) have not yielded specimens of this taxon.

*H. davisii* found in the main part of the New England region is separated by a relatively flat zone of about 70 km in a straight line from this isolated species.

**Etymology:** *H. kaputarensis* sp. nov. is named in reflection of from where this taxon occurs.

**HEMIERGIS DORSEI SP. NOV.**

**LSIDurn:lsid:zoobank.org:act:B8210D46-9AD8-4C37-9B32-08AA604F5823**

**Holotype:** A preserved specimen at the National Museum of Victoria, Melbourne, Victoria, Australia, specimen number D9393 collected from 7.5 km west of Amiens, south-east Queensland, Australia, Latitude -28.58 S., Longitude 151.73 E.

This government-owned facility allows access to its holdings.

**Diagnosis:** *Hemiergis keilleri* sp. nov., *H. pailsorum* sp. nov., *H. kaputarensis* sp. nov., *H. dorsei* sp. nov. and *H. awe* sp. nov. are five of several species until now treated by most authors as populations of the well-known species *H. decresiensis* (Cuvier, 1829), a putative taxon until now treated as occupying the arc from south-east Queensland to south-east South Australia, mainly, but not always tied to cooler areas and granite type rock areas. This means the relevant species are usually found in uplands in the northern parts of the general distribution (i.e. northern New South Wales, far south Queensland, more northern parts of South Australia in the Flinders Ranges), while extending to lower altitude areas further south (e.g. Kangaroo Island in South Australia).

It is uncertain if the climatic factors, substrates, competing species or a combination of these are the main factors constraining extant distributions of and movements of the relevant species.

In terms of *H. keilleri* sp. nov. and each of the other relevant species, it is important to spell out the differences between each as essential parts of this diagnosis.

*H. decresiensis* is herein confined to Kangaroo Island, South Australia.

The morphologically similar putative taxon (herein treated as a full species, but only tentatively), *H. continentis* (Copland, 1946) is herein restricted to nearby parts of south-east South Australia, generally in the region including the Adelaide Hills, with the bulk of the population found between Victor Harbour in the south and Burra in the north, with the population not extending any further east than the Coorong in the south, or beyond the Murray River further north.

*H. awe* sp. nov. is the divergent taxon found in the cooler parts of the Flinders Ranges around Wilpena Pound and potentially other nearby locations.

*H. pailsorum* sp. nov. is the isolated population found in the Mount Arapiles area west of the Grampians in western Victoria.

*H. keilleri* sp. nov. is found in association with the granitic hills from Mount Kerang (Wedderburn) in the north, south through the associated hills to the connected Pyrenees and Mount Buangor ranges (around Beaufort), all in western Victoria, Australia.

*H. talbingoensis* (Copland, 1946) is the species found in the Granite belt of the western side of the Great Dividing Range from near Yea in central Victoria, generally north and east of there to about Goulburn in New South Wales.

*H. namatjira* Wells and Wellington, 1985 is found generally north of Goulburn in New South Wales, north to about Mudgee and the Hunter Valley in New South Wales.

*H. davisii* (Copland, 1946) is found north of the Hunter Valley in the New England region, generally south of the line between Inverell and Glen Innes.

*H. kaputarensis* sp. nov. is an isolated, range-restricted morphologically divergent taxon confined to the high altitude Kaputar Range, north-west New South Wales, being some 70 km

from the nearest population of *H. davisii* to the east.

*H. dorsei* sp. nov. is a range restricted taxon confined to the high altitude Granite Belt, around Stanthorpe in far southern Queensland, separated by a relatively rock-free zone from *H. davisii* to the south.

The preceding species are separated from one another by the following suites of characters:

*H. decresiensis* has 24-26 midbody scale rows; is light greyish brown on the dorsal surface and greyish on the flanks. Black peppering on the back barely tends to form dorso-linear stripes. The black border extending along the upper flank is thick.

*H. continentis* has 24-26 midbody scale rows; and is a dark grey brown lizard, being this colour both dorsally and on most of the flanks, although the lower flanks are more whitish in colour. Black peppering on the back barely tends to form dorso-linear stripes. The black border extending along the upper flank is very thin and with an ill-defined lower boundary.

*H. awe* sp. nov. is similar in most respects to *H. continentis* detailed above, but is separated from that form by being more chocolate brown in dorsal colour and similar on the flanks, including the lower flanks which remain brownish and the fact that the black border extending along the upper flank has a well defined upper and lower edge.

*H. pailsorum* sp. nov. has 24-26 midbody scale rows; it is light brown on the dorsum and creamish on the flanks. There is a thick black line forming the border of the upper flank, which extends unbroken along the entire length of the (original) tail. Dorsally there is spotting composed of scattered moderate sized black spots, tending to form semi-distinct and broken lines. While black spots or peppering are on the centre of most scales on the dorsum in the other species in the complex, *H. pailsorum* sp. nov. is unusual in that this is not quite the case, with black spotting tending to be scattered, especially at the anterior part of the dorsum. Lower labials are strongly barred. There are no scattered white spots or flecks on the side of the tail.

*H. keilleri* sp. nov. has 24-26 midbody scale rows; is a dark brownish to brownish grey on the dorsal surface. The black line at the top of the flank has a lower boundary that is often, but not always poorly defined, below which is a light brownish or grey colouration before becoming lighter at the lower edge of the flank. On the upper surface the dark spotting at the centre of each scale is reasonably large and well defined to give the lizard an appearance of having moderately well-defined lines running down the dorsum, the spotting itself being slightly broken. There are scattered white spots or flecks on the side of the tail. Lower labials are either all brownish or grey or otherwise strongly etched around the edges brownish-grey and white in the centres.

*H. talbingoensis* has 22 midbody scale rows; the dorsum is a dark brown colour and a brownish-grey on the lower flank; the black line of the upper flank is very wide, with a poorly defined lower edge.

Dorsally the dark spotting or markings are typically either blurred or broken, especially on the posterior part of the body, meaning the appearance of stripes on the dorsum is often not there or only at the anterior part of the body. Striping of any form from the dorsum does not continue onto the tail. Upper and lower labials are a mixture of white and brownish, mainly brownish, but without any obvious patterning or markings.

*H. namatjira* has 20 midbody scale rows (rarely 18 or 22); is a boldly marked lizard, with well-defined black lines running down the dorsum of the body and continuing down the tail where they break to become lines of well-defined blackish spots. The black line on the top of the lateral edge of the flank is thin and well-defined. Mid and lower flank is whitish-grey. Upper labials are mainly dark, with white bars. The dorsum itself is a light beige-brown colour.

*H. davisii* is similar in most respects to *H. namatjira* above, but separated from *H. namatjira* by having a moderately thick line on the upper edge of the flank, below which is whitish grey and

then below that another moderately thick black line on the mid to lower flank, which tends to break at the posterior end. This lower line is unique to this species and the morphologically similar *H. dorsei* sp. nov.. The dorsum itself is a beige-grey colour. The head is a light grey colour with only limited black peppering.

*H. dorsei* sp. nov. is similar in most respects to *H. davisii* above, but separated from that species by the increased amount of black pigment on the upper surface of the head, especially towards the snout, and the fact that the pair of black lines running down the dorsum are thicker and more prominent. The anterior of the body also has a strong and lighter brownish tinge (as compared to the lower part of the body); the light scales (or parts of them) that are between the black lines running down either side of the midline are of a slightly different colour to those outside these lines, which is apparently unique to this species. Adults observed appear to be more thick set in build than seen in *H. davisii* or for that matter any other species in the complex.

*H. kaputarensis* sp. nov. has 20 midbody scale rows; it is a lizard that appears to be a plain brown colour when viewed at a distance; stripes on the dorsum are either faded or absent and usually dark brown rather than blackish in colour, meaning that they often appear to blend in with the surrounding scale colouration, although some aberrant specimens are very boldly striped with unusually thick stripes.

While the dorsum is invariably brownish in colour, the upper surface of the head is a darker brown or grey colour, but does not appear blackish towards the snout, have any obvious marks or flecks or rapid colour change at any point. Upper and lower labials are also brownish, but with small white centres. Sides of the tail are boldly dark flecked at the anterior end.

All the preceding species *H. decresiensis* (Cuvier, 1829), *H. continentis* (Copland, 1946), *H. awe* sp. nov., *H. pailsorum* sp. nov., *H. keilleri* sp. nov., *H. talbingoensis* (Copland, 1946), *H. namatjira* Wells and Wellington, 1985, *H. davisii* (Copland, 1946), *H. kaputarensis* sp. nov. and *H. dorsei* sp. nov. being the entirety of the genus *Hemiergus* Wagler, 1830 as defined in this paper, are separated from all other species within *Hemiergus sensu* Cogger (2014), being the genera *Chelomeles* Duméril and Bibron, 1839 (type species *Chelomeles quadrilineatus* Duméril and Bibron, 1839), *Arenicolascincus* Wells and Wellington, 1985 (type species *Hemiergus millewae* Coventry, 1976), *Patheticoscincus* Wells and Wellington, 1984 (type species *Lygosoma australis* Gray, 1839), *Eroticoscincus* Wells and Wellington, 1984, (type species *Lygosoma graciloides* Lönnberg and Andersson, 1913) and *Anepischetosia* Wells and Wellington, 1985 (type species *Siaphos maccoyi* Lucas and Frost, 1894) by having tridactyle limbs with second toes only being slightly longer than the third (versus much longer in the genus *Chelomeles* Duméril and Bibron, 1839).

All the preceding genera are separated from all other Australian skinks by the following suite of characters: Parietal shields in contact behind the interparietal; lower eyelid is movable with a transparent disc; limbs short, usually separated by at least several scale lengths when adpressed;

supranasals usually absent; nasals small to moderate and usually separated; fingers 2-5, toes 2-5; ear opening is either small or in specimens with five fingers and five toes is hidden. They are cryptozoic, fossorial, small, slender, smooth-scaled skinks (modified and corrected from Cogger 2014).

*H. decresiensis* in life is depicted Wilson and Swan (2021) on page 341 at top right and online at:

<https://www.inaturalist.org/observations/73883044>

and

<https://www.inaturalist.org/observations/73882340>

and

<https://www.inaturalist.org/observations/6880996>

*H. continentis* in life is depicted in Wilson and Swan (2021) on page 341 at top left and online at:

<https://www.inaturalist.org/observations/100106076>

and  
<https://www.flickr.com/photos/128497936@N03/50183308686/>  
 and  
<https://www.flickr.com/photos/stephenmahony/52860519424/>  
 and  
<https://www.flickr.com/photos/126237772@N07/31545804293/>  
 and  
<https://www.flickr.com/photos/126237772@N07/31514451484/>  
 and  
<https://www.flickr.com/photos/ryanfrancis/52020686868/>  
*H. pailsorum* sp. nov. is depicted in life online at:  
<https://www.flickr.com/photos/126237772@N07/49903278286/>  
 and  
<https://www.flickr.com/photos/127392361@N04/49903286101/>  
 and  
<https://www.inaturalist.org/observations/153528278>  
*H. keilleri* sp. nov. is depicted in life online at:  
<https://www.flickr.com/photos/68921296@N06/7991310532/>  
 and  
<https://www.flickr.com/photos/68921296@N06/7991299111/>  
 and  
<https://www.inaturalist.org/observations/37502548>  
 and  
<https://www.inaturalist.org/observations/144710964>  
 and  
<https://www.inaturalist.org/observations/64154617>  
 and  
<https://www.inaturalist.org/observations/64229366>  
*H. talbingoensis* is depicted in life in Wilson and Swan (2021) on page 345 at bottom and online at:  
[https://www.flickr.com/photos/ken\\_griffiths\\_photography/40306479154/](https://www.flickr.com/photos/ken_griffiths_photography/40306479154/)  
 and  
<https://www.inaturalist.org/observations/99854026>  
 and  
<https://www.inaturalist.org/observations/119837457>  
 and  
<https://www.flickr.com/photos/189037423@N06/51288445179/>  
 and  
<https://www.flickr.com/photos/189037423@N06/51288445169/>  
*H. namatjira* is depicted in life in Hoser (1989) on page 98 at middle left, Cogger (2014) on page 577 at bottom, Swan *et al.* (2022) on page 172 top and online at:  
<https://www.flickr.com/photos/shaneblackfnq/18604715978/>  
 and  
<https://www.inaturalist.org/observations/57303146>  
 and  
<https://www.inaturalist.org/observations/8410443>  
*H. davisii* is depicted in life in Wilson and Swan (2021) on page 343 middle right and online at:  
<https://www.flickr.com/photos/126237772@N07/47509260012/>  
 and  
<https://www.inaturalist.org/observations/130747870>  
 and  
<https://www.inaturalist.org/observations/134584279>  
 and  
<https://www.inaturalist.org/observations/130597944>  
*H. kaputarensis* sp. nov. is depicted in life online at:  
<https://www.flickr.com/photos/171250498@N08/51282573293/>  
 and  
<https://www.flickr.com/photos/ryanfrancis/40026976514/>  
 and  
[https://www.flickr.com/photos/zimny\\_anders/52903501674/](https://www.flickr.com/photos/zimny_anders/52903501674/)  
 and

<https://www.inaturalist.org/observations/69663574>  
 and  
<https://www.inaturalist.org/observations/42467274>  
 and  
<https://www.inaturalist.org/observations/61527956>

**Distribution:** *H. dorsei* sp. nov. is only known from the Granite belt of far south-east Queensland and possibly immediately adjacent parts of far northern New South Wales (e.g. Bolivia Hill). It is separated by a relatively rock free zone from the taxon *H. davisii*, found in a line generally south of Inverell/Glen Innes in the rest of the New England region, which in turn is separated by the Hunter Valley to the south from its next congener, *H. namatjira*.  
**Etymology:** *H. dorsei* sp. nov. is named in honour of wildlife displayer Marc Dorse of Toowoomba, Queensland, Australia (as of 2023) in recognition of his many contributions to herpetology in Australia.

**HEMERGIS AWE SP. NOV.**

**LSID**Durn:lsid:zoobank.org:act:D282E75D-C79B-4085-A2A5-684DFDD39451

**Holotype:** A preserved specimen at the South Australian Museum, Adelaide, South Australia, Australia, specimen number R53231 collected from 5.5 km west, north-west of Wilpena Pound Chalet, Wilpena Pound, South Australia, Australia, Latitude -31.5061 S., Longitude 138.5519 E.

This government-owned facility allows access to its holdings.

**Paratype:** A preserved specimen at the South Australian Museum, Adelaide, South Australia, Australia, specimen number R60931 collected from 3.8km north, north-east of Rawnsley Park Homestead, South Australia, Australia, Latitude -31.6228 S., Longitude 138.6131 E.

**Diagnosis:** *Hemiergis keilleri* sp. nov., *H. pailsorum* sp. nov., *H. kaputarensis* sp. nov., *H. dorsei* sp. nov. and *H. awe* sp. nov. are five of several species until now treated by most authors as populations of the well-known species *H. decresiensis* (Cuvier, 1829), a putative taxon until now treated as occupying the arc from south-east Queensland to south-east South Australia, mainly, but not always tied to cooler areas and granite type rock areas. This means the relevant species are usually found in uplands in the northern parts of the general distribution (i.e. northern New South Wales, far south Queensland, more northern parts of South Australia in the Flinders Ranges), while extending to lower altitude areas further south (e.g. Kangaroo Island in South Australia).

It is uncertain if the climatic factors, substrates, competing species or a combination of these are the main factors constraining extant distributions of and movements of the relevant species.

In terms of *H. keilleri* sp. nov. and each of the other relevant species, it is important to spell out the differences between each as essential parts of this diagnosis.

*H. decresiensis* is herein confined to Kangaroo Island, South Australia.

The morphologically similar putative taxon (herein treated as a full species, but only tentatively), *H. continentis* (Copland, 1946) is herein restricted to nearby parts of south-east South Australia, generally in the region including the Adelaide Hills, with the bulk of the population found between Victor Harbour in the south and Burra in the north, with the population not extending any further east than the Coorong in the south, or beyond the Murray River further north.

*H. awe* sp. nov. is the divergent taxon found in the cooler parts of the Flinders Ranges around Wilpena Pound and potentially other nearby locations.

*H. pailsorum* sp. nov. is the isolated population found in the Mount Arapiles area west of the Grampians in western Victoria.

*H. keilleri* sp. nov. is found in association with the granitic hills from Mount Kerang (Wedderburn) in the north, south through the associated hills to the connected Pyrenees and Mount Buangor

ranges (around Beaufort), all in western Victoria, Australia.

*H. talbingoensis* (Copland, 1946) is the species found in the Granite belt of the western side of the Great Dividing Range from near Yea in central Victoria, generally north and east of there to about Goulburn in New South Wales.

*H. namatjira* Wells and Wellington, 1985 is found generally north of Goulburn in New South Wales, north to about Mudgee and the Hunter Valley in New South Wales.

*H. davisii* (Copland, 1946) is found north of the Hunter Valley in the New England region, generally south of the line between Inverell and Glen Innes.

*H. kaputarensis* sp. nov. is an isolated, range-restricted morphologically divergent taxon confined to the high altitude Kaputar Range, north-west New South Wales, being some 70 km from the nearest population of *H. davisii* to the east.

*H. dorsei* sp. nov. is a range restricted taxon confined to the high altitude Granite Belt, around Stanthorpe in far southern Queensland, separated by a relatively rock-free zone from *H. davisii* to the south.

The preceding species are separated from one another by the following suites of characters:

*H. decrensiensis* has 24-26 midbody scale rows; is light greyish brown on the dorsal surface and greyish on the flanks. Black peppering on the back barely tends to form dorso-linear stripes. The black border extending along the upper flank is thick.

*H. continentis* has 24-26 midbody scale rows; and is a dark grey brown lizard, being this colour both dorsally and on most of the flanks, although the lower flanks are more whitish in colour. Black peppering on the back barely tends to form dorso-linear stripes. The black border extending along the upper flank is very thin and with an ill-defined lower boundary.

*H. awe* sp. nov. is similar in most respects to *H. continentis* detailed above, but is separated from that form by being more chocolate brown in dorsal colour and similar on the flanks, including the lower flanks which remain brownish and the fact that the black border extending along the upper flank has a well defined upper and lower edge.

*H. pailsorum* sp. nov. has 24-26 midbody scale rows; it is light brown on the dorsum and creamish on the flanks. There is a thick black line forming the border of the upper flank, which extends unbroken along the entire length of the (original) tail. Dorsally there is spotting composed of scattered moderate sized black spots, tending to form semi-distinct and broken lines. While black spots or peppering are on the centre of most scales on the dorsum in the other species in the complex, *H. pailsorum* sp. nov. is unusual in that this is not quite the case, with black spotting tending to be scattered, especially at the anterior part of the dorsum. Lower labials are strongly barred. There are no scattered white spots or flecks on the side of the tail.

*H. keilleri* sp. nov. has 24-26 midbody scale rows; is a dark brownish to brownish grey on the dorsal surface. The black line at the top of the flank has a lower boundary that is often, but not always poorly defined, below which is a light brownish or grey colouration before becoming lighter at the lower edge of the flank. On the upper surface the dark spotting at the centre of each scale is reasonably large and well defined to give the lizard an appearance of having moderately well-defined lines running down the dorsum, the spotting itself being slightly broken. There are scattered white spots or flecks on the side of the tail. Lower labials are either all brownish or grey or otherwise strongly etched around the edges brownish-grey and white in the centres.

*H. talbingoensis* has 22 midbody scale rows; the dorsum is a dark brown colour and a brownish-grey on the lower flank; the black line of the upper flank is very wide, with a poorly defined lower edge.

Dorsally the dark spotting or markings are typically either blurred or broken, especially on the posterior part of the body, meaning the appearance of stripes on the dorsum is often not there or only at the anterior part of the body. Striping of any form from the

dorsum does not continue onto the tail. Upper and lower labials are a mixture of white and brownish, mainly brownish, but without any obvious patterning or markings.

*H. namatjira* has 20 midbody scale rows (rarely 18 or 22); is a boldly marked lizard, with well-defined black lines running down the dorsum of the body and continuing down the tail where they break to become lines of well-defined blackish spots. The black line on the top of the lateral edge of the flank is thin and well-defined. Mid and lower flank is whitish-grey. Upper labials are mainly dark, with white bars. The dorsum itself is a light beige-brown colour.

*H. davisii* is similar in most respects to *H. namatjira* above, but separated from *H. namatjira* by having a moderately thick line on the upper edge of the flank, below which is whitish grey and then below that another moderately thick black line on the mid to lower flank, which tends to break at the posterior end. This lower line is unique to this species and the morphologically similar *H. dorsei* sp. nov.. The dorsum itself is a beige-grey colour. The head is a light grey colour with only limited black peppering.

*H. dorsei* sp. nov. is similar in most respects to *H. davisii* above, but separated from that species by the increased amount of black pigment on the upper surface of the head, especially towards the snout, and the fact that the pair of black lines running down the dorsum are thicker and more prominent. The anterior of the body also has a strong and lighter brownish tinge (as compared to the lower part of the body); the light scales (or parts of them) that are between the black lines running down either side of the midline are of a slightly different colour to those outside these lines, which is apparently unique to this species. Adults observed appear to be more thick set in build than seen in *H. davisii* or for that matter any other species in the complex.

*H. kaputarensis* sp. nov. has 20 midbody scale rows; it is a lizard that appears to be a plain brown colour when viewed at a distance; stripes on the dorsum are either faded or absent and usually dark brown rather than blackish in colour, meaning that they often appear to blend in with the surrounding scale colouration, although some aberrant specimens are very boldly striped with unusually thick stripes.

While the dorsum is invariably brownish in colour, the upper surface of the head is a darker brown or grey colour, but does not appear blackish towards the snout, have any obvious marks or flecks or rapid colour change at any point. Upper and lower labials are also brownish, but with small white centres. Sides of the tail are boldly dark flecked at the anterior end.

All the preceding species *H. decrensiensis* (Cuvier, 1829), *H. continentis* (Copland, 1946), *H. awe* sp. nov., *H. pailsorum* sp. nov., *H. keilleri* sp. nov., *H. talbingoensis* (Copland, 1946), *H. namatjira* Wells and Wellington, 1985, *H. davisii* (Copland, 1946), *H. kaputarensis* sp. nov. and *H. dorsei* sp. nov. being the entirety of the genus *Hemiergus* Wagler, 1830 as defined in this paper, are separated from all other species within *Hemiergus sensu* Cogger (2014), being the genera *Chelomeles* Duméril and Bibron, 1839 (type species *Chelomeles quadrilineatus* Duméril and Bibron, 1839), *Arenicolascincus* Wells and Wellington, 1985 (type species *Hemiergus millewae* Coventry, 1976), *Patheticoscincus* Wells and Wellington, 1984 (type species *Lygosoma australis* Gray, 1839), *Eroticoscincus* Wells and Wellington, 1984, (type species *Lygosoma graciloides* Lönnberg and Andersson, 1913) and *Anepischetosia* Wells and Wellington, 1985 (type species *Siaphos maccoyi* Lucas and Frost, 1894) by having tridactyle limbs with second toes only being slightly longer than the third (versus much longer in the genus *Chelomeles* Duméril and Bibron, 1839).

All the preceding genera are separated from all other Australian skinks by the following suite of characters: Parietal shields in contact behind the interparietal; lower eyelid is movable with a transparent disc; limbs short, usually separated by at least several scale lengths when adpressed; supranasals usually absent; nasals small to moderate and usually separated; fingers 2-5, toes 2-5; ear opening is either



small or in specimens with five fingers and five toes is hidden. They are cryptozoic, fossorial, small, slender, smooth-scaled skinks (modified and corrected from Cogger 2014).

*H. decresiensis* in life is depicted Wilson and Swan (2021) on page 341 at top right and online at:

<https://www.inaturalist.org/observations/73883044>

and

<https://www.inaturalist.org/observations/73882340>

and

<https://www.inaturalist.org/observations/6880996>

*H. continentis* in life is depicted in Wilson and Swan (2021) on page 341 at top left and online at:

<https://www.inaturalist.org/observations/100106076>

and

<https://www.flickr.com/photos/128497936@N03/50183308686/>

and

<https://www.flickr.com/photos/stephenmahony/52860519424/>

and

<https://www.flickr.com/photos/126237772@N07/31545804293/>

and

<https://www.flickr.com/photos/126237772@N07/31514451484/>

and

<https://www.flickr.com/photos/ryanfrancis/52020686868/>

*H. pailsorum* sp. nov. is depicted in life online at:

<https://www.flickr.com/photos/126237772@N07/49903278286/>

and

<https://www.flickr.com/photos/127392361@N04/49903286101/>

and

<https://www.inaturalist.org/observations/153528278>

*H. keilleri* sp. nov. is depicted in life online at:

<https://www.flickr.com/photos/68921296@N06/7991310532/>

and

<https://www.flickr.com/photos/68921296@N06/7991299111/>

and

<https://www.inaturalist.org/observations/37502548>

and

<https://www.inaturalist.org/observations/144710964>

and

<https://www.inaturalist.org/observations/64154617>

and

<https://www.inaturalist.org/observations/64229366>

*H. talbingoensis* is depicted in life in Wilson and Swan (2021) on page 345 at bottom and online at:

[https://www.flickr.com/photos/ken\\_griffiths\\_photography/40306479154/](https://www.flickr.com/photos/ken_griffiths_photography/40306479154/)

and

<https://www.inaturalist.org/observations/99854026>

and

<https://www.inaturalist.org/observations/119837457>

and

<https://www.flickr.com/photos/189037423@N06/51288445179/>

and

<https://www.flickr.com/photos/189037423@N06/51288445169/>

*H. namatjira* is depicted in life in Hoser (1989) on page 98 at middle left, Cogger (2014) on page 577 at bottom, Swan *et al.* (2022) on page 172 top and online at:

<https://www.flickr.com/photos/shaneblackfnq/18604715978/>

and

<https://www.inaturalist.org/observations/57303146>

and

<https://www.inaturalist.org/observations/8410443>

*H. davisii* is depicted in life in Wilson and Swan (2021) on page 343 middle right and online at:

<https://www.flickr.com/photos/126237772@N07/47509260012/>

and

<https://www.inaturalist.org/observations/130747870>

and

<https://www.inaturalist.org/observations/134584279>

and

<https://www.inaturalist.org/observations/130597944>

*H. kaputarensis* sp. nov. is depicted in life online at:

<https://www.flickr.com/photos/171250498@N08/51282573293/>

and

<https://www.flickr.com/photos/ryanfrancis/40026976514/>

and

[https://www.flickr.com/photos/zimny\\_anders/52903501674/](https://www.flickr.com/photos/zimny_anders/52903501674/)

and

<https://www.inaturalist.org/observations/69663574>

and

<https://www.inaturalist.org/observations/42467274>

and

<https://www.inaturalist.org/observations/61527956>

**Distribution:** *H. awe* sp. nov. is only known from the northern part of the Flinders Ranges in South Australia and appears to be geographically disjunct from populations within the same genus further south.

A similar situation appears to exist with respect of geckos in the genus *Underwoodisaurus* Wermuth, 1965 (see material cited in Hoser 2016) or *Crinia* Tschudi, 1838 (see material cited in Hoser 2020).

**Etymology:** *H. awe* sp. nov. is the name given to the taxon by local Adnyamathanha people, being the "first nations" people from the area.

The name derives from when these lizards are found by lifting rocks and the exclamation made, "awe".

They are commonly confused with small snakes when first seen.

Small children find these lizards when looking for insects and other curiosities, whereas adult people tend not to look for them by lifting rocks for fear of finding venomous snakes.

#### **ARENICOLASCINCUS BONFIRE SP. NOV.**

**LSID**Durn:lsid:zoobank.org:act:D2F4C6C6-ABB6-4F26-B626-8889BF48A29E

**Holotype:** A preserved specimen at the South Australian Museum, Adelaide, South Australia, Australia, specimen number R57695 collected from 11.5 km west, south-west of Pinkawillinie, (near Kimba) South Australia, Australia, Latitude -33.1033 S., Longitude 136.0636 E.

This government-owned facility allows access to its holdings.

**Paratypes:** Three preserved specimens at the South Australian Museum, Adelaide, South Australia, Australia, specimen numbers R57714 and R57715 both collected from 5.6 km north, north-west of Waddikee, South Australia, Australia, Latitude -33.2686 S., Longitude 136.2467 E. and specimen number R17142 collected from near the Pinkawillinie Nature Reserve, (near Kimba) South Australia, Australia, Latitude -33.1033 S., Longitude 136.0636 E.

**Diagnosis:** Until now, all publishing herpetologists have treated putative "*Hemiergis millewae* Coventry, 1976" as a single wide-ranging species found inhabiting Spinifex areas in southern Australia, from western Victoria to eastern Western Australia and including nearby southern New South Wales and drier near coastal regions of South Australia.

Exceptional to that were Wells and Wellington, 1985, who not only transferred the putative species to their erected genus *Arenicolascincus*, but also placed the far west Australian population into a new species, *A. lami*.

Significant is that as recently as 2023, both names are universally ignored by all publishing herpetologists and this is neither scientific or tenable.

In terms of the genus, *Arenicolascincus*, the type species "*Hemiergis millewae* Coventry, 1976" has been shown in a

number of calibrated phylogenies (including Skinner *et al.* 2013) to have diverged from its nearest relatives 15 MYA confirming the correctness of the Wells and Wellington action and so it is followed here, irrespective of any arguments put by Wells and Wellington in 1985.

Morphological divergence of the relevant species also supports the actions of Wells and Wellington.

In terms of their taxon, *A. lami* Wells and Wellington, 1985, I note the claim by their detractors, including Peter Uetz in his non ICZN "the reptile database", (last checked in early 2023) that it is "*nomen nudem*".

That statement is false.

The deliberate and reckless lie of Uetz and others in the Wolfgang Wuster gang of thieves is shown by simple cross-referencing of the Wells and Wellington description from 1985 with the *International Code of Zoological Nomenclature* (any of editions 2-4), including the given definitions of "*nomen nudem*", and it is self evident that the Wells and Wellington description is both code compliant and not a *nomen nudem*.

In terms of the taxon itself, it is quite divergent morphologically from eastern congeners and so is quite properly recognized herein as a species taxon under the name *A. lami*.

Suffice to say that if I thought that the name *A. lami* was "unavailable", I would not have hesitated to rename it, but to do so, when it is obviously available, is nothing less than an act of egregious taxonomic vandalism and to which I will not knowing be a party to.

Besides *A. millewae* (Coventry, 1976), with a type locality of Millewa South Bore in western Victoria, Australia, Latitude 34.5628 S., Longitude 141.4 E., being the form from the sandy areas of western Victoria and nearby parts of south-east South Australia and southern New South Wales, and *A. lami* from the eastern Goldfields region of south-east Western Australia, at least two other forms warrant species-level recognition.

These are *A. bonfire* *sp. nov.* from the Eyre Peninsula region of South Australia, and *A. wha* *sp. nov.* from the Barrier Range in New South Wales.

The four species are readily separated from one another by the following unique suites of characters:

*Arenicolascincus millewae* of the type form is a lizard with a chocolate-brown dorsum, an ill-defined boundary between the colour of the upper flank (reddish tinge) and the dorsum (brownish) an orange distal end of the tail (original tail) and dark barring at the rear of each upper labial, that may be either weakly or well defined. The upper surface of the head is a similar colour to that of the dorsum.

*A. lami* is a lighter yellowish-brown lizard with white upper labials and no obvious line separating the upper and lateral surfaces. Midway down the flank is a weakly defined boundary between the yellowish brown dorsum and the whitish venter, the degree of infusion of the ventral colour on the flank, being between a third and half of this surface, versus far less than a third in the other three (eastern) species. The upper surface of the head is noticeably dark grey, in contrast to the lighter dorsal body colour.

*A. bonfire* *sp. nov.* is a lizard with a reddish-brown dorsum, no obvious reddening or orange colour of the tail at the distal end, a weakly defined boundary between the dorsal and lateral edge and mainly dark coloured upper labials (versus mainly white in *A. millewae*). The upper surface of the head is a similar colour to that of the dorsum.

*A. wha* *sp. nov.* is reddish brown on the dorsum, with the reddish colour most intense on the outer edges, where it forms a strong, well-defined line separating it from the dark greyish-brown flanks, the colour extending to the lower edge. Upper labials are strongly etched dark brownish-grey with white. Whereas the dorsal surface of the head is generally plain in colour in the other three preceding species, in *A. wha* *sp. nov.* the upper surface is a combination of dark and light pigment in the form of etched scales or marbling, of which the upper labials form the most

boldly marked part. These markings extend to the back of the head and upper neck, from where the colour abruptly changes to the plain and relatively uniform dorsal colouration posterior to that, this including the latter part of the neck and body. Farquhar (2020) also noted that *A. wha* *sp. nov.* had 15 lamellae under the fourth toe (as compared to 12-14 in Coventry's type species for *A. millewae*) and 8 supraciliary scales (versus 9 in Coventry's type specimen of *A. millewae*).

All the four preceding species, forming the entirety of the genus *Arenicolascincus* Wells and Wellington, 1985 are separated from all other species of Australian skink, by the following unique combination of characters: Smooth scaled-elongate skink lizards, usually found in association with *Triodia* habitat in southern Australia, limbs so small that when adpressed, they remain separated by at least 6 scales; a lower eyelid that is scaly and with an opaque scaly disc; with pentadactyle limbs; deep ear depression; separated nasals; supranasals absent; narrowly separated prefrontals; usually 2 nuchals; 6-9 supraciliaries; 7 supralabials (usually 5 is subocular); parietal shields in contact behind the interparietal; 12-16 lamellae under the fourth toes (modified from Wells and Wellington, 1985, Cogger, 2014, Farquhar 2020, as well as the result of inspection of more than 100 additional specimens from South Australia, Western Australia and Victoria).

*A. millewae* in life is depicted in Cogger (2014) on page 576 top left and online at:

<https://www.flickr.com/photos/190014189@N06/51676968242/> and

<https://www.flickr.com/photos/euprepiosaur/52237543529/> and

<https://www.flickr.com/photos/127392361@N04/48018287851/>

*A. lami* in life is depicted in Storr, Smith and Johnstone (1981) in plate 2, bottom right and online at:

<https://www.flickr.com/photos/124699310@N06/14493776395/>

*A. bonfire* *sp. nov.* is depicted in life online at:

<https://www.flickr.com/photos/127392361@N04/50704693253/> and

<https://www.inaturalist.org/observations/125406908>

and

<https://www.inaturalist.org/observations/100386270>

and

<https://www.inaturalist.org/observations/136010452>

*H. wha* *sp. nov.* (the holotype) is depicted in life in Farquhar (2020) on page 637 in Fig. 1. and the same animal (same photo) is depicted online at:

<https://www.flickr.com/photos/126237772@N07/50651053563/>

**Distribution:** *A. bonfire* *sp. nov.* appears to be confined to the Eyre Peninsula and immediately adjacent areas of southern South Australia.

**Etymology:** Named in reflection of how I first found specimens of this species near Whyalla in South Australia. For full details refer to Hoser (1996), available online at <http://www.smuggled.com/hersa.htm>

**ARENICOLASCINCUS WHA SP. NOV.**

**LSIDurn:lsid:zoobank.org:act:93B2718A-7056-42F6-A01E-F3BA4C830284**

**Holotype:** A preserved specimen at the Australian Museum, Sydney, New South Wales, Australia, specimen number R.185794 collected from the Silverton Wind Farm, Barrier Range, western New South Wales, Australia, Latitude -31.77322 S., Longitude 141.25031 E.

This government-owned facility allows access to its holdings.

**Diagnosis:** Until now, all publishing herpetologists have treated putative "*Hemiergis millewae* Coventry, 1976" as a single wide-ranging species found inhabiting Spinifex areas in southern Australia, from western Victoria to eastern Western Australia and including nearby southern New South Wales and drier near coastal regions of South Australia.

Exceptional to that were Wells and Wellington, 1985, who not only transferred the putative species to their erected genus *Arenicolascincus*, but also placed the far west Australian population into a new species, *A. lami*.

Significant is that as recently as 2023, both names are universally ignored by all publishing herpetologists and this is neither scientific or tenable.

In terms of the genus, *Arenicolascincus*, the type species "*Hemiergis millewae* Coventry, 1976" has been shown in a number of calibrated phylogenies including Skinner *et al.* (2013) to have diverged from its nearest relatives 15 MYA confirming the correctness of the Wells and Wellington action and so it is followed here, irrespective of any arguments put by Wells and Wellington in 1985.

Morphological divergence of the relevant species also supports the actions of Wells and Wellington.

In terms of their taxon, *A. lami* Wells and Wellington, 1985, I note the claim by their detractors, including Peter Uetz in his non ICZN "the reptile database", (last checked in 2023) that it is "*nomen nudem*".

That statement is false.

The lie of Uetz and others in the Wolfgang Wuster gang of thieves is shown by simple cross-referencing of the Wells and Wellington description from 1985 with the *International Code of Zoological Nomenclature* (any of editions 2-4), including the given definitions of "*nomen nudem*", and it is self evident that the Wells and Wellington description is both code compliant and not a *nomen nudem*.

In terms of the taxon itself, it is quite divergent morphologically from eastern congeners and so is quite properly recognized herein as a species taxon under the name *A. lami*.

Suffice to say that if I thought that the name *A. lami* was "unavailable", I would not have hesitated to rename it, but to do so, when it is obviously available, is nothing less than an act of egregious taxonomic vandalism and to which I will not knowing be a party to.

Besides *A. millewae* (Coventry, 1976), with a type locality of Millewa South Bore in western Victoria, Australia, Latitude 34.5628 S., Longitude 141.4 E., being the form from the sandy areas of western Victoria and nearby parts of south-east South Australia and southern New South Wales, and *A. lami* from the eastern Goldfields region of south-east Western Australia, at least two other forms warrant species-level recognition.

These are *A. bonfire sp. nov.* from the Eyre Peninsula region of South Australia, and *A. wha sp. nov.* from the Barrier Range in New South Wales.

The four species are readily separated from one another by the following unique suites of characters:

*Arenicolascincus millewae* of the type form is a lizard with a chocolate-brown dorsum, an ill-defined boundary between the colour of the upper flank (reddish tinge) and the dorsum (brownish) an orange distal end of the tail (original tail) and dark barring at the rear of each upper labial, that may be either weakly or well defined. The upper surface of the head is a similar colour to that of the dorsum.

*A. lami* is a lighter yellowish-brown lizard with white upper labials and no obvious line separating the upper and lateral surfaces. Midway down the flank is a weakly defined boundary between the yellowish brown dorsum and the whitish venter, the degree of infusion of the ventral colour on the flank, being between a third and half of this surface, versus far less than a third in the other three (eastern) species. The upper surface of the head is noticeably dark grey, in contrast to the lighter dorsal body colour.

*A. bonfire sp. nov.* is a lizard with a reddish-brown dorsum, no obvious reddening or orange colour of the tail at the distal end, a weakly defined boundary between the dorsal and lateral edge and mainly dark coloured upper labials (versus mainly white in *A. millewae*). The upper surface of the head is a similar colour to that of the dorsum.

*A. wha sp. nov.* is reddish brown on the dorsum, with the reddish colour most intense on the outer edges, where it forms a strong, well-defined line separating it from the dark greyish-brown flanks, the colour extending to the lower edge. Upper labials are strongly etched dark brownish-grey with white. Whereas the dorsal surface of the head is generally plain in colour in the other three preceding species, in *A. wha sp. nov.* the upper surface is a combination of dark and light pigment in the form of etched scales or marbling, of which the upper labials form the most boldly marked part. These markings extend to the back of the head and upper neck, from where the colour abruptly changes to the plain and relatively uniform dorsal colouration posterior to that, this including the latter part of the neck and body. Farquhar (2020) also noted that *A. wha sp. nov.* had 15 lamellae under the fourth toe (as compared to 12-14 in Coventry's type species for *A. millewae*) and 8 supraciliary scales (versus 9 in Coventry's type specimen of *A. millewae*).

All the four preceding species, forming the entirety of the genus *Arenicolascincus* Wells and Wellington, 1985 are separated from all other species of Australian skink, by the following unique combination of characters: Smooth scaled-elongate skink lizards, usually found in association with *Triodia* habitat in southern Australia, limbs so small that when adpressed, they remain separated by at least 6 scales; a lower eyelid that is scaly and with an opaque scaly disc; with pentadactyle limbs; deep ear depression; separated nasals; supranasals absent; narrowly separated prefrontals; usually 2 nuchals; 6-9 supraciliaries; 7 supralabials (usually 5 is subocular); parietal shields in contact behind the interparietal; 12-16 lamellae under the fourth toes (modified from Wells and Wellington, 1985, Cogger, 2014, Farquhar (2020) and the result of inspection of more than 100 additional specimens from Western Australia, South Australia and Victoria).

*A. millewae* in life is depicted in Cogger (2014) on page 576 top left and online at:

<https://www.flickr.com/photos/190014189@N06/51676968242/>

and

<https://www.flickr.com/photos/euprepiosaur/52237543529/>

and

<https://www.flickr.com/photos/127392361@N04/48018287851/>

*A. lami* in life is depicted in Storr, Smith and Johnstone (1981) in plate 2, bottom right and online at:

<https://www.flickr.com/photos/124699310@N06/14493776395/>

*A. bonfire sp. nov.* is depicted in life online at:

<https://www.flickr.com/photos/127392361@N04/50704693253/>

and

<https://www.inaturalist.org/observations/125406908>

and

<https://www.inaturalist.org/observations/100386270>

and

<https://www.inaturalist.org/observations/136010452>

*H. wha sp. nov.* (the holotype) is depicted in life in Farquhar (2020) on page 637 in Fig. 1. And the same animal (same photo) is depicted online at:

<https://www.flickr.com/photos/126237772@N07/50651053563/>

**Distribution:** *A. wha sp. nov.* is only known from the type locality and can reasonably be assumed to be a Barrier Range endemic, restricted to pockets of relatively scattered suitable habitat as detailed by Farquhar (2020).

**Etymology:** Named in reflection of the exclamation made by the Wilyakali people (the local native inhabitants of the region) when burning highly flammable *Triodia* bushes upon seeing these small lizards wriggle out from the flames.

In the first instance they are commonly confused with young snakes, which as a rule strike fear into the local people.

***PATHETICOSCINCUS AGH SP. NOV.***

<https://www.zoobank.org/NomenclaturalActs/2eaa4f3d-abe6-4f83-87ba-83823909c7b4>

**Holotype:** A preserved male specimen at the Western Australian Museum, Perth, Western Australia, Australia, specimen number R119725 collected from Sampson Brook, 7 km east of Hamel, Western Australia, Australia, Latitude -32.883333 S., Longitude 115.983333 E.

This government-owned facility allows access to its holdings.

**Paratypes:** Three preserved specimens at the Western Australian Museum, Perth, Western Australia, Australia, specimen number R138001 collected 10.8 km east of Waroona, Western Australia, Australia, Latitude -32.85 S., Longitude 116.033333 E. and specimen numbers R116935 and R116936, both being females collected from 10 km south-east of Capel, Western Australia, Australia, Latitude -33.616667 S., Longitude 115.616667 E.

**Diagnosis:** Until now *Patheticoscincus agh sp. nov.* has been treated as a north-western population of *P. australis* (Gray, 1839), AKA *P. gracilipes* (Steindachner, 1870), a putative species from south-west Australia.

Cogger *et al.* (1983) and later authors appear to have misread the relevant provisions of the *International Code of Zoological Nomenclature*, (which happens to be the same in editions 2-4) in using the later name in preference of the earlier one, which is why I follow Storr (1967) and Wells and Wellington (1985) in using the name *P. australis* for the relevant taxon

*P. australis* is found from about Brooke Inlet in south-west Australia (Latitude -34.933333 S., Longitude 116.533333 E.) eastwards along the south-coastal region to Cheyne Beach, Western Australia (Latitude -34.883333 S., Longitude 118.4 E.).

*P. agh sp. nov.* is found from the D'Entrecasteaux National Park in the south (Latitude -34.416667 S., Longitude 115.75 E.) northwards along the coast to near Waroona (Latitude -32.85 S., Longitude 116.033333 E.) in Western Australia, Australia.

*P. agh sp. nov.* is readily separated from *P. australis* by having 19 midbody rows (versus 20-22 in *P. australis*), 16 subdigital lamellae under the fourth toe (versus 18-23 in *P. australis*), 5 supraciliaries (versus 6-7 in *P. australis*). In colouration, *P. agh sp. nov.* is usually somewhat darker than *P. australis* and on the tail there is two well-defined dark blackish stripes running down either side, with minimal white spots or intrusions, versus either an absence of that configuration or if present, with numerous white spots or intrusions over the black.

The two species within *Patheticoscincus* Wells and Wellington, 1984 are separated from all other Australian skinks by the following suite of characters: Smooth scaled-elongate skink lizards, from south-west Australia; limbs so small that when adpressed, they remain separated by at least 6 scales; a lower eyelid with a small transparent disc; with pentadactyle limbs; 16-23 subdigital lamellae under the fourth toe; deep ear depression; separated nasals; supranasals absent; narrowly separated prefrontals; usually 2 nuchals; 5-7 supraciliaries; 7 supralabials; parietal shields in contact behind the interparietal; postmental contacting two infralabials on either side (modified from Wells and Wellington, 1985, Cogger, 2014, and the result of inspection of additional specimens from South-west Western Australia).

The type form of *Patheticoscincus australis* is depicted in Cogger (2014) on page 574 bottom, Storr, Smith and Johnstone (1981) in plate 17 (4) and online at:

<https://www.flickr.com/photos/136643623@N03/39792768063/>  
and

<https://www.flickr.com/photos/euprepiosaur/52921552874/>  
and

<https://www.flickr.com/photos/171250498@N08/52911465641/>  
*P. agh sp. nov.* is depicted in life in Wilson and Swan (2021) on page 341 middle left.

**Distribution:** *P. agh sp. nov.* is found from the D'Entrecasteaux

National Park in the south (Latitude -34.416667 S., Longitude 115.75 E.) northwards along the coast to near Waroona (Latitude -32.85 S., Longitude 116.033333 E.) in Western Australia, Australia.

**Etymology:** The Noongars being the original inhabitants of the south-west Australian coast, where this taxon occurred, would exclaim "agh" when they saw these lizards wriggling in the substrate, often mistaking them for small snakes, which they feared greatly.

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CONFLICT OF INTEREST - NONE.

## Two new species and thirteen new subspecies within the Australian Skink genus *Eremiascincus* Greer, 1979.

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### ABSTRACT

It has been common knowledge among Australian herpetologists that the species diversity within the Australian skink genus *Eremiascincus* Greer, 1979 has been underestimated.

To partially correct this situation, obviously divergent forms are herein formally named as new species or subspecies in accordance with the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

Within the *E. isolepis* (Boulenger, 1887) complex, five species are recognized herein, being *E. isolepis*, *E. foresti* (Kinghorn, 1932) and *E. harwoodi* (Wells and Wellington, 1985) as well as two newly named forms. North Queensland specimens referred to the taxon are herein formally named as a new species *E. gudjal* sp. nov. and specimens from the Arnhem Land escarpment in the Northern Territory are formally named *E. yolngu* sp. nov..

In addition to this, within each of *E. isolepis* and *E. foresti* a new subspecies is formally named for the first time being *E. isolepis jinigudera* subsp. nov. and *E. foresti martu* subsp. nov..

The species *E. musivus*, Mecke, Doughty and Donnellan, 2009 is also formally divided into two subspecies, with the north eastern population being of the newly named and divergent form, being *E. musivus oculorum* subsp. nov..

The species *E. pallida* (Günther, 1875) is split into two divergent subspecies, with the south-western form formally named for the first time as *E. pallida flavescens* subsp. nov..

The northern outlier population of *E. intermedia* (Sternfeld, 1919) from the mid-north of the Northern Territory around the upper reaches of the Roper River system, which has a consistently higher number of body bands is formally named as the subspecies *E. intermedia yungman* subsp. nov..

*E. richardsonii* (Gray, 1845) is divided into ten morphologically divergent subspecies, including the nominate form and the resurrected "*Hinulia ambigua* De Vis, 1888" as one of them and eight newly named forms being, *E. richardsonii djaru* subsp. nov., *E. richardsonii yindjibarndi* subsp. nov., *E. richardsonii nyiyarparli* subsp. nov., *E. richardsonii baiyungu* subsp. nov., *E. richardsonii ngaanyatjarra* subsp. nov., *E. richardsonii neglectas* subsp. nov., *E. richardsonii pindiini* subsp. nov. and *E. richardsonii wiradjuri* subsp. nov..

The basis of the taxonomic actions has been a thorough review of all previously published relevant literature, including molecular data that indicates divergent lineages as well as inspection of relevant specimens of the putative taxa.

Each newly named form appears to have been allopatrically separated from their nearest relatives by barriers formed from differing habitat, sometimes combined with the impact of closely related and competing species, in particular others within *Eremiascincus*.

**Keywords:** Australia; skink; reptile; taxonomy; nomenclature; *Eremiascincus*; *Mawsoniascincus*; *Sphenomorphus*; *Hinulia*; *Eremiascincus*; *isolepis*; *foresti*; *harwoodi*; *musivus*; *pallida*; *fasciolatus*; *intermedius*; new species; *gudjal*; *yolngu*; new subspecies; *jinigudera*; *martu*; *oculorum*; *flavescens*; *yungman*; *djaru*; *yindjibarndi*; *nyiyarparli*; *baiyungu*; *ngaanyatjarra*; *neglectas*; *pindiini*; *wiradjuri*.

## INTRODUCTION

It has been common knowledge among Australian herpetologists for many years, that the species diversity within the Australian “sand-swimming” skink genus *Eremiascincus* Greer, 1979 has been underestimated.

The genus was first defined by Greer in 1979, consisting of just two putative species, being *E. fasciolatus* (Günther, 1867) and *E. richardsonii* (Gray, 1845).

Previously various other forms were described, but were synonymised within these two taxa as detailed in Cogger *et al.* (1983).

In the decades post-dating the publication of Cogger *et al.* (1983), other species have been added to the genus *Eremiascincus*, by way of resurrecting forms from synonymy, descriptions of new species and the transfer of morphologically similar species into the genus following molecular studies.

Wilson and Swan (2021) claim 11 species within continental Australia and there are another five described forms from the lesser Sundas (3 islands), these consisting of all the widely recognized forms, as in those that appear within contemporary texts.

Notable is that within this collection of named and recognized taxa within the genus *Eremiascincus*, is the conspicuous absence of the form formally named by Wells and Wellington (1985), originally described as “*Glaphyromorphus harwoodi* Wells and Wellington, 1985”, and later synonymised with *E. isolepis* (Boulenger, 1887) by all later authors without explanation or evidence in support of the action.

Obviously that putative taxon (*Glaphyromorphus harwoodi* Wells and Wellington, 1985) was first among many synonym forms that needed to be assessed critically to see if they were in fact valid forms and not merely synonyms as was generally thought.

In terms of “*Glaphyromorphus harwoodi* Wells and Wellington, 1985”, it was a taxon I had inspected in the wild on a number of occasions and I was well convinced that there is no way, it was merely another population of the type form of *E. isolepis* (Boulenger, 1887) as was being stated by relevant publishing “herpetologists” in Australia, either directly or by inference. It was a substantially larger, more heavily built lizard. It was of different colour, habits and also allopatric to the type population of *E. isolepis* (Boulenger, 1887).

It was also separated from *E. isolepis* by a number of known biogeographical barriers and within a wholly divergent and different eco-system.

Anyone can simply go to a photo-sharing website such as “Inaturalist” or “Flickr” and confirm the obvious fact that *E. isolepis* and *E. harwoodi* are not of the same species.

Hence it appears that the non-recognition of *E. harwoodi* as a valid species has been a direct result of the unscientific anti Wells and Wellington doctrine being promulgated by Richard Shine and others in Australian herpetology, as detailed in Hoser (2007) and elsewhere.

The preceding example of non-recognition of a divergent form in the genus *Eremiascincus* is mentioned to indicate an obvious need to re-assess the genus, with a view to formally identifying unrecognized and divergent forms in the complex and preferably before any may become extinct.

Hence the audit of the genus and the final publication of this paper. To partially correct this situation, obviously divergent forms were scrutinized to see if they should be recognized as either species or subspecies and if no synonym names were available, then to formally name them in accordance with the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999) as amended (ICZN 2012).

## MATERIALS AND METHODS

Specimens of all recognized putative species within *Eremiascincus* Greer, 1979, *sensu* Wilson and Swan (2021), including the five non-Australian species from the Lesser Sundas (Timor, Wetar and Sumba) were inspected from across the putative ranges for each putative taxon.

This included dead, live and photos with good locality data.

Consistent differences were noted and ultimately matched with the ranges of different forms and as a rule were found to be distributed

allopatric to other like specimens of closest related forms.

Relevant literature was also consulted to confirm the absence of any possible synonym forms or names of any potential newly identified taxa, which did not exist beyond those outlined already, or if there were synonym names available, whether or not they could be used for any given newly identified form (herein).

Publications relevant to the ultimate taxonomic and nomenclatural conclusions made herein included

Aplin *et al.* (1993), Boulenger (1887, 1897), Brongersma (1942), Brown (2014), Chapple *et al.* (2019), Cogger (2014), Cogger *et al.* (1983), de Rooij (1915), De Vis (1888), Dunn (1927), Glauert (1960), Gray (1842, 1845), Greer (1979, 1990), Günther (1867, 1875), Hoser (1989, 1991, 2007, 2012, 2015a-g, 2017, 2018, 2019a-b, 2020), Kinghorn (1932), Lidth de Jeude (1895), Mecke and Doughty (2018), Mecke *et al.* (2009, 2013), Mertens (1928, 1930), Peters (1966), Reeder (2003), Ride *et al.* (1999), Shea and Sadlier (1999), Singhal *et al.* (2018), Skinner *et al.* (2013), Smith (1927, 1937), Steindachner (1867), Sternfeld (1919), Storr (1967, 1972, 1974), Swan *et al.* (2022), Swanson (1976), Wells (2009), Wells and Wellington (1984, 1985), Werner (1910), Wilson (2022), Wilson and Knowles (1988), Wilson and Swan (2021) and sources cited therein.

## RESULTS

Numerous potentially previously unnamed forms were identified and it was soon apparent that they should all carry proper scientific names.

Relevant synonyms lists for Australian species that have synonyms are published within Cogger *et al.* (1983) and Wells (2009) and are therefore not formally given here again.

In terms of the putative species *E. isolepis* (Boulenger, 1887), it became clear that within this wide-ranging putative species that there were multiple forms.

Five species are recognized herein, including the previously named *E. isolepis* with a type locality of Nichol Bay, Western Australia), *E. foresti* (Kinghorn, 1932), with a type locality of Forrest River, East Kimberley District in Western Australia and *E. harwoodi* (Wells and Wellington, 1985), with a type locality of Brunette Downs Station in the Barkly Tableland District of the Northern Territory as well as two newly named forms. Each of the three preceding forms generally occupy the areas of their type localities, except for *E. harwoodi* which also appears to occupy most of the top third of the Northern Territory, including around Lawn Hill in far north-west Queensland. North-east Queensland specimens referred to the taxon are herein formally named as a new species *E. gudjal sp. nov.*, generally occurring in the dry zone of the lower Cape York, west to about Hughenden.

Specimens from the Arnhem Land escarpment in the Northern Territory are formally named *E. yolngu sp. nov.* and appear to be range restricted to the relevant sandstone plateaux.

There is no molecular basis to divide the five taxa (no data), but each are allopatric to each other and significantly different in form. Furthermore, the two newly named forms occur in areas of known endemism, the north-east Queensland species also being separated from its morphology divergent nearest relative by a wide zone of unsuitable black-soil habitat (the north-central Queensland fold).

In addition to this, within each of *E. isolepis* and *E. foresti* a new subspecies is formally named for the first time being *E. isolepis jinigudera subsp. nov.* and *E. foresti martu subsp. nov.*

The molecular basis for the formal recognition of the divergent form *E. foresti* as being separate from *E. isolepis* is seen in Mecke *et al.* (2009). I note that Wells and Wellington (1985) set a precedent in formally recognising *E. foresti* as valid and no basis to reject this position has even been advanced by any herpetologist within Australia at any time.

This paper also gives a molecular basis to separate each of the preceding two mentioned subspecies, which also happen to morphologically divergent.

The populations are allopatric and separated by known biogeographical barriers, so the subspecies-level differentiation is not altogether surprising.

In terms of the species *E. harwoodi* (Wells and Wellington, 1985), I



simply mention that it is morphologically the most divergent form of the complex within putative *E. isolepis* as currently recognized that it is astounding that it hasn't been widely recognized to date.

Because there is no formal description of that taxon within this paper, and the taxon is not well known in Australian herpetology, I give some relevant identifying information about this species.

*E. harwoodi* is readily separated from all others in the putative *E. isolepis* complex by the distinctive light yellow-brown dorsum, versus reddish or grey brown in the other species, upper labials (numbering 7) that are white and with light brown etchings, but no dark etching, or bars, or alternating dark reddish-brown and white; there is heavy peppering on the mid dorsum forming what appears to be a darker line down the midline, and plain brown or reduced markings on the dorso-lateral edge.

The species also considerably larger and more robust in build than either *E. isolepis* and *E. foresti* being with a snout-vent length of 40-86 mm, mean of 64.6 mm, versus 29-72 mm, mean of 52 in both *E. isolepis* and *E. foresti* (see Storr 1972).

Wells and Wellington (1985) wrote that their taxon "is another of a growing list of endemic species from the black soil plains of the Barkly Tablelands".

That does not appear to be strictly true.

*E. harwoodi* appears to be most abundant in elevated and sandy areas adjacent to the black soil plains both on the Barkly Tablelands and to the north and west of there, rather than the black soil areas themselves. Brunette Downs Station and Rockhampton Downs Station immediately to the west have considerable areas of elevated land with mainly red dirt, not covered in black soil as seen more commonly to the south and south-east and also to a lesser extent, within parts of these large commercial properties.

The distribution of *E. harwoodi*, does occupy areas with black soil on some occasions, but only when there are intervening dunes or other sandy soils, from where the main populations seem to be found. They otherwise appear to be absent from the expansive black soil plains themselves.

The species *E. musivus*, Mecke, Doughty and Donnellan, 2009, with a type locality of 20 km east north-east of Karratha, Western Australia is also formally divided into two subspecies, with the allopatric north eastern population being of the newly named and divergent form, being *E. musivus oculorum subsp. nov.*

Again Mecke *et al.* (2009) gives a molecular basis to explain the allopatric divergence and explanation for the consistent physical differences between specimens in each population.

The species *E. pallida* (Günther, 1875), with a type locality of Nickol Bay, Western Australia is split into two divergent subspecies, with the south-western form formally named for the first time as *E. pallida flavescens subsp. nov.*

*E. intermedia* (Sternfeld, 1919), with a type locality of Hermannsburg Mission, Central Australia, Northern Territory is split into two regionally allopatric subspecies.

The divergent form, which has a consistently higher number of body bands, from the mid-north of the Northern Territory, generally being found in moderately elevated areas around the upper reaches of the Roper River system, is formally named as the subspecies *E. intermedia yungman subsp. nov.*

The pan Australian taxon, *E. richardsonii* (Gray, 1845), with a type locality of Houtman's Abrolhos, Western Australia, with the associated junior synonym of the proximally close *E. monotropis* (Boulenger, 1887) with a type locality of Chapiion Bay, Western Australia (herein treated as a synonym of the nominate form), is divided into ten morphologically divergent subspecies.

This is including the nominate form (combined with *E. monotropis*) and the resurrected "*Hinulia ambigua* De Vis, 1888", with a type locality of Charleville, Queensland, as another of them and eight newly named forms being, *E. richardsonii djaru subsp. nov.*, *E. richardsonii yindjibarndi subsp. nov.*, *E. richardsonii nyiyarparli subsp. nov.*, *E. richardsonii baiyungu subsp. nov.*, *E. richardsonii ngaanyatjarra subsp. nov.*, *E. richardsonii neglecta subsp. nov.*, *E. richardsonii pindiini subsp. nov.* and *E. richardsonii wiradjuri subsp. nov.*

Each form appears to be associated with a mountain range or otherwise elevated rocky area in areas known for endemism with

other saxacoline associated reptile taxa.

They appear to be morphologically divergent in each of the relevant areas, as detailed by Storr (1972 and 1974) and are largely split on a similar basis.

The main difference is the division of Pilbara and Kimberley specimens which he grouped together and are split here four ways on the basis of consistent differences and allopatry, across known biogeographical breaks.

These are populations within the East Kimberley (including referred populations from the west Kimberley district), North Pilbara (generally north of the Fortescue River), south Pilbara (generally south of the Fortescue River), and the Cape Range outlier.

I note that the number of described forms in the *E. richardsonii* complex is far higher than the already named number of subspecies forms in the *E. fasciolatus* complex, which occupies a similar pan Australian range.

However the two species are quite different in preferred habitats. They are usually exclusive of one another in that *E. richardsonii* occupies rocky areas and those immediately adjacent, whereas the *E. fasciolatus* complex species occupy the intervening areas, not necessarily tied to hills and rocks. It is this important factor that causes the putative *E. richardsonii* populations to allopatrically separate.

The decision to treat each of the ten forms as subspecies has been made in the absence of molecular data and none being likely in the near future.

Obviously if and when such data becomes available for the relevant forms, it may be necessary to elevate one or more to full species.

The basis of the taxonomic actions noted above has been a thorough review of all previously published relevant literature, including molecular data that indicates divergent lineages as well as through inspection of relevant specimens of the putative taxa.

Biogeographical evidence has also been assessed.

Each newly named form appears to have been allopatrically separated from their nearest relatives by barriers formed from differing habitat, sometimes combined with the impact of closely related and competing species, in particular others within *Eremiascincus*.

I note that the genus name *Mawsoniascincus* Wells and Wellington, 1985, type species "*Lygosoma isolepis* Boulenger, 1887" has been proposed.

The concept as most recently put forward in Wells (2009) is as follows:

"The genus *Mawsoniascincus* Wells and Wellington, 1985 is restricted to the *isolepis* complex of species - *Mawsoniascincus brongersmai* (Storr, 1972); *Mawsoniascincus douglasi* (Storr, 1967); *Mawsoniascincus foresti* (Kinghorn, 1932); *Mawsoniascincus harwoodi* (Wells and Wellington, 1985) comb. nov.; *Mawsoniascincus isolepis* (Boulenger, 1887)."

That genus concept is not at all supported by the phylogeny published by Mecke *et al.* (2009); see Fig 2, page 5.

At best it would be restricted to four species, not including the first two listed in the Wells account and additionally including *E. musivus*. However the type species for *Eremiascincus*, namely *E. richardsonii* is shown to be close in the same phylogeny, indicating synonymy is probably the best option.

That phylogeny is not calibrated and dated.

A different genus concept using the available name *Mawsoniascincus* Wells and Wellington, 1985 is seen in Skinner *et al.* (2013), see Fig. 1 on page 911, which shows putative *E. isolepis* on a stem by itself (separate from all other species within *Eremiascincus*), just under 10 MYA divergent from the rest in a calibrated tree.

This position if confirmed in later studies, may warrant recognition of *Mawsoniascincus* at some stage as either a subgenus (most likely on the basis of the above) or less likely as a full genus.

On the basis of the ambiguous molecular results just cited and as a matter of convenience, I choose not to use the available ICZN name *Mawsoniascincus*, with respect of the relevant taxa later in this paper.

#### NOTES ON THE SCIENTIFIC 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).

This includes if Latinisation is wrong, any apparent spelling mistakes and so on.

Any online citations within this paper, are not as a rule cited in the references part of this paper and have the same most recent viewing and checking date of 14 August 2023 (at which time they were still online as cited).

Unless otherwise stated explicitly, colour and other descriptions apply to living adult male specimens of generally good health, as seen by day and not under any form of stress by means such as excessive cool, heat, dehydration, excessive ageing, 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 the formal description and does not rely on material within publications not explicitly cited herein.

Photos of species or subspecies referred to within the formal descriptions (within publications and/or online) also have characters that conform to the diagnostic characters as stated in the descriptions.

In the unlikely event that someone seeks to synonymise forms formally named herein, the name to be used in the first instance is that which appears first in this paper by way of description and page priority as listed in the abstract keywords.

Some material within descriptions is repeated to ensure each fully complies with the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

#### CONSERVATION

The following taxa are formally named in accordance with the rules of ICZN as published in the *International Code of Zoological Nomenclature* (Ride *et al.* 1999). I do not use the alternative illegal nomenclature of the ever changing rules of the Wolfgang Wüster gang, as detailed in a blog document known as Wüster (2012), rebadged as Kaiser *et al.* (2013) (cited herein), as frequently amended since.

I also do not support the other illegal actions of the cohort, including thefts of live reptiles from wildlife displays, attempted theft of ICZN name authority by way of plagiarism of earlier papers and acts of taxonomic vandalism, unlawful telephone threats to kill (as confirmed in the law courts), physical and sexual violence against vulnerable women and children (as confirmed in the law courts), scientific fraud, running thousands of fake social media accounts for the purposes of spreading hate and lies (as confirmed in the law courts), scamming money from funding bodies on false pretences and other unlawful activity, as detailed by Goodman (2019), Hoser (2009, 2012a-b, 2013a-b, 2015a-f, 2016a, 2016b, 2019a-b) and sources cited therein.

In case it has not already been made clear, I note that in the 5 years preceding this publication, Australian law courts have found against members of the Wolfgang Wüster gang for acts of theft of snakes, criminal damage to property, intellectual property theft, trademark infringement, copyright infringement, making false complaints to government authorities to instigate illegal armed raids, running thousands of fake social media accounts for illegal activities, an unlawful attempt to defraud the Accor Hotels Group, shooting native Australian aboriginals, supporting international terrorist groups including ISIS, perjury and other serious criminal actions. Penalties have included fines, jail, numerous court restraining orders, as well as payment of damages and restitution (e.g. Goodman 2019).

Significantly the unlawful actions by the Wolfgang Wüster gang have serious negative conservation implications.

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

Also refer to the relevant comments within Hoser (1989, 1991, 1993, 1996 and 2007).

Therefore attempts by taxonomic vandals like the Wolfgang Wüster gang via Kaiser (2012a, 2012b, 2013, 2014a, 2014b) and Kaiser *et al.* (2013) (as frequently amended and embellished, e.g. Rhodin *et al.* 2015, Thiele *et al.* 2020, Hammer and Thiele 2021) to unlawfully suppress the recognition of these taxa on the basis they have a personal dislike for the person who formally named it should be resisted (e.g. Ceriaco *et al.* 2023, Cogger 2014, Dubois *et al.* 2019, Hawkeswood, 2021, Mosyakin 2022 and Wellington 2015).

Claims by the Wüster gang against this paper and the descriptions herein will no doubt be no different to those the gang have made previously, all of which were discredited long ago as outlined by Ceriaco *et al.* (2023), Cogger (2014), Cotton (2014), Dubois *et al.* (2019), Hawkeswood (2021), Hoser, (2007a-b, 2009a, 2012a, 2012c, 2013, 2015a-f, 2019a, 2019b), ICZN (1991, 2001, 2021), Mosyakin (2022), Wellington (2015) and sources cited therein.

#### *EREMIASCINCUS GUDJAL SP. NOV.*

**LSID**urn:lsid:zoobank.org:act:C0717B78-BF2B-405F-B69F-203CEE73169

**Holotype:** A preserved specimen at the Australian Museum, Sydney, New South Wales, Australia, specimen number R.63803 collected from Mount Surprise, North Queensland, Australia, Latitude -18.15 S., Longitude 144.316 E.

This government-owned facility allows access to its specimens.

**Paratypes:** Three preserved specimens at the Queensland Museum, Brisbane, Queensland, Australia, being 1/ Specimen number J59028, collected from Amber Station via Mount Surprise, North Queensland, Australia, Latitude -17.733333 S., Longitude 144.283333 E., 2/ Specimen number J60295 collected at "Croc Hole" Mount Surprise, North Queensland, Australia, Latitude 17.741667 S., Longitude 144.341667 E., 3/ Brodies Camp, near Bulleringa National Park, North Queensland, Australia, Latitude -17.678056 S., Longitude 143.9475 E.

**Diagnosis:** Until now *Eremiascincus gudjal sp. nov.* has been treated as an east Australian outlier population of *Eremiascincus isolepis* (Boulenger, 1887), with a type locality of Nickol Bay, Western Australia.

*E. gudjal sp. nov.* is separated from *E. isolepis* and related forms previously treated as putative *E. isolepis* the following suite of characters: Its larger size being a snout-vent of 68 mm, (versus an average of 52 mm in the type form of *E. isolepis*); a distinctive purplish pink upper surface of the snout and similar behind the eye and near the ear; upper and lower labials heavily barred purple and white, the purple being slightly wider than the white; above the eye on the scales on the bulge of the upper eye the colour is a dull greenish-yellow grey-brown; there is a brown dorsum that is indistinctly spotted purple, the spotting generally absent around the dorsolateral line, before reappearing on most of the flanks, below which white peppering grades onto the white lower surfaces. The speckled tail is a yellow-golden brown colour. Overall the colour is relatively light, sometimes giving an opaque appearance.

The only species within the complex until now treated as putative *E. isolepis* of similar large size to *E. gudjal sp. nov.* are *E. harwoodi*, type locality Brunette Downs, Northern Territory and occurring in most of the top third of the Northern Territory, as well as a small part of far north-west Queensland in the vicinity of Lawn Hill and *E. yolngu sp. nov.* from the Arnhem Land escarpment.

*E. harwoodi* is readily separated from all others in the putative *E. isolepis* complex by the distinctive light yellow-brown dorsum, versus reddish or grey brown in the other species, upper labials (numbering 7) that are white and with light brown etchings, but no dark etching, or bars, or alternating dark reddish-brown and white; heavy peppering on the mid dorsum forming what appears to be a darker line down the midline, and plain brown or reduced markings on the dorso-lateral edge.

The species also considerably larger and more robust in build than either *E. isolepis* and the closely related *E. foresti* (Kinghorn, 1932)

being with a snout-vent length of 40-86 mm, mean of 64.6 mm, versus 29-72 mm, mean of 52 in both *E. isolepis* and *E. foresti* (see Storr 1972).

Besides being a more thick-set species than *E. gudjal sp. nov.* and *E. yolngu sp. nov.*, *E. harwoodi* lacks the purplish-pink tinge over the dorsum and flanks, this tinge only being noticeable on the upper surfaces of the front limbs. The upper surfaces of the hind limbs are mainly a dull grey colour.

Another species in the *E. isolepis* complex, *E. foresti* with a type locality of the Forrest River, East Kimberley District, Western Australia, is most similar to *E. isolepis*, but was shown by the phylogeny of Mecke *et al.* (2009) at Fig. 2. to be a different species. It is readily separated from *E. isolepis* by being generally dark in dorsal colour (versus light) and with fewer midbody scale rows, being 25-30, mean 27.7, versus, 28-32, mean 30.6 in *E. isolepis* (Storr, 1972).

*E. foresti* of the nominate form is separated from all other species in the complex, as well as the subspecies *E. foresti martu subsp. nov.* by having the black peppering on the dorsum coalescing into two distinctive lines, running on either side of the vertebral line.

Furthermore *E. foresti martu subsp. nov.* has a dorsum that is uniform brown in colour and with black spots on the dorsum forming two distinct lines down the dorsum on either side of the vertebral line, as opposed to the thick peppering forming the lines on the back in type *E. foresti* or the similar black peppering across the dorsum seen in the other related taxa.

*E. foresti martu subsp. nov.* being the west Kimberley form of the species, has scattered semi-distinct white spots on the flanks, versus numerous distinct white spots on the flanks in the nominate form of *E. foresti*.

*E. isolepis jinigudera subsp. nov.* from the Cape Range of Western Australia and the Exmouth Gulf is separated from the nominate subspecies of *E. isolepis* found further north along the Pilbara Coast, north of Warraboo, by the presence of black on the upper flank being bound by white on the lower flank and both areas being distinct, and with a well defined border between the two, versus indistinct blackish on the upper flank and whitish below and without any well defined border in the nominate form of *E. isolepis*.

Both nominate *E. isolepis* and *E. isolepis jinigudera subsp. nov.* are separated from all related species by the presence of a pale brown dorsum with numerous black spots scattered fairly evenly across the entire dorsal surface, including all the way to the dorsolateral line and with no reduction either along the vertebral line or near the flanks.

These spots are highly contrasting in *E. isolepis jinigudera subsp. nov.*, but only moderately so in nominate *E. isolepis*.

The anterior upper surface of the tail in *E. isolepis jinigudera subsp. nov.* has more black than brown, versus the reverse in the nominate subspecies of *E. isolepis*.

*E. yolngu sp. nov.* a species confined to the Arnhem Land escarpment and adjacent formations in the Litchfield National Park area, is morphologically most similar to *E. gudjal sp. nov.* as defined and diagnosed above, but is separated from that species (and by extension, all the others) by having a more strongly purple colouration running through the otherwise brownish dorsum; an upper flank that is dark purple to purple-brown in colour, overlain with numerous evenly spaced, scattered white spots, versus brown with heavy purple peppering at the mid flank in *E. gudjal sp. nov.* and tiny dark specks or peppering on the dorsal surface, versus medium-sized regularly arranged dull spots on the dorsum in *E. gudjal sp. nov.*

Both species have heavily barred purple and white labials.

The morphologically similar, sometimes sympatric species *E. douglasi* (Storr, 1967), with a type locality of Darwin in the Northern Territory, is readily separated from *E. yolngu sp. nov.* by the presence of numerous bold white spots scattered across the flank.

The morphologically similar, sometimes sympatric species *E. darwiniensis* (Storr, 1967), with a type locality of Darwin, Northern Territory, is readily separated from *E. yolngu sp. nov.* by the fact that the adpressed limbs do not meet and are separated by noticeably more than the length of the forelimb; and 20-22 mid body rows, versus 24 or more in *E. yolngu sp. nov.*

All the preceding mentioned species and subspecies (except for *E. douglasi* and *E. darwiniensis*) are collectively separated from all other species within *Eremiascincus* Greer, 1979 by the following unique combination of characters:

Dorsal scales are smooth and without keels; adpressed limbs overlap or almost touch; mid dorsal and ventral scales are subequal; seven supralabials; no solid black dorsolateral stripe without spots or flecks; fourth toe lamellae are strongly keeled and those on the basal quarter are divided, 24 or more midbody rows (modified from Cogger 2014).

*E. isolepis* of the type form is depicted in life online at:

<https://www.flickr.com/photos/euprepiosaur/51018115301/>

and

<https://www.inaturalist.org/observations/153398277>

*E. gudjal sp. nov.* is depicted in life in Wilson (2022) on page 152 bottom right, and online at:

<https://www.flickr.com/photos/127392361@N04/51282980490/>

and

<https://www.flickr.com/photos/171250498@N08/51283163284/>

and

<https://www.flickr.com/photos/127392361@N04/49458338778/>

and

<https://www.flickr.com/photos/128497936@N03/38912302375/>

and

<https://www.flickr.com/photos/euprepiosaur/5834217765/>

*E. yolngu sp. nov.* is depicted in life in Cogger (2014) on page 557 at top left, Horner (1992) on page 136 at bottom.

*E. harwoodi* is depicted in life online at:

<https://www.flickr.com/photos/ryanfrancis/8394139754/>

and

<https://www.inaturalist.org/observations/66912783>

*E. foresti* is depicted in life online at:

<https://www.inaturalist.org/observations/26046002>

*E. foresti martu subsp. nov.* is depicted in life in Wilson and Swan (2021) on page 327 at top, as well as Storr, Smith and Johnstone (1981) on plate 17, photo 2, and online at:

<https://www.flickr.com/photos/stephenmahony/7541162776/>

and

<https://www.flickr.com/photos/58828131@N07/44520537932/>

and

<https://www.flickr.com/photos/stephenmahony/7541157854/>

and

<https://www.flickr.com/photos/23031163@N03/6745396031/>

and

<https://www.inaturalist.org/observations/169358717>

and

<https://www.inaturalist.org/observations/161890091>

*E. isolepis jinigudera subsp. nov.* is depicted in life online at:

<https://www.inaturalist.org/observations/9963997>

and

<https://www.inaturalist.org/observations/9866899>

and

<https://www.inaturalist.org/observations/9605602>

**Distribution:** *E. gudjal sp. nov.* occurs in north Queensland, generally on the southern parts of the drier parts of Cape York Peninsula, from about Mount Carbine in the north-east, Croydon in the north-west and to Hughenden in the south-west.

**Etymology:** *E. gudjal sp. nov.* is a name taken from that of Gudjal people, the original native Aboriginal Australian inhabitants of the area from which this species occurs.

Most of these people were exterminated by the British King and Queen's Royal servants and the land since occupied by invaders.

Most of this region is now a weed infested wasteland with massively degraded ecosystems.

Surviving Gudjal people, who have not been shot and killed by Queensland police can occasionally be found living under sheets of tin and abandoned car wrecks.

**EREMIASCINCUS YOLNGU SP. NOV.**

**LSID**Durn:lsid:zoobank.org:act:A88A4290-EF44-4AB6-8751-B5DF69896BBE

**Holotype:** A preserved specimen at the Australian Museum, Sydney, New South Wales, Australia, specimen number R.12873 collected from Howley Mines, Northern Territory, Australia, Latitude -13.45 S., Longitude 131.383 E.

This government-owned facility allows access to its holdings.

**Paratype:** A preserved specimen at the Australian Museum, Sydney, New South Wales, Australia, specimen number R.41281 collected from Nourlangie Rock, Northern Territory, Australia, Latitude -12.883 S., Longitude 132.833 E.

**Diagnosis:** Until now *Eremiascincus gudjal sp. nov.* has been treated as an east Australian outlier population of *Eremiascincus isolepis* (Boulenger, 1887), with a type locality of Nickol Bay, Western Australia as has been *E. yolngu sp. nov.* from the Arnhem Land escarpment.

*E. gudjal sp. nov.* is separated from *E. isolepis* and related forms previously treated as putative *E. isolepis* the following suite of characters: Its larger size being a snout-vent of 68 mm, (versus an average of 52 mm in the type form of *E. isolepis*); a distinctive purplish pink upper surface of the snout and similar behind the eye and near the ear; upper and lower labials heavily barred purple and white, the purple being slightly wider than the white; above the eye on the scales on the bulge of the upper eye the colour is a dull greenish-yellow grey-brown; there is a brown dorsum that is indistinctly spotted purple, the spotting generally absent around the dorsolateral line, before reappearing on most of the flanks, below which white peppering grades onto the white lower surfaces. The speckled tail is a yellow-golden brown colour. Overall the colour is relatively light, sometimes giving an opaque appearance.

The only species within the complex until now treated as putative *E. isolepis* of similar large size to *E. gudjal sp. nov.* are *E. harwoodi*, type locality Brunette Downs, Northern Territory and occurring in most of the top third of the Northern Territory, as well as a small part of far north-west Queensland in the vicinity of Lawn Hill and *E. yolngu sp. nov.* from the Arnhem Land escarpment.

*E. harwoodi* is readily separated from all others in the putative *E. isolepis* complex by the distinctive light yellow-brown dorsum, versus reddish or grey brown in the other species, upper labials (numbering 7) that are white and with light brown etchings, but no dark etching, or bars, or alternating dark reddish-brown and white; heavy peppering on the mid dorsum forming what appears to be a darker line down the midline, and plain brown or reduced markings on the dorso-lateral edge.

The species also considerably larger and more robust in build than either *E. isolepis* and the closely related *E. foresti* (Kinghorn, 1932) being with a snout-vent length of 40-86 mm, mean of 64.6 mm, versus 29-72 mm, mean of 52 in both *E. isolepis* and *E. foresti* (see Storr 1972).

Besides being a more thick-set species than *E. gudjal sp. nov.* and *E. yolngu sp. nov.*, *E. harwoodi* lacks the purplish-pink tinge over the dorsum and flanks, this tinge only being noticeable on the upper surfaces of the front limbs. The upper surfaces of the hind limbs are mainly a dull grey colour.

Another species in the *E. isolepis* complex, *E. foresti* with a type locality of the Forrest River, East Kimberley District, Western Australia, is most similar to *E. isolepis*, but was shown by the phylogeny of Mecke *et al.* (2009) at Fig. 2. to be a different species. It is readily separated from *E. isolepis* by being generally dark in dorsal colour (versus light) and with fewer midbody scale rows, being 25-30, mean 27.7, versus, 28-32, mean 30.6 in *E. isolepis* (Storr, 1972).

*E. foresti* of the nominate form is separated from all other species in the complex, as well as the subspecies *E. foresti martu subsp. nov.* being the west Kimberley form of the species, by having the black peppering on the dorsum coalescing into two distinctive lines, running on either side of the vertebral line.

Furthermore *E. foresti martu subsp. nov.* has a dorsum that is uniform brown in colour and with black spots on the dorsum forming two distinct lines down the dorsum on either side of the vertebral line, as opposed to the thick peppering forming the lines on the back in type *E. foresti* or the similar black peppering across the

dorsum seen in the other related taxa.

*E. foresti martu subsp. nov.* has scattered semi-distinct white spots on the flanks, versus numerous distinct white spots on the flanks in the nominate form of *E. foresti*.

*E. isolepis jinigudera subsp. nov.* from the Cape Range of Western Australia and the Exmouth Gulf is separated from the nominate subspecies of *E. isolepis* found further north along the Pilbara Coast, north of Warraboo, by the presence of black on the upper flank being bound by white on the lower flank and both areas being distinct, and with a well defined border between the two, versus indistinct blackish on the upper flank and whitish below and without any well defined border in the nominate form of *E. isolepis*.

Both nominate *E. isolepis* and *E. isolepis jinigudera subsp. nov.* are separated from all related species by the presence of a pale brown dorsum with numerous black spots scattered fairly evenly across the entire dorsal surface, including all the way to the dorsolateral line and with no reduction either along the vertebral line or near the flanks.

These spots are highly contrasting in *E. isolepis jinigudera subsp. nov.*, but only moderately so in nominate *E. isolepis*.

The anterior upper surface of the tail in *E. isolepis jinigudera subsp. nov.* has more black than brown, versus the reverse in the nominate subspecies of *E. isolepis*.

*E. yolngu sp. nov.* a species confined to the Arnhem Land escarpment and adjacent formations in the Litchfield National Park area, is morphologically most similar to *E. gudjal sp. nov.* as defined and diagnosed above, but is separated from that species (and by extension, all the others) by having a more strongly purple colouration running through the otherwise brownish dorsum; an upper flank that is dark purple to purple-brown in colour, overlain with numerous evenly spaced, scattered white spots, versus brown with heavy purple peppering at the mid flank in *E. gudjal sp. nov.* and tiny dark specks or peppering on the dorsal surface, versus medium-sized regularly arranged dull spots on the dorsum in *E. gudjal sp. nov.*

Both species have heavily barred purple and white labials.

The morphologically similar, sometimes sympatric species *E. douglasi* (Storr, 1967), with a type locality of Darwin in the Northern Territory, is readily separated from *E. yolngu sp. nov.* by the presence of numerous bold white spots scattered across the flank. The morphologically similar, sometimes sympatric species *E. darwiniensis* (Storr, 1967), with a type locality of Darwin, Northern Territory, is readily separated from *E. yolngu sp. nov.* by the fact that the adpressed limbs do not meet and are separated by noticeably more than the length of the forelimb; and 20-22 mid body rows, versus 24 or more in *E. yolngu sp. nov.*

All the preceding mentioned species and subspecies (except for *E. douglasi* and *E. darwiniensis*) are collectively separated from all other species within *Eremiascincus* Greer, 1979 by the following unique combination of characters:

Dorsal scales are smooth and without keels; adpressed limbs overlap or almost touch; mid dorsal and ventral scales are subequal; seven supralabials; no solid black dorsolateral stripe without spots or flecks; fourth toe lamellae are strongly keeled and those on the basal quarter are divided, 24 or more midbody rows (modified from Cogger 2014).

For photos of the relevant species and subspecies, refer to the preceding description of *E. gudjal sp. nov.*

**Distribution:** *E. yolngu sp. nov.* is a species confined to the Arnhem Land escarpment and adjacent formations in the Litchfield National Park area of the Northern Territory, Australia.

**Etymology:** *E. yolngu sp. nov.* is named in honour of the Yolngu people, being the original native Australian inhabitants of the area the species occurs in recognition of their tenure of the land for more than 40K years. The Yolngu people have done better than most other original Australians in the wake of the British invasion in the late 1700's and early 1800's.

Although they were shot, killed and stripped of all they owned like other Aboriginal Australians, the few lucky survivors had a stroke of luck in the 1970's.

In the 1970's they managed to gain control of a "rocky wasteland" that was "given" to them by their British invaders, because 1/ the

asked for it and 2/ The British invaders saw no use in the land at all. It was called Arnhem Land and the British Australians simply couldn't cope with the plague proportions of biting insects.

Shortly thereafter, uranium deposits were found at Narbalek, which the British desperately needed to continue to test their nuclear weapons at Maralinga in South Australia (tough luck for the Maralinga tribe), just in case they decided to drop a few bombs on the Soviets, Chinese or anyone else they couldn't screw over. The Yolngu managed to cut a royalty deal with the mining company and within a short time they became the wealthiest Aboriginal tribe in Australia.

**EREMIASCINCUS ISOLEPIS JINIGUDERA SUBSP. NOV.**  
**LSIDurn:lsid:zoobank.org:act:0D28C8A4-692A-45F0-B4C3-64562C8D023C**

**Holotype:** A preserved specimen at the Western Australian Museum, Perth, Western Australia, Australia, specimen number R157220, collected from Hope Island, Western Australia, Australia, Latitude -22.166667 S., Longitude -22.166667 S.

This government-owned facility allows access to its holdings.

**Paratype:** A preserved specimen at the Western Australian Museum, Perth, Western Australia, Australia, specimen number R100793 collected at Simpson Island, Western Australia, Australia, Latitude -22.133333 S., Longitude 114.483333 E.

**Diagnosis:** *Eremiascincus isolepis jinigudera subsp. nov.* from the Cape Range of Western Australia and the Exmouth Gulf is separated from the nominate subspecies of *E. isolepis* found further north along the Pilbara Coast, north of Warraraboo, to about Whim Creek (and including immediately offshore islands) by the presence of black on the upper flank being bound by white on the lower flank and both areas being distinct, and with a well defined border between the two, versus indistinct blackish on the upper flank and whitish below and without any well defined border in the nominate form of *E. isolepis*.

Both nominate *E. isolepis* and *E. isolepis jinigudera subsp. nov.* are separated from all related species formerly treated as putative *E. isolepis* by the presence of a pale brown dorsum with numerous black spots scattered fairly evenly across the entire dorsal surface, including all the way to the dorsolateral line and with no reduction either along the vertebral line or near the flanks.

These spots are highly contrasting in *E. isolepis jinigudera subsp. nov.*, but only moderately so in nominate *E. isolepis*.

The anterior upper surface of the tail in *E. isolepis jinigudera subsp. nov.* has more black than brown, versus the reverse in the nominate subspecies of *E. isolepis*.

Until now *Eremiascincus gudjal sp. nov.* has been treated as an east Australian outlier population of *Eremiascincus isolepis* (Boulenger, 1887), with a type locality of Nickol Bay, Western Australia as has been *E. yolngu sp. nov.* from the Arnhem Land escarpment.

*E. gudjal sp. nov.* is separated from *E. isolepis* and related forms previously treated as putative *E. isolepis* the following suite of characters: Its larger size being a snout-vent of 68 mm, (versus an average of 52 mm in the type form of *E. isolepis*); a distinctive purplish pink upper surface of the snout and similar behind the eye and near the ear; upper and lower labials heavily barred purple and white, the purple being slightly wider than the white; above the eye on the scales on the bulge of the upper eye the colour is a dull greenish-yellow grey-brown; there is a brown dorsum that is indistinctly spotted purple, the spotting generally absent around the dorsolateral line, before reappearing on most of the flanks, below which white peppering grades onto the white lower surfaces. The speckled tail is a yellow-golden brown colour. Overall the colour is relatively light, sometimes giving an opaque appearance.

The only species within the complex until now treated as putative *E. isolepis* of similar large size to *E. gudjal sp. nov.* are *E. harwoodi*, type locality Brunette Downs, Northern Territory and occurring in most of the top third of the Northern Territory, as well as a small part of far north-west Queensland in the vicinity of Lawn Hill and *E. yolngu sp. nov.* from the Arnhem Land escarpment.

*E. harwoodi* is readily separated from all others in the putative *E. isolepis* complex by the distinctive light yellow-brown dorsum, versus reddish or grey brown in the other species, upper labials

(numbering 7) that are white and with light brown etchings, but no dark etching, or bars, or alternating dark reddish-brown and white; heavy peppering on the mid dorsum forming what appears to be a darker line down the midline, and plain brown or reduced markings on the dorso-lateral edge.

The species is also considerably larger and more robust in build than either *E. isolepis* and the closely related *E. foresti* (Kinghorn, 1932), being with a snout-vent length of 40-86 mm, mean of 64.6 mm, versus 29-72 mm, mean of 52 in both *E. isolepis* and *E. foresti* (see Storr 1972).

Besides being a more thick-set species than *E. gudjal sp. nov.* and *E. yolngu sp. nov.*, *E. harwoodi* lacks the purplish-pink tinge over the dorsum and flanks, this tinge only being noticeable on the upper surfaces of the front limbs. The upper surfaces of the hind limbs are mainly a dull grey colour.

Another species in the *E. isolepis* complex, *E. foresti* with a type locality of the Forrest River, East Kimberley District, Western Australia, is most similar to *E. isolepis*, but was shown by the phylogeny of Mecke *et al.* (2009) at Fig. 2. to be a different species. It is readily separated from *E. isolepis* by being generally dark in dorsal colour (versus light) and with fewer midbody scale rows, being 25-30, mean 27.7, versus, 28-32, mean 30.6 in *E. isolepis* (Storr, 1972).

*E. foresti* of the nominate form is separated from all other species in the complex, as well as the subspecies *E. foresti martu subsp. nov.* being the west Kimberley form of the species, by having the black peppering on the dorsum coalescing into two distinctive lines, running on either side of the vertebral line.

Furthermore *E. foresti martu subsp. nov.* has a dorsum that is uniform brown in colour and with black spots on the dorsum forming two distinct lines down the dorsum on either side of the vertebral line, as opposed to the thick peppering forming the lines on the back in type *E. foresti* or the similar black peppering across the dorsum seen in the other related taxa.

*E. foresti martu subsp. nov.* has scattered semi-distinct white spots on the flanks, versus numerous distinct white spots on the flanks in the nominate form of *E. foresti*.

*E. yolngu sp. nov.* a species confined to the Arnhem Land escarpment and adjacent formations in the Litchfield National Park area, is morphologically most similar to *E. gudjal sp. nov.* as defined and diagnosed above, but is separated from that species (and by extension, all the others) by having a more strongly purple colouration running through the otherwise brownish dorsum; an upper flank that is dark purple to purple-brown in colour, overlain with numerous evenly spaced, scattered white spots, versus brown with heavy purple peppering at the mid flank in *E. gudjal sp. nov.* and tiny dark specks or peppering on the dorsal surface, versus medium-sized regularly arranged dull spots on the dorsum in *E. gudjal sp. nov.*

Both species have heavily barred purple and white labials.

The morphologically similar, sometimes sympatric species *E. douglasi* (Storr, 1967), with a type locality of Darwin in the Northern Territory, is readily separated from *E. yolngu sp. nov.* by the presence of numerous bold white spots scattered across the flank.

The morphologically similar, sometimes sympatric species *E. darwiniensis* (Storr, 1967), with a type locality of Darwin, Northern Territory, is readily separated from *E. yolngu sp. nov.* by the fact that the addressed limbs do not meet and are separated by noticeably more than the length of the forelimb; and 20-22 mid body rows, versus 24 or more in *E. yolngu sp. nov.*

All the preceding mentioned species and subspecies (except for *E. douglasi* and *E. darwiniensis*) are collectively separated from all other species within *Eremiascincus* Greer, 1979 by the following unique combination of characters:

Dorsal scales are smooth and without keels; addressed limbs overlap or almost touch; mid dorsal and ventral scales are subequal; seven supralabials; no solid black dorsolateral stripe without spots or flecks; fourth toe lamellae are strongly keeled and those on the basal quarter are divided, 24 or more midbody rows (modified from Cogger 2014).

For photos of the relevant species and subspecies, refer to the preceding description of *E. gudjal sp. nov.*

**Distribution:** *Eremiascincus isolepis jinigudera subsp. nov.* occurs around the Cape Range of Western Australia and the Exmouth Gulf coasts and islands only. It is separated from the nominate subspecies of *E. isolepis* found further north along the Pilbara Coast, north of Warraboo, to about Whim Creek and including immediately offshore islands, being apparently allopatric.

**Etymology:** *E. isolepis jinigudera subsp. nov.* is named in honour of the Jinigudera people, being the original native Aboriginal inhabitants of the region this species occurs.

**EREMIASCINCUS FORESTI MARTU SUBSP. NOV.**

LSIDurn:lsid:zoobank.org:act:EBCFDA17-7184-49D3-94B8-FC59956229E7

**Holotype:** A preserved specimen at the Western Australian Museum, Perth, Western Australia, Australia, specimen number R139066 collected from Mandora, Western Australia, Australia, Latitude -19.4752 S., Longitude 121.2652 E.

This government-owned facility allows access to its holdings.

**Paratype:** Four preserved specimens at the Western Australian Museum, Perth, Western Australia, Australia, specimen numbers R139079, R139082, R139090 and R139116 collected from Mandora, Western Australia, Australia, Latitude -19.4752 S., Longitude 121.2652 E.

**Diagnosis:** The following diagnosis of the relevant species includes all that is necessary for the diagnosis for the subspecies *E. foresti martu subsp. nov.*

*Eremiascincus isolepis jinigudera subsp. nov.* from the Cape Range of Western Australia and the Exmouth Gulf is separated from the nominate subspecies of *E. isolepis* found further north along the Pilbara Coast, north of Warraboo, to about Whim Creek (and including immediately offshore islands) by the presence of black on the upper flank being bound by white on the lower flank and both areas being distinct, and with a well defined border between the two, versus indistinct blackish on the upper flank and whitish below and without any well defined border in the nominate form of *E. isolepis*.

Both nominate *E. isolepis* and *E. isolepis jinigudera subsp. nov.* are separated from all related species formerly treated as putative *E. isolepis* by the presence of a pale brown dorsum with numerous black spots scattered fairly evenly across the entire dorsal surface, including all the way to the dorsolateral line and with no reduction either along the vertebral line or near the flanks.

These spots are highly contrasting in *E. isolepis jinigudera subsp. nov.*, but only moderately so in nominate *E. isolepis*.

The anterior upper surface of the tail in *E. isolepis jinigudera subsp. nov.* has more black than brown, versus the reverse in the nominate subspecies of *E. isolepis*.

Until now *Eremiascincus gudjal sp. nov.* has been treated as an east Australian outlier population of *Eremiascincus isolepis* (Boulenger, 1887), with a type locality of Nickol Bay, Western Australia as has been *E. yolngu sp. nov.* from the Arnhem Land escarpment.

*E. gudjal sp. nov.* is separated from *E. isolepis* and related forms previously treated as putative *E. isolepis* the following suite of characters: Its larger size being a snout-vent of 68 mm, (versus an average of 52 mm in the type form of *E. isolepis*); a distinctive purplish pink upper surface of the snout and similar behind the eye and near the ear; upper and lower labials heavily barred purple and white, the purple being slightly wider than the white; above the eye on the scales on the bulge of the upper eye the colour is a dull greenish-yellow grey-brown; there is a brown dorsum that is indistinctly spotted purple, the spotting generally absent around the dorsolateral line, before reappearing on most of the flanks, below which white peppering grades onto the white lower surfaces. The speckled tail is a yellow-golden brown colour. Overall the colour is relatively light, sometimes giving an opaque appearance.

The only species within the complex until now treated as putative *E. isolepis* of similar large size to *E. gudjal sp. nov.* are *E. harwoodi*, type locality Brunette Downs, Northern Territory and occurring in most of the top third of the Northern Territory, as well as a small part of far north-west Queensland in the vicinity of Lawn Hill and *E. yolngu sp. nov.* from the Arnhem Land escarpment.

*E. harwoodi* is readily separated from all others in the putative

*E. isolepis* complex by the distinctive light yellow-brown dorsum, versus reddish or grey brown in the other species, upper labials (numbering 7) that are white and with light brown etchings, but no dark etching, or bars, or alternating dark reddish-brown and white; heavy peppering on the mid dorsum forming what appears to be a darker line down the midline, and plain brown or reduced markings on the dorso-lateral edge.

The species is also considerably larger and more robust in build than either *E. isolepis* and the closely related *E. foresti* (Kinghorn, 1932), being with a snout-vent length of 40-86 mm, mean of 64.6 mm, versus 29-72 mm, mean of 52 in both *E. isolepis* and *E. foresti* (see Storr 1972).

Besides being a more thick-set species than *E. gudjal sp. nov.* and *E. yolngu sp. nov.*, *E. harwoodi* lacks the purplish-pink tinge over the dorsum and flanks, this tinge only being noticeable on the upper surfaces of the front limbs. The upper surfaces of the hind limbs are mainly a dull grey colour.

Another species in the *E. isolepis* complex, *E. foresti* with a type locality of the Forrest River, East Kimberley District, Western Australia, is most similar to *E. isolepis*, but was shown by the phylogeny of Mecke *et al.* (2009) at Fig. 2. to be a different species. It is readily separated from *E. isolepis* by being generally dark in dorsal colour (versus light) and with fewer midbody scale rows, being 25-30, mean 27.7, versus, 28-32, mean 30.6 in *E. isolepis* (Storr, 1972).

*E. foresti* of the nominate form is separated from all other species in the complex, as well as the subspecies *E. foresti martu subsp. nov.* being the west Kimberley form of the species, by having the black peppering on the dorsum coalescing into two distinctive lines, running on either side of the vertebral line.

Furthermore *E. foresti martu subsp. nov.* has a dorsum that is uniform brown in colour and with black spots on the dorsum forming two distinct lines down the dorsum on either side of the vertebral line, as opposed to the thick peppering forming the lines on the back in type *E. foresti* or the similar black peppering across the dorsum seen in the other related taxa.

*E. foresti martu subsp. nov.* has scattered semi-distinct white spots on the flanks, versus numerous distinct white spots on the flanks in the nominate form of *E. foresti*.

*E. yolngu sp. nov.* a species confined to the Arnhem Land escarpment and adjacent formations in the Litchfield National Park area, is morphologically most similar to *E. gudjal sp. nov.* as defined and diagnosed above, but is separated from that species (and by extension, all the others) by having a more strongly purple colouration running through the otherwise brownish dorsum; an upper flank that is dark purple to purple-brown in colour, overlain with numerous evenly spaced, scattered white spots, versus brown with heavy purple peppering at the mid flank in *E. gudjal sp. nov.* and tiny dark specks or peppering on the dorsal surface, versus medium-sized regularly arranged dull spots on the dorsum in *E. gudjal sp. nov.*

Both species have heavily barred purple and white labials.

The morphologically similar, sometimes sympatric species *E. douglasi* (Storr, 1967), with a type locality of Darwin in the Northern Territory, is readily separated from *E. yolngu sp. nov.* by the presence of numerous bold white spots scattered across the flank. The morphologically similar, sometimes sympatric species *E. darwiniensis* (Storr, 1967), with a type locality of Darwin, Northern Territory, is readily separated from *E. yolngu sp. nov.* by the fact that the addressed limbs do not meet and are separated by noticeably more than the length of the forelimb; and 20-22 mid body rows, versus 24 or more in *E. yolngu sp. nov.*

All the preceding mentioned species and subspecies (except for *E. douglasi* and *E. darwiniensis*) are collectively separated from all other species within *Eremiascincus* Greer, 1979 by the following unique combination of characters:

Dorsal scales are smooth and without keels; addressed limbs overlap or almost touch; mid dorsal and ventral scales are subequal; seven supralabials; no solid black dorsolateral stripe without spots or flecks; fourth toe lamellae are strongly keeled and those on the basal quarter are divided, 24 or more midbody rows (modified from Cogger 2014).

For photos of the relevant species and subspecies, refer to the preceding description of *E. gudjal* sp. nov..

**Distribution:** *E. foresti martu* subsp. nov. is a West Kimberley endemic, also being found as far south along the coast to about Sandfire Flat (Mandora). The nominate subspecies form of *E. foresti* occurs in the east Kimberley district.

**Etymology:** *E. foresti martu* subsp. nov. is named in honour of the Martu people, being the original native Aboriginal inhabitants of the region this species occurs. Quite a number survived the British invasion of Australia and this region in the 1800's because quite simply there was nothing in the local deserts the British wanted to steal and most white Australians couldn't cope with the heat.

**EREMIASCINCUS MUSIVUS OCULORUM SUBSP. NOV.**

**LSIDurn:lsid:zoobank.org:act:AAB12CE9-F25E-49D3-B40F-19722719E652**

**Holotype:** A preserved specimen at the Western Australian Museum, Perth, Western Australia, Australia, specimen number R139042 collected from Mandora, Western Australia, Australia, Latitude -19.4830 S., Longitude 121.2750 E.

This government-owned facility allows access to its holdings.

**Paratype:** A preserved specimen at the Western Australian Museum, Perth, Western Australia, Australia, specimen number R139095 collected from Mandora, Western Australia, Australia, Latitude -19.4844 S., Longitude 121.2825 E.

**Diagnosis:** The species *E. musivus* Mecke, Doughty and Donnellan, 2009, type locality 20 km east north-east of Karratha, Western Australia occurs in two populations. One, as far as is known is confined to the general area of the type locality and north to near Port Hedland and the second, the new subspecies *E. musivus oculorum* subsp. nov. is found generally north of Goldsworthy and into the western Great Sandy Desert, generally near the coast.

*E. musivus oculorum* subsp. nov. is separated from *E. musivus* Mecke, Doughty and Donnellan, 2009 by a general reduction in the amount and intensity of black pigment on the back; dark markings on the upper surface of the tail tending to be in the form of spots rather than bands, versus well-defined bands in *E. musivus*.

*E. musivus oculorum* subsp. nov. has blackish smudges on the top of the head, versus obvious black spots in *E. musivus*.

*E. musivus* is separated from all other species within *Eremiascincus* Greer, 1979 by the following combination of characters:

"A small, slender *Eremiascincus* (maximum SVL 59.2 mm), distinguished from other members of the genus by the following combination of characters: ground colour reddish to yellowish brown with a characteristic, consistent dorsal pattern of numerous whitish and dark spots often aligning to form short streaks in an irregular, diffuse reticulum; the presence of a pale vertebral stripe running from the neck to the base of tail (occasionally extending to tail); narrow, wavy, dark bands on the tail (~ 35), which are divided medially and interspaces between these dark bands, which consist of dark-edged pale scales in a single row; homogenous, smooth scales on the dorsum and tail; scales along the top of fourth toe with oblique sutures on basal quarter to third of digit, followed by single rows of scales with transverse sutures; 4TLam undivided and only feebly keeled; plantar scales 10-15; small circular ear opening; MBSR 29-34, PVS 52-62; Supralabials usually 7; 3 chin shields and 1 median chin shield."

The preceding was quoted verbatim from Mecke et al. (2009).

The type subspecies of *E. musivus* is depicted in life in Mecke et al. (2009), page 14 in Figure 6, and Wilson and Swan (2021) on page 327 middle left and online at:

<https://www.flickr.com/photos/euprepiosaur/46447971604/>

*E. musivus oculorum* subsp. nov. is depicted in life in Hoser (1989) on page 113 at top right and online at:

<https://www.flickr.com/photos/124699310@N06/17140026821/>

**Distribution:** The new subspecies *E. musivus oculorum* subsp. nov. is found generally north of Goldsworthy and into the western Great Sandy Desert, generally near the coast.

The nominate form of *E. musivus* is found south of Port Hedland with a main distribution around Karratha and Dampier.

**Etymology:** *E. musivus oculorum* subsp. nov. is named in reflection of the Latin word "*oculorum*" which means "*blurred in colouration*".

**EREMIASCINCUS PALLIDA FLAVESCENTIBUS SUBSP. NOV.**

**LSIDurn:lsid:zoobank.org:act:9F95A5AA-2630-4618-9576-14E68F079902**

**Holotype:** A preserved male specimen at the Western Australian Museum, Perth, Western Australia, Australia, specimen number R136287 collected from Muggon Station, Western Australia, Australia, Latitude -26.4908 S., Longitude 115.3206 E.

This government-owned facility allows access to its holdings.

**Paratype:** A preserved male specimen at the Western Australian Museum, Perth, Western Australia, Australia, specimen number R139445 collected from Cane River, Western Australia, Australia, Latitude 22.1555 S., Longitude 115.3519 E.

**Diagnosis:** The species *E. pallida* (Günther, 1875), with a type locality of Nickol Bay, Western Australia is split into two divergent subspecies, with the south-western form formally named for the first time as *E. pallida flavescens* subsp. nov..

*E. pallida flavescens* subsp. nov. occurs in the general region from Warramboe southwards to near Canarvon, Western Australia. Nominate *E. pallida* occurs in the Pilbara generally north and west of the type locality to include the majority of the Western Australian interior, extending to western parts of the Northern Territory and South Australia.

*E. pallida flavescens* subsp. nov. is readily separated from the nominate subspecies by the fact that the purple coloured semi-distinct bands on the flank do not extend well onto the dorsum, versus does so in the type subspecies. The ear of *E. pallida flavescens* subsp. nov. has an obvious yellow marking, versus not so in nominate *E. pallida*.

Both forms of *E. pallida* are readily separated from all other species within *Eremiascincus* Greer, 1979 by the following combination of characters: having narrow bands (not wide ones, or none at all) in some form on the lower part of the flanks that may or may not extend over the dorsum, but if they do extend over the dorsum, this is either not complete or extremely faint on top; last supralabial undivided; no row of subinfralabials present; scales on top of the fourth toe with transverse sutures along distal third to entire digit; there are seven supralabials; one infralabial scale is in contact with postmental scale.

*E. pallida flavescens* subsp. nov. in life is depicted in Storr, Smith and Johnstone (1981) plate 3, second from bottom on left, Wilson and Swan (2021) on page 327, middle right and online at: [https://www.flickr.com/photos/colonel\\_007/49113064953/](https://www.flickr.com/photos/colonel_007/49113064953/) and

[https://www.flickr.com/photos/colonel\\_007/49113064953/](https://www.flickr.com/photos/colonel_007/49113064953/)

The nominate subspecies of *E. pallida* is depicted in life online at: <https://www.flickr.com/photos/euprepiosaur/46257415665/> and

<https://www.flickr.com/photos/reptileshots/26142379655/>

**Distribution:** *E. pallida flavescens* subsp. nov. occurs in the general region from Warramboe southwards to near Canarvon, Western Australia. Nominate *E. pallida* occurs in the Pilbara generally north and west of the type locality, Nickol Bay, Western Australia to include the majority of the Western Australian interior, extending to western parts of the Northern Territory and South Australia.

**Etymology:** *E. pallida flavescens* subsp. nov. uses the Latin word "*flavescens*" which means "*yellowish*" or "*yellowish brown*" in colour in reflection of the typical colour of the adult lizard.

**EREMIASCINCUS INTERMEDIUS YUNGMAN SUBSP. NOV.**

**LSIDurn:lsid:zoobank.org:act:B6D897B8-2EDE-4CD7-B87E-5367057B70F2**

**Holotype:** A preserved specimen at the Museum and Art Gallery of the Northern Territory, Darwin, Northern Territory, Australia, specimen number R23342 collected from 12 Mile Stock Yards, Eley National Park, Northern Territory, Australia, Latitude -14.952 S., Longitude 133.219 E.

This government-owned facility allows access to its holdings.

**Paratypes:** 1/ Two preserved specimens at the Western Australian Museum, Perth, Western Australia, Australia, specimen numbers R24144 and R24145, both collected from 6 km south of Larrimah, Northern Territory, Australia, Latitude -15.38 S., Longitude 133.13 E. 2/ A preserved specimen at the Museum and Art Gallery of the

Northern Territory, Darwin, Northern Territory, Australia, specimen number R26938 collected from Maryfield Station, Sturt Plateau, Northern Territory, Australia, Latitude -15.816 S., Longitude 133.2 E.

**Diagnosis:** *E. intermedia* (Sternfeld, 1919), with a type locality of Hermannsburg Mission, Central Australia, Northern Territory is herein split into two regionally allopatric subspecies.

The nominate form occurs in the region of the central Australian ranges north to Tennant Creek and being found west of there in the Tanami Desert and east of there to at least Freweena Roadhouse, (best known for the highest retail fuel prices in Australia) on the western edge of the Barkly Tableland.

*E. intermedia yungman subsp. nov.* occurs north of this area in the general region encompassing the southern headwaters of the Roper River system in the Northern Territory, including Elsey National Park in the north and Sturt Plateau in the south, both being effectively along the main north-south Highway, with specimens having been found at least 100 km east and west of this line.

*E. intermedia yungman subsp. nov.* is readily separated from *E. intermedia* by having 17-19 dorsal body bands, versus 10-16 in the nominate subspecies of *E. intermedia*, as well as a noticeable darkening of the upper surface of the head, versus not so in *E. intermedia*.

*E. intermedia yungman subsp. nov.* also has noticeably smaller limbs and a smaller ear aperture than specimens of the nominate form.

Both subspecies of *E. intermedia* are readily separated from all other species of *Eremiascincus* Greer, 1979 by the following combination of characters: narrow dark bands on dorsum, encircling it and of full intensity at the vertebral midline as on the flanks and perfectly transverse caudal bands, with the possible exception of some at the anterior part of the tail; no trace of dark or white flecks; last supralabial undivided; no row of subinfralabials present; scales on top of the fourth toe with transverse sutures along distal third to entire digit; 7 supralabials; one infralabial scale in contact with postmental scale.

**Distribution:** *E. intermedia yungman subsp. nov.* occurs north the driest parts of the Northern Territory (being areas south of Tennant Creek, being known from the general region encompassing the southern headwaters of the Roper River system in the Northern Territory, including Elsey National Park in the north and Sturt Plateau in the south, both being effectively along the main north-south Highway, with specimens having been found at least 100 km east and west of this line.

The nominate form of *E. intermedia* occurs in the region of the central Australian ranges north to Tennant Creek and being found west of there in the Tanami Desert and east of there to at least Freweena Roadhouse on the western edge of the Barkly Tableland.

**Etymology:** *E. intermedia yungman subsp. nov.* is named in honour of the Yungman tribe of Australian Aboriginals, being the original inhabitants of the area this subspecies occurs. The few who survived the British invasion of the area of the 1800's, fled their lands to avoid being killed and nowadays eke out a miserable existence living under sheets of tin and other rubbish on the outskirts of European settlements in the area.

The formerly pristine lands they inhabited are now mainly overgrazed cattle runs owned by tax-evading, trans-national corporations.

**EREMIASCINCUS RICHARDSONII DJARU SUBSP. NOV.**

**LSID**Durn:lsid:zoobank.org:act:4474FAF1-B7B2-4BC6-B6A0-1F7F57131086

**Holotype:** A preserved specimen at the South Australian Museum, Adelaide, South Australia, Australia, specimen number R3535 collected from Moolabulla Station, East Kimberley District, Western Australia, Australia, Latitude -18.2 S., Longitude 127.5 E.

This government-owned facility allows access to its holdings.

**Paratypes:** 1/ A preserved specimen at the Western Australian Museum, Perth, Western Australia, Australia, specimen number R103162 collected from the Bungle Bungle National Park, Western Australia, Australia, Latitude -17.55 S., Longitude 128.25 S.

This government-owned facility allows access to its holdings.

2/ Two preserved specimens at the Museum and Art Gallery of the Northern Territory, Darwin, Northern Territory, Australia, specimen

numbers R07041 and R07042 both collected from Turkey Creek, Western Australia, Australia, Latitude -16.9 S., Longitude 128.317 E.

**Diagnosis:** Until now, most authors have treated *Eremiascincus richardsonii* (Gray, 1845) as a single pan-Australian species, without recognition of any local variants as either species or subspecies.

It is almost certainly a complex of multiple species, but in the absence of molecular data, each of ten obviously divergent lineages are herein formally identified as separate subspecies.

For two, including the nominate form, there are available names and these are used in accordance with the requirements of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

Names are assigned for the first time in accordance with the *International Code of Zoological Nomenclature* to the other eight divergent populations. I will not invoke the Kaiser *et al.* (2013) doctrine to attempt to steal "name authority" from scientists who have previously done the hard work to name the relevant taxa.

The ten relevant taxa, all essentially from areas generally near their type localities and/or as otherwise indicated are as follows:

*Eremiascincus richardsonii* (Gray, 1845) (originally named as *Hinulia richardsonii*) with an alleged type locality of Houtman's Abrolhos, Western Australia, including the putative taxon "*Lygosoma monotropis* Boulenger, 1887" from Champion Bay, Western Australia, being on the proximal coast to the type locality and also found generally also further south and including nearby inland areas.

*E. richardsonii ambigua* (De Vis, 1888) (originally named as *Hinulia ambigua*) with a type locality of Charleville, south-west, Queensland, occurring throughout south-west Queensland and the adjacent north-west tip of New South Wales, generally west of the Darling River basin;

*E. richardsonii djaru subsp. nov.* from the East Kimberley district of northern Western Australia, with those from the West Kimberley also tentatively referred to this taxon;

*E. richardsonii yindjibarndi subsp. nov.* from the North Pilbara district in Western Australia;

*E. richardsonii nyiyarparli subsp. nov.* from the South Pilbara district in Western Australia;

*E. richardsonii baiyungu subsp. nov.* from the Cape Range area in Western Australia;

*E. richardsonii ngaanyatjarra subsp. nov.* from the Warburton Range in eastern central Western Australia;

*E. richardsonii neglectas subsp. nov.* from the Petermann and Musgrave Ranges, near the borders of South Australia, Western Australia and the Northern Territory;

*E. richardsonii pindiini subsp. nov.* from the western and central interior of South Australia;

*E. richardsonii wiradjuri subsp. nov.* from inland southern New South Wales and into the far east of South Australia.

The preceding subspecies are separated from each other by the following unique combinations of characters;

*E. richardsonii* of the nominate subspecies type form is an insular giant race with smooth or weakly keeled scales in mature specimens and large size (127 mm snout-vent) length.

It is separated from the similarly large Pilbara and Kimberley forms described herein by having proportionately smaller limbs.

Specimens of the same putative subspecies from the nearby mainland of Western Australia, generally found in the region bound by Ajana then south and east to Narragin and Woolgangie are of similar form, but are of the smallest of the subspecies with an average maximum snout-vent length of less than 85 mm. Interparietal is always longer than the frontoparietals.

There are 7-10 dorsal body bands and they are rich purple-brown in colour against a bold light yellow background, being of the same thickness as the light interspaces.

*E. richardsonii* of the nominate subspecies type form is depicted in life online at:

<https://www.inaturalist.org/observations/36982514>

and

<https://www.flickr.com/photos/23031163@N03/21580364169/>



and  
<https://www.inaturalist.org/observations/140042097>  
 and

<https://www.inaturalist.org/observations/124194636>

*E. richardsonii ambigua* is defined and separated from the other taxa by the having 31 to 32 midbody rows, 7-8 upper labials, 6-7 supraciliaries above either eye; 3 supraoculars in contact with frontal, and only 2 secondary temporals; 12-13 dorsal body bands, with interspaces far wider than the darker bands; 22-24 lamellae under the fourth toe.

*E. richardsonii ambigua* in life is depicted online at:  
<https://www.inaturalist.org/observations/22455039>  
 and

<https://www.inaturalist.org/observations/103346455>

*E. richardsonii djaru subsp. nov.*, *E. richardsonii yindjibarndi subsp. nov.*, *E. richardsonii baiyungu subsp. nov.* and *E. richardsonii nyiyarparli subsp. nov.* are as a group of four subspecies readily separated from the other subspecies by the following characters: Their large size; snout-vent length exceeds 100 mm regularly, versus never in the other subspecies (with the exception of the insular form of *Eremiascincus richardsonii*); reduced dorsal keeling in adults meaning that the dorsal scales are effectively smooth (except for *E. richardsonii baiyungu subsp. nov.* and *E. richardsonii nyiyarparli subsp. nov.* which by contrast are heavily keeled); few if any nuchals (average of about 0.6, versus 1.1 in the other subspecies); fronto-parietals as long or longer than the interparietal, versus not so in the other subspecies (unless explicitly stated otherwise in the descriptions); 8-9 upper labials, versus 7-8, but never nine in the other subspecies.

*E. richardsonii djaru subsp. nov.* is separated from *E. richardsonii yindjibarndi subsp. nov.* by having 10-12 body bands, versus 7-9 in *E. richardsonii yindjibarndi subsp. nov.* The lighter bands on the dorsum of *E. richardsonii djaru subsp. nov.* are more beige-yellow than the rich yellow seen in *E. richardsonii yindjibarndi subsp. nov.* Furthermore the darker outer edges of each yellow scale in the dorsum is prominent in *E. richardsonii yindjibarndi subsp. nov.* versus not so in *E. richardsonii djaru subsp. nov.*, giving *E. richardsonii djaru subsp. nov.* a more immaculate appearance.

*E. richardsonii yindjibarndi subsp. nov.* is unusual in the complex in that there is a slight fading of the posterior edge of each dark dorsal cross-band.

Both *E. richardsonii baiyungu subsp. nov.* and *E. richardsonii nyiyarparli subsp. nov.* are separated from *E. richardsonii djaru subsp. nov.* and *E. richardsonii yindjibarndi subsp. nov.* by having keeled dorsal scales (versus essentially smooth in the other two species).

*E. richardsonii nyiyarparli subsp. nov.* is readily separated from *E. richardsonii baiyungu subsp. nov.* by having 11-13 body bands, versus 8-10 in *E. richardsonii baiyungu subsp. nov.* The colour of the head, versus the body in *E. richardsonii nyiyarparli subsp. nov.* is not significantly different, versus darker and of a different shade of brown in *E. richardsonii baiyungu subsp. nov.*

*E. richardsonii yindjibarndi subsp. nov.* is depicted in life in Hoser (1989) page 95 at bottom.

*E. richardsonii nyiyarparli subsp. nov.* in life is depicted online at:  
<https://www.inaturalist.org/observations/10579380>

and  
<https://www.inaturalist.org/observations/160274522>  
 and

<https://www.inaturalist.org/observations/19878364>

*E. richardsonii ngaanyatjarra subsp. nov.* is separated from the other subspecies by having rich chocolate brown dorsal bands (9-12 in number) over a light yellow background, each lighter scale also prominently etched with the same chocolate brown, a light orange-brown head; lower numbers of subdigital lamellae under the fourth toe 21-26 (22.8), against averages of 24.0-25.8 in all other subspecies; 29-32 midbody rows and 24-26 caudal bands (original tail) (Storr 1967, 1974).

It is also the only West Australian form in which the dark bands are obviously narrower than the lighter interspaces. In this respect it is like all subspecies found in the NT, South Australia, NSW and Queensland, the two most eastern subspecies having interspaces

roughly double the width of the darker bands..

*E. richardsonii ngaanyatjarra subsp. nov.* in life is depicted online at:

<https://www.inaturalist.org/observations/65339599>

*E. richardsonii neglectas subsp. nov.* is separated from the other subspecies by the combination of the following characters, in being essentially similar to *E. richardsonii ngaanyatjarra subsp. nov.* except for differing by having 33-34 midbody rows, 10-14 dorsal bands and 32 caudal bands (original tail).

*E. richardsonii neglectas subsp. nov.* in life is depicted online at:  
<https://www.inaturalist.org/observations/100444376>

*E. richardsonii pindiini subsp. nov.* is separated from the other subspecies by the high frequency of 2 (rather than 3) supraoculars in contact with frontal (56 %) and numerous lamellae under fourth toe (24-29, average 26.7).

The frequency of specimens with frontal not clearly longer than frontoparietal plus interparietals is high (44 %); and more than half the specimens have the frontoparietal longer than interparietals.

The number of scale rows is extremely low (28-32, average 29.8). Labials 8 (rarely 7); supraciliaries 7-9 (mostly 8); dark dorsal bands 8-11 (av. 9.6) and, as in all populations east of the Western Australian border, are considerably narrower than the interspaces. Upper surface of head is distinctively brown and the body background is yellow. Any darker outline of light scales on the dorsum are effectively absent.

*E. richardsonii pindiini subsp. nov.* is depicted in life online at:  
<https://www.inaturalist.org/observations/145886752>

*E. richardsonii wiradjuri subsp. nov.* is similar in most respects to both *E. richardsonii ambigua* and

*E. richardsonii pindiini subsp. nov.* but separated from each by the following character suite: 8-10 dark dorsal bands (versus 11-13 in *E. richardsonii ambigua*); 8 upper labials; 8-9 supraciliaries; 21-23 lamellae under the fourth toe (versus 24-29 in *E. richardsonii pindiini subsp. nov.*); 3 secondary temporals. 32-36 midbody rows 22-29 caudal bands.

*E. richardsonii wiradjuri subsp. nov.* in life is depicted online at:  
<https://www.inaturalist.org/observations/159623531>

and  
<https://www.inaturalist.org/observations/38874809>  
 and

<https://www.inaturalist.org/observations/39033932>

All the preceding subspecies of *E. richardsonii* (Gray, 1845) are separated from all other species within the genus *Eremiascincus* Greer, 1979 by the presence of dorsal scales that are keeled or with central ridges, especially on the rump and base of the tail, or alternatively, if keeling is very weak or absent, a large adult size in excess of a snout-vent length of over 90 mm; 32 or less tail bands; 14 or less dark bands on the body; body bands distinct, unbroken and of same intensity on the back as the flanks.

**Distribution:** *E. richardsonii djaru subsp. nov.* occurs in the the East Kimberley district of northern Western Australia. Specimens from the west Kimberley are morphologically similar and tentatively referred to this subspecies.

**Etymology:** The Djaru people are the Aboriginal people (first Australians) of the southern Kimberley district and occupy an area inhabited by this taxon.

**EREMIASCINCUS RICHARDSONII YINDJIBARNDI SUBSP. NOV.**  
**LSIDurn:lsid:zoobank.org:act:B1269461-6A94-4269-BC66-7DE892FBE730**

**Holotype:** A preserved specimen at the Western Australian Museum, Perth, Western Australia, Australia, specimen number R73528 collected from 8 km east of Woodstock Homestead, Pilbara District, Western Australia, Australia, Latitude -21.616667 S., Longitude 119.033333 E.

This government-owned facility allows access to its holdings.

**Paratype:** A preserved specimen at the Western Australian Museum, Perth, Western Australia, Australia, specimen number R99360 collected from Woodstock station Pilbara District, Western Australia, Australia, Latitude -21.616667 S., Longitude 118.95 E.

**Diagnosis:** Until now, most authors have treated *Eremiascincus*

*richardsonii* (Gray, 1845) as a single pan-Australian species, without recognition of any local variants as either species or subspecies.

It is almost certainly a complex of multiple species, but in the absence of molecular data, each of ten obviously divergent lineages are herein formally identified as separate subspecies.

For two, including the nominate form, there are available names and these are used in accordance with the requirements of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

Names are assigned for the first time in accordance with the *International Code of Zoological Nomenclature* to the other eight divergent populations in this paper.

The ten relevant taxa are all essentially from areas generally near their type localities and/or as otherwise indicated in the preceding description of *E. richardsonii djaru subsp. nov.*

*E. richardsonii yindjibarndi subsp. nov.* is separated from other subspecies within the *Eremiascincus richardsonii* (Gray, 1845) complex by the suite of characters as indicated below.

*E. richardsonii djaru subsp. nov.* from the East Kimberley district of Western Australia, *E. richardsonii yindjibarndi subsp. nov.* from the Pilbara region of Western Australia, generally north of the Fortescue River, *E. richardsonii baiyungu subsp. nov.* from the Cape Range district in Western Australia and *E. richardsonii nyiyarparli subsp. nov.* from the Pilbara region of Western Australia, south of the Fortescue River, are as a group of four subspecies readily separated from the other subspecies by the following characters: Their large size, snout-vent length exceeds 100 mm regularly, versus never in the other subspecies (with the exception of the insular form of *Eremiascincus richardsonii*); reduced dorsal keeling in adults meaning that the dorsal scales are effectively smooth (except for *E. richardsonii baiyungu subsp. nov.* and *E. richardsonii nyiyarparli subsp. nov.* which by contrast are heavily keeled); few if any nuchals (average of about 0.6, versus 1.1 in the other subspecies); fronto-parietals as long or longer than the interparietal, versus not so in the other subspecies (unless explicitly stated otherwise in the descriptions); 8-9 upper labials, versus 7-8, but never nine in the other subspecies.

*E. richardsonii djaru subsp. nov.* is separated from *E. richardsonii yindjibarndi subsp. nov.* by having 10-12 body bands, versus 7-9 in *E. richardsonii yindjibarndi subsp. nov.* The lighter bands on the dorsum of *E. richardsonii djaru subsp. nov.* are more beige-yellow than the rich yellow seen in *E. richardsonii yindjibarndi subsp. nov.* Furthermore the darker outer edges of each yellow scale in the dorsum is prominent in *E. richardsonii yindjibarndi subsp. nov.* versus not so in *E. richardsonii djaru subsp. nov.*, giving *E. richardsonii djaru subsp. nov.* a more immaculate appearance.

*E. richardsonii yindjibarndi subsp. nov.* is unusual in the complex in that there is a slight fading of the posterior edge of each dark dorsal cross-band.

Both *E. richardsonii baiyungu subsp. nov.* and *E. richardsonii nyiyarparli subsp. nov.* are separated from *E. richardsonii djaru subsp. nov.* and *E. richardsonii yindjibarndi subsp. nov.* by having keeled dorsal scales (versus essentially smooth in the other two species).

*E. richardsonii nyiyarparli subsp. nov.* is readily separated from *E. richardsonii baiyungu subsp. nov.* by having 11-13 body bands, versus 8-10 in *E. richardsonii baiyungu subsp. nov.* The colour of the head, versus the body in *E. richardsonii nyiyarparli subsp. nov.* is not significantly different, versus darker and of a different shade of brown in *E. richardsonii baiyungu subsp. nov.*

*E. richardsonii yindjibarndi subsp. nov.* is depicted in life in Hoser (1989) page 95 at bottom.

*E. richardsonii nyiyarparli subsp. nov.* in life is depicted online at: <https://www.inaturalist.org/observations/10579380>

and

<https://www.inaturalist.org/observations/160274522>

and

<https://www.inaturalist.org/observations/19878364>

Separation of the other six subspecies from each other and the ones above are done within the preceding formal description of *E. richardsonii djaru subsp. nov.* which is explicitly also relied upon as part of this formal description.

All the preceding subspecies of *E. richardsonii* (Gray, 1845) are separated from all other species within the genus *Eremiascincus* Greer, 1979 by the presence of dorsal scales that are keeled or with central ridges, especially on the rump and base of the tail, or alternatively, if keeling is very weak or absent, a large adult size in excess of a snout-vent length of over 90 mm; 32 or less tail bands; 14 or less dark bands on the body; body bands distinct, unbroken and of same intensity on the back as the flanks.

**Distribution:** *E. richardsonii yindjibarndi subsp. nov.* occurs in the Pilbara region of Western Australia, generally north of the Fortescue River.

**Etymology:** The Yindjibarndi people are the original (first Australians) inhabitants and occupiers of the lands where this taxon occurs in the North Pilbara area of Western Australia.

**EREMIASCINCUS RICHARDSONII NYIYARPARLI SUBSP. NOV.**  
**LSIDurn:lsid:zoobank.org:act:90D003AF-7487-45C0-95A1-45656B0D3B53**

**Holotype:** A preserved specimen at the Western Australian Museum, Perth, Western Australia, Australia, specimen number R73633 collected from the Ophthalmia Range area, Pilbara District, Western Australia, Australia, Latitude -23.283333 S., Longitude 119.133333 E.

This government-owned facility allows access to its holdings.

**Paratype:** A preserved specimen at the Western Australian Museum, Perth, Western Australia, Australia, specimen number R23990 collected from Mount Newman, Pilbara District, Western Australia, Australia, Latitude -23.2711 S., Longitude 119.5611 E.

**Diagnosis:** Until now, most authors have treated *Eremiascincus richardsonii* (Gray, 1845) as a single pan-Australian species, without recognition of any local variants as either species or subspecies.

It is almost certainly a complex of multiple species, but in the absence of molecular data, each of ten obviously divergent lineages are herein formally identified as separate subspecies.

For two, including the nominate form, there are available names and these are used in accordance with the requirements of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

Names are assigned for the first time in accordance with the *International Code of Zoological Nomenclature* to the other eight divergent populations in this paper.

The ten relevant taxa are all essentially from areas generally near their type localities and/or as otherwise indicated in the preceding description of *E. richardsonii djaru subsp. nov.*

*E. richardsonii nyiyarparli subsp. nov.* is separated from other subspecies within the *Eremiascincus richardsonii* (Gray, 1845) complex by the suite of characters as indicated below.

*E. richardsonii djaru subsp. nov.* from the East Kimberley district of Western Australia, *E. richardsonii yindjibarndi subsp. nov.* from the Pilbara region of Western Australia, generally north of the Fortescue River, *E. richardsonii baiyungu subsp. nov.* from the Cape Range district in Western Australia and *E. richardsonii nyiyarparli subsp. nov.* from the Pilbara region of Western Australia, south of the Fortescue River, are as a group of four subspecies readily separated from the other subspecies by the following characters: Their large size, snout-vent length exceeds 100 mm regularly, versus never in the other subspecies (with the exception of the insular form of *Eremiascincus richardsonii*); reduced dorsal keeling in adults meaning that the dorsal scales are effectively smooth (except for *E. richardsonii baiyungu subsp. nov.* and *E. richardsonii nyiyarparli subsp. nov.* which by contrast are heavily keeled); few if any nuchals (average of about 0.6, versus 1.1 in the other subspecies); fronto-parietals as long or longer than the interparietal, versus not so in the other subspecies (unless explicitly stated otherwise in the descriptions); 8-9 upper labials, versus 7-8, but never nine in the other subspecies.

*E. richardsonii djaru subsp. nov.* is separated from *E. richardsonii yindjibarndi subsp. nov.* by having 10-12 body bands, versus 7-9 in *E. richardsonii yindjibarndi subsp. nov.* The lighter bands on the dorsum of *E. richardsonii djaru subsp. nov.* are more beige-yellow than the rich yellow seen in *E. richardsonii yindjibarndi subsp. nov.* Furthermore the darker outer edges of each yellow scale in the dorsum is prominent in *E. richardsonii yindjibarndi subsp. nov.*

nov. versus not so in *E. richardsonii djaru subsp. nov.*, giving *E. richardsonii djaru subsp. nov.* a more immaculate appearance. *E. richardsonii yindjibarndi subsp. nov.* is unusual in the complex in that there is a slight fading of the posterior edge of each dark dorsal cross-band.

Both *E. richardsonii baiyungu subsp. nov.* and *E. richardsonii nyiyarparli subsp. nov.* are separated from *E. richardsonii djaru subsp. nov.* and *E. richardsonii yindjibarndi subsp. nov.* by having keeled dorsal scales (versus essentially smooth in the other two species).

*E. richardsonii nyiyarparli subsp. nov.* is readily separated from *E. richardsonii baiyungu subsp. nov.* by having 11-13 body bands, versus 8-10 in *E. richardsonii baiyungu subsp. nov.*. The colour of the head, versus the body in *E. richardsonii nyiyarparli subsp. nov.* is not significantly different, versus darker and of a different shade of brown in *E. richardsonii baiyungu subsp. nov.*.

*E. richardsonii yindjibarndi subsp. nov.* is depicted in life in Hoser (1989) page 95 at bottom.

*E. richardsonii nyiyarparli subsp. nov.* in life is depicted online at: <https://www.inaturalist.org/observations/10579380>

and

<https://www.inaturalist.org/observations/160274522>

and

<https://www.inaturalist.org/observations/19878364>

Separation of the other six subspecies from each other and the ones above are done within the preceding formal description of *E. richardsonii djaru subsp. nov.* which is explicitly also relied upon as part of this formal description.

All the preceding subspecies of *E. richardsonii* (Gray, 1845) are separated from all other species within the genus *Eremiascincus* Greer, 1979 by the presence of dorsal scales that are keeled or with central ridges, especially on the rump and base of the tail, or alternatively, if keeling is very weak or absent, a large adult size in excess of a snout-vent length of over 90 mm; 32 or less tail bands; 14 or less dark bands on the body; body bands distinct, unbroken and of same intensity on the back as the flanks.

**Distribution:** *E. richardsonii nyiyarparli subsp. nov.* occurs in the Pilbara region of Western Australia, generally south of the Fortescue River.

**Etymology:** The Nyiyarparli people are the original (first Australians) inhabitants and occupiers of the lands where this taxon occurs in the South Pilbara area of Western Australia. Their neighbouring tribe the Puutu Kuntji Kurrma people made international headlines in May 2020, after a tax minimising mining company, Rio Tinto deliberately blew up and destroyed a sacred site near Juukan Gorge, that was over 20K years old. The destruction of the sacred artefacts was not the problem, but rather that the local native inhabitants complained about it and it got international media attention.

**EREMIASCINCUS RICHARDSONII BAIYUNGU SUBSP. NOV.**

**LSID**Durn:lsid:zoobank.org:act:364F5D6C-E427-46FD-9B2F-12F5F2355E1B

**Holotype:** A preserved specimen at the Western Australian Museum, Perth, Western Australia, Australia, specimen number R15127 collected from Yardie Creek, Western Australia, Australia, Latitude -21.5300 S., Longitude 114.0000 E.

This government-owned facility allows access to its holdings.

**Paratype:** Three preserved specimens at the Western Australian Museum, Perth, Western Australia, Australia, specimen numbers R8212-8213 and R8232 all collected from Warroora, Western Australia, Australia, Latitude 23.4814 S., Longitude 113.7936 E.

**Diagnosis:** Until now, most authors have treated *Eremiascincus richardsonii* (Gray, 1845) as a single pan-Australian species, without recognition of any local variants as either species or subspecies.

It is almost certainly a complex of multiple species, but in the absence of molecular data, each of ten obviously divergent lineages are herein formally identified as separate subspecies.

For two, including the nominate form, there are available names and these are used in accordance with the requirements of the *International Code of Zoological Nomenclature* (Ride et al. 1999).

Names are assigned for the first time in accordance with the *International Code of Zoological Nomenclature* to the other eight divergent populations in this paper.

The ten relevant taxa are all essentially from areas generally near their type localities and/or as otherwise indicated in the preceding description of *E. richardsonii djaru subsp. nov.*.

*E. richardsonii nyiyarparli subsp. nov.* is separated from other subspecies within the *Eremiascincus richardsonii* (Gray, 1845) complex by the suite of characters as indicated below.

*E. richardsonii djaru subsp. nov.* from the East Kimberley district of Western Australia, *E. richardsonii yindjibarndi subsp. nov.* from the Pilbara region of Western Australia, generally north of the Fortescue River, *E. richardsonii baiyungu subsp. nov.* from the Cape Range district in Western Australia and *E. richardsonii nyiyarparli subsp. nov.* from the Pilbara region of Western Australia, south of the Fortescue River, are as a group of four subspecies readily separated from the other subspecies by the following characters: Their large size, snout-vent length exceeds 100 mm regularly, versus never in the other subspecies (with the exception of the insular form of *Eremiascincus richardsonii*); reduced dorsal keeling in adults meaning that the dorsal scales are effectively smooth (except for *E. richardsonii baiyungu subsp. nov.* and *E. richardsonii nyiyarparli subsp. nov.* which by contrast are heavily keeled); few if any nuchals (average of about 0.6, versus 1.1 in the other subspecies); fronto-parietals as long or longer than the interparietal, versus not so in the other subspecies (unless explicitly stated otherwise in the descriptions); 8-9 upper labials, versus 7-8, but never nine in the other subspecies.

*E. richardsonii djaru subsp. nov.* is separated from *E. richardsonii yindjibarndi subsp. nov.* by having 10-12 body bands, versus 7-9 in *E. richardsonii yindjibarndi subsp. nov.* The lighter bands on the dorsum of *E. richardsonii djaru subsp. nov.* are more beige-yellow than the rich yellow seen in *E. richardsonii yindjibarndi subsp. nov.* Furthermore the darker outer edges of each yellow scale in the dorsum is prominent in *E. richardsonii yindjibarndi subsp. nov.* versus not so in *E. richardsonii djaru subsp. nov.*, giving *E. richardsonii djaru subsp. nov.* a more immaculate appearance.

*E. richardsonii yindjibarndi subsp. nov.* is unusual in the complex in that there is a slight fading of the posterior edge of each dark dorsal cross-band.

Both *E. richardsonii baiyungu subsp. nov.* and *E. richardsonii nyiyarparli subsp. nov.* are separated from *E. richardsonii djaru subsp. nov.* and *E. richardsonii yindjibarndi subsp. nov.* by having keeled dorsal scales (versus essentially smooth in the other two species).

*E. richardsonii nyiyarparli subsp. nov.* is readily separated from *E. richardsonii baiyungu subsp. nov.* by having 11-13 body bands, versus 8-10 in *E. richardsonii baiyungu subsp. nov.*. The colour of the head, versus the body in *E. richardsonii nyiyarparli subsp. nov.* is not significantly different, versus darker and of a different shade of brown in *E. richardsonii baiyungu subsp. nov.*.

*E. richardsonii yindjibarndi subsp. nov.* is depicted in life in Hoser (1989) page 95 at bottom.

*E. richardsonii nyiyarparli subsp. nov.* in life is depicted online at: <https://www.inaturalist.org/observations/10579380>

and

<https://www.inaturalist.org/observations/160274522>

and

<https://www.inaturalist.org/observations/19878364>

Separation of the other six subspecies from each other and the ones above are done within the preceding formal description of *E. richardsonii djaru subsp. nov.* which is explicitly also relied upon as part of this formal description.

All the preceding subspecies of *E. richardsonii* (Gray, 1845) are separated from all other species within the genus *Eremiascincus* Greer, 1979 by the presence of dorsal scales that are keeled or with central ridges, especially on the rump and base of the tail, or alternatively, if keeling is very weak or absent, a large adult size in excess of a snout-vent length of over 90 mm; 32 or less tail bands; 14 or less dark bands on the body; body bands distinct, unbroken and of same intensity on the back as the flanks.

**Distribution:** *E. richardsonii baiyungu subsp. nov.* occurs in the

Cape Range area of coastal Western Australia, Australia.

**Etmology:** The Baiyungu people are the original (first Australians) inhabitants and occupiers of the lands where this taxon occurs in the Cape Range area of Western Australia.

**EREMIASCINCUS RICHARDSONII NGAANYATJARRA SUBSP. NOV.**

**LSIDurn:lsid:zoobank.org:act:1CBB92C7-DDB6-4A74-85AB-A06B873A377A**

**Holotype:** A preserved specimen at the Western Australian Museum, Perth, Western Australia, Australia, specimen number R20747 collected from the Blackstone Mining Camp, Western Australia, Australia, Latitude -26.016667 S., Longitude 128.366667 E.

This government-owned facility allows access to its holdings.

**Paratypes:** 14 preserved specimens at the Western Australian Museum, Perth, Western Australia, Australia, specimen numbers R 14643, 17112, 17745, 17746, 17747, 17855, 22008, 22009, 22010, 22058, 22069, 22070, 22103, 22200, all collected from the Warburton Range in eastern Western Australia, Australia.

**Diagnosis:** Until now, most authors have treated *Eremiascincus richardsonii* (Gray, 1845) as a single pan-Australian species, without recognition of any local variants as either species or subspecies.

It is almost certainly a complex of multiple species, but in the absence of molecular data, each of ten obviously divergent lineages are herein formally identified as separate subspecies.

For two, including the nominate form, there are available names and these are used in accordance with the requirements of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

Names are assigned for the first time in accordance with the *International Code of Zoological Nomenclature* to the other eight divergent populations in this paper.

The ten relevant taxa are all essentially from areas generally near their type localities and/or as otherwise indicated in the preceding description of *E. richardsonii djaru subsp. nov.*

*E. richardsonii neglectas subsp. nov.* and the closely related and morphologically similar *E. richardsonii ngaanyatjarra subsp. nov.* are separated from other subspecies within the *Eremiascincus richardsonii* (Gray, 1845) complex by the following unique combination of characters:

*E. richardsonii ngaanyatjarra subsp. nov.* is separated from the other subspecies by having rich chocolate brown dorsal bands (9-12 in number) over a light yellow background, each lighter scale also prominently etched with the same chocolate brown, a light orange-brown head; lower numbers of subdigital lamellae under the fourth toe 21-26 (22.8), against averages of 24.0-25.8 in all other subspecies; 29-32 midbody rows and 24-26 caudal bands (original tail) (Storr 1967, 1974).

It is also the only West Australian form in which the dark bands are obviously narrower than the lighter interspaces. In this respect it is like all subspecies found in the NT, South Australia, NSW and Queensland, the two most eastern subspecies having interspaces roughly double the width of the darker bands..

*E. richardsonii ngaanyatjarra subsp. nov.* in life is depicted online at:

<https://www.inaturalist.org/observations/65339599>

*E. richardsonii neglectas subsp. nov.* is separated from the other subspecies by the combination of the following characters, in being essentially similar to *E. richardsonii ngaanyatjarra subsp. nov.* except for differing by having 33-34 midbody rows, 10-14 dorsal bands and 32 caudal bands (original tail).

*E. richardsonii neglectas subsp. nov.* in life is depicted online at:

<https://www.inaturalist.org/observations/100444376>

Separation of the other nine subspecies from each other and the one above (*E. richardsonii ngaanyatjarra subsp. nov.*) are done within the preceding formal description of *E. richardsonii djaru subsp. nov.* which is explicitly also relied upon as part of this formal description.

All the preceding subspecies of *E. richardsonii* (Gray, 1845) are separated from all other species within the genus *Eremiascincus* Greer, 1979 by the presence of dorsal scales that are keeled or with central ridges, especially on the rump and base of the tail, or

alternatively, if keeling is very weak or absent, a large adult size in excess of a snout-vent length of over 90 mm; 32 or less tail bands; 14 or less dark bands on the body; body bands distinct, unbroken and of same intensity on the back as the flanks.

**Distribution:** *E. richardsonii ngaanyatjarra subsp. nov.* occurs in the Warburton Range and nearby Blackstone Range of central eastern Western Australia, Australia.

The closely related *E. richardsonii neglectas subsp. nov.* occur in and near the Petermann and Musgrave Ranges, all situated generally near the borders of South Australia, Western Australia and the Northern Territory.

**Etmology:** The Ngaanyatjarra people are the original (first Australians) inhabitants and occupiers of the lands where this taxon occurs in central eastern Western Australia, Australia.

**EREMIASCINCUS RICHARDSONII NEGLECTAS SUBSP. NOV.**

**LSIDurn:lsid:zoobank.org:act:C0D1E905-6ED7-422C-94E8-FD0A7217299D**

**Holotype:** A preserved specimen at the South Australian Museum, Adelaide, South Australia, Australia, specimen number R50195 collected from 14 km south-east of Sentinel Hill, South Australia, Latitude -26.1717 S., Longitude 132.5478 E.

This government-owned facility allows access to its holdings.

**Paratype:** A preserved specimen at the South Australian Museum, Adelaide, South Australia, Australia, specimen number R51566 collected from 38 km east south-east of Amata, South Australia, Australia, Latitude -26.2872 S., Longitude 131.4917 E.

**Diagnosis:** Until now, most authors have treated *Eremiascincus richardsonii* (Gray, 1845) as a single pan-Australian species, without recognition of any local variants as either species or subspecies.

It is almost certainly a complex of multiple species, but in the absence of molecular data, each of ten obviously divergent lineages are herein formally identified as separate subspecies.

For two, including the nominate form, there are available names and these are used in accordance with the requirements of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

Names are assigned for the first time in accordance with the *International Code of Zoological Nomenclature* to the other eight divergent populations in this paper.

The ten relevant taxa are all essentially from areas generally near their type localities and/or as otherwise indicated in the preceding description of *E. richardsonii djaru subsp. nov.*

*E. richardsonii neglectas subsp. nov.* and the closely related and morphologically similar *E. richardsonii ngaanyatjarra subsp. nov.* are separated from other subspecies within the *Eremiascincus richardsonii* (Gray, 1845) complex by the following unique combination of characters:

*E. richardsonii ngaanyatjarra subsp. nov.* is separated from the other subspecies by having rich chocolate brown dorsal bands (9-12 in number) over a light yellow background, each lighter scale also prominently etched with the same chocolate brown, a light orange-brown head; lower numbers of subdigital lamellae under the fourth toe 21-26 (22.8), against averages of 24.0-25.8 in all other subspecies; 29-32 midbody rows and 24-26 caudal bands (original tail) (Storr 1967, 1974).

It is also the only West Australian form in which the dark bands are obviously narrower than the lighter interspaces. In this respect it is like all subspecies found in the NT, South Australia, NSW and Queensland, the two most eastern subspecies having interspaces roughly double the width of the darker bands..

*E. richardsonii ngaanyatjarra subsp. nov.* in life is depicted online at:

<https://www.inaturalist.org/observations/65339599>

*E. richardsonii neglectas subsp. nov.* is separated from the other subspecies by the combination of the following characters, in being essentially similar to *E. richardsonii ngaanyatjarra subsp. nov.* except for differing by having 33-34 midbody rows, 10-14 dorsal bands and 32 caudal bands (original tail).

*E. richardsonii neglectas subsp. nov.* in life is depicted online at:

<https://www.inaturalist.org/observations/100444376>

Separation of the other nine subspecies from each other and the one above (*E. richardsonii neglectas subsp. nov.*) are done within

the preceding formal description of *E. richardsonii djaru* subsp. nov. which is explicitly also relied upon as part of this formal description. All the preceding subspecies of *E. richardsonii* (Gray, 1845) are separated from all other species within the genus *Eremiascincus* Greer, 1979 by the presence of dorsal scales that are keeled or with central ridges, especially on the rump and base of the tail, or alternatively, if keeling is very weak or absent, a large adult size in excess of a snout-vent length of over 90 mm; 32 or less tail bands; 14 or less dark bands on the body; body bands distinct, unbroken and of same intensity on the back as the flanks.

**Distribution:** *E. richardsonii neglectas* subsp. nov. occur in and near the Petermann and Musgrave Ranges, all situated generally near the borders of South Australia, Western Australia and the Northern Territory. The closely related *E. richardsonii ngaanyatjarra* subsp. nov. occurs in the Warburton Range and nearby Blackstone Range of central eastern Western Australia, Australia.

**Etymology:** The subspecies nomen "*neglectas*" comes from the Latin word "*neglectus*" which means overlooked, in reference to the taxon being overlooked by herpetologists in a generally overlooked part of Australia. The spelling has been changed for the nomen to avoid potential homonym issues and therefore should not be changed.

**EREMIASCINCUS RICHARDSONII PINDIINI SUBSP. NOV.**

**LSIDurn:lsid:zoobank.org:act:61F47094-246F-4DA1-9774-79B8DD84D27B**

**Holotype:** A preserved specimen at the South Australian Museum, Adelaide, South Australia, Australia, specimen number R678 collected from Oldea, South Australia, Australia, Latitude -30.45 S., Longitude 131.83 E.

This government-owned facility allows access to its holdings.

**Paratypes:** 1/ A preserved specimen at the South Australian Museum, Adelaide, South Australia, Australia, specimen number R9404 collected from Oldea, South Australia, Australia, Latitude -30.45 S., Longitude 131.83 E., 2/ Three preserved specimens at the National Museum of Victoria, Melbourne, Victoria, Australia, specimen numbers D390, 396, 397 all collected from Oldea, South Australia, Australia, Latitude -30.45 S., Longitude 131.83 E.

**Diagnosis:** Until now, most authors have treated *Eremiascincus richardsonii* (Gray, 1845) as a single pan-Australian species, without recognition of any local variants as either species or subspecies.

It is almost certainly a complex of multiple species, but in the absence of molecular data, each of ten obviously divergent lineages are herein formally identified as separate subspecies.

For two, including the nominate form, there are available names and these are used in accordance with the requirements of the *International Code of Zoological Nomenclature* (Ride et al. 1999). Names are assigned for the first time in accordance with the *International Code of Zoological Nomenclature* to the other eight divergent populations in this paper.

The ten relevant taxa are all essentially from areas generally near their type localities and/or as otherwise indicated in the preceding description of *E. richardsonii djaru* subsp. nov..

*E. richardsonii pindiini* subsp. nov. is separated from other subspecies within the *Eremiascincus richardsonii* (Gray, 1845) complex by the following unique combination of characters:

*E. richardsonii pindiini* subsp. nov. is separated from the other subspecies by the high frequency of 2 (rather than 3) supraoculars in contact with frontal (56 %) and numerous lamellae under fourth toe (24-29, average 26.7). The frequency of specimens with frontal not clearly longer than frontoparietal plus interparietals is high (44 %); and more than half the specimens have the frontoparietal longer than interparietals. The number of scale rows is extremely low (28-32, average 29.8). Labials 8 (rarely 7); supraciliaries 7-9 (mostly 8); dark dorsal bands 8-11 (av. 9.6) and, as in all populations east of the Western Australian border, are considerably narrower than the interspaces. Upper surface of head is distinctively brown and the body background is yellow. Any darker outline of light scales on the dorsum are effectively absent.

*E. richardsonii pindiini* subsp. nov. is depicted in life online at: <https://www.inaturalist.org/observations/145886752>

Separation of the other nine subspecies from each other and the

one above are done within the preceding formal description of *E. richardsonii djaru* subsp. nov. which is explicitly also relied upon as part of this formal description.

All the preceding subspecies of *E. richardsonii* (Gray, 1845) are separated from all other species within the genus *Eremiascincus* Greer, 1979 by the presence of dorsal scales that are keeled or with central ridges, especially on the rump and base of the tail, or alternatively, if keeling is very weak or absent, a large adult size in excess of a snout-vent length of over 90 mm; 32 or less tail bands; 14 or less dark bands on the body; body bands distinct, unbroken and of same intensity on the back as the flanks.

**Distribution:** *E. richardsonii pindiini* subsp. nov. occurs in the western and central interior of South Australia, east to the Flinders Ranges and therefore occupies the main part of the State of South Australia.

**Etymology:** The Pindiini people are the Aboriginal people (first Australians) of the region north of the Nullarbor Plain, which is where this subspecies occurs and after whom the taxon is named. Other than having to deal with nuclear fall-out from the repeated British Atomic Bomb testing at nearby Maralinga, as well as the associated dumping of radioactive wastes on their lands, these peaceful Australian natives have generally been left alone by the British conquerors and had to deal with radiation sickness, cancers, birth defects in children and other health issues without the benefits of western medicine.

**EREMIASCINCUS RICHARDSONII WIRADJURI SUBSP. NOV.**

**LSIDurn:lsid:zoobank.org:act:DAAE74CB-79FD-4DEF-AA69-4720E50C4276**

**Holotype:** A preserved specimen at the Australian Museum in Sydney, New South Wales, Australia, specimen number R7276 collected from the Hay Line, Darlington Point, New South Wales, Australia, Latitude -34.566 S., Longitude 146.0 E.

This government-owned facility allows access to its holdings.

**Paratype:** A preserved specimen at the Australian Museum in Sydney, New South Wales, Australia, specimen number R7277 collected from the Hay Line, Darlington Point, New South Wales, Australia, Latitude -34.566 S., Longitude 146.0 E.

**Diagnosis:** Until now, most authors have treated *Eremiascincus richardsonii* (Gray, 1845) as a single pan-Australian species, without recognition of any local variants as either species or subspecies.

It is almost certainly a complex of multiple species, but in the absence of molecular data, each of ten obviously divergent lineages are herein formally identified as separate subspecies.

For two, including the nominate form, there are available names and these are used in accordance with the requirements of the *International Code of Zoological Nomenclature* (Ride et al. 1999). Names are assigned for the first time in accordance with the *International Code of Zoological Nomenclature* to the other eight divergent populations in this paper.

The ten relevant taxa are all essentially from areas generally near their type localities and/or as otherwise indicated in the preceding description of *E. richardsonii djaru* subsp. nov..

*E. richardsonii wiradjuri* subsp. nov. is separated from other subspecies within the *Eremiascincus richardsonii* (Gray, 1845) complex by the following unique combination of characters:

*E. richardsonii wiradjuri* subsp. nov. is similar in most respects to both *E. richardsonii ambigua* and *E. richardsonii pindiini* subsp. nov. but separated from each by the following character suite: 8-10 dark dorsal bands (versus 11-13 in *E. richardsonii ambigua*); 8 upper labials; 8-9 supraciliaries; 21-23 lamellae under the fourth toe (versus 24-29 in *E. richardsonii pindiini* subsp. nov.); 3 secondary temporals. 32-36 midbody rows 22-29 caudal bands.

*E. richardsonii wiradjuri* subsp. nov. in life is depicted online at:

<https://www.inaturalist.org/observations/159623531>

and

<https://www.inaturalist.org/observations/38874809>

and

<https://www.inaturalist.org/observations/39033932>

*E. richardsonii ambigua* is defined and separated from the other

taxa by the having 31 to 32 midbody rows, 7-8 upper labials, 6-7 supraciliaries above either eye; 3 supraoculars in contact with frontal, and only 2 secondary temporals; 12-13 dorsal body bands; 22-24 lamellae under the fourth toe.

*E. richardsonii ambigua* in life is depicted online at: <https://www.inaturalist.org/observations/22455039>

and

<https://www.inaturalist.org/observations/103346455>

*E. richardsonii pindiini* subsp. nov. is separated from other subspecies within the *Eremiascincus richardsonii* (Gray, 1845) complex by the following unique combination of characters:

*E. richardsonii pindiini* subsp. nov. is separated from the other subspecies by the high frequency of 2 (rather than 3) supraoculars in contact with frontal (56 %) and numerous lamellae under fourth toe (24-29, average 26.7).

The frequency of specimens with frontal not clearly longer than frontoparietal plus interparietals is high (44 %); and more than half the specimens have the frontoparietal longer than interparietals.

The number of scale rows is extremely low (28-32, average 29.8). Labials 8 (rarely 7); supraciliaries 7-9 (mostly 8); dark dorsal bands 8-11 (av. 9.6) and, as in all populations east of the Western Australian border, are considerably narrower than the interspaces. Upper surface of head is distinctively brown and the body background is yellow. Any darker outline of light scales on the dorsum are effectively absent.

*E. richardsonii pindiini* subsp. nov. is depicted in life online at: <https://www.inaturalist.org/observations/145886752>

Separation of the other subspecies in the *E. richardsonii* species group from each other and the one above (*E. richardsonii wiradjuri* subsp. nov.) are done within the preceding formal description of *E. richardsonii djaru* subsp. nov. which is explicitly also relied upon as part of this formal description.

All the preceding subspecies of *E. richardsonii* (Gray, 1845) are separated from all other species within the genus *Eremiascincus* Greer, 1979 by the presence of dorsal scales that are keeled or with central ridges, especially on the rump and base of the tail, or alternatively, if keeling is very weak or absent, a large adult size in excess of a snout-vent length of over 90 mm; 32 or less tail bands; 14 or less dark bands on the body; body bands distinct, unbroken and of same intensity on the back as the flanks.

**Distribution:** *E. richardsonii wiradjuri* subsp. nov. occurs in southern inland southern New South Wales and extending into the far east of South Australia near the Victorian border.

**Etymology:** The subspecies is named in recognition of the Wiradjuri who are the original native Australian (first nations) inhabitants of the region this subspecies occurs. Their most valuable artefacts, including burial sites over 20K years old, were stolen and ended up in the British Museum. In passing I mention that "Ayers Rock" otherwise known as Uluru from central Australia was not taken back to the UK, because the British invaders realized it was too big to fit inside the British Museum.

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#### CONFLICT OF INTEREST

None.



*Eremiascincus musivus oculatorum subsp. nov.*



*Eremiascincus richardsonii yindjibarndi subsp. nov.*