

# Three new gecko species within the Australian Underwoodisaurus milii species complex (Carphodactylidae).

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#### ABSTRACT

Hoser (2016) in a major revision of the Australian Carphodactylidae divided the putative species complex generally known as the Barking Gecko or *Underwoodisaurus milii* (Bory de Saint-Vincent, 1825) into a total of six defined species, two being formally named for the first time.

Three other divergent forms were not formally named and these are formally identified and named in this paper in accordance with the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999). These are *U. wellsi sp. nov.* from the northern extension of the Flinders Ranges in South Australia, *U. wellingtoni sp. nov.* from central Australia in the Macdonnell Ranges and *U. dorsei sp. nov.* from south-east Queensland.

**Keywords:** Taxonomy; nomenclature; gecko; thick-tailed gecko; Carphodactylidae; Australia; *Underwoodisaurus; milii; mensforthi; asper; martinekae; perthensis; husbandi; seorsus;* new species; *wellsi; wellingtoni; dorsei.* 

#### INTRODUCTION

Hoser (2016) in a major revision of the Australian

Carphodactylidae divided the putative species

complex generally known as the Barking Gecko or

Underwoodisaurus milii (Bory de Saint-Vincent, 1825 into a total of six well defined species, two being formally named for the first time.

Three other allopatric and divergent forms were not formally named due to the lack of either molecular data, specimens to examine, or both.

Since 2016 further specimens of these three populations have been inspected and it has been determined to name them within this paper as new species.

As mentioned in the abstract, these are *U. wellsi sp. nov.* from the northern extension of the Flinders Ranges in South Australia,

*U. wellingtoni sp. nov.* from central Australia in the Macdonnell Ranges and *U. dorsei sp. nov.* from south-east Queensland. In terms of the population from the north Flinders Ranges in South Australia, Oliver and Bauer (2011) provided molecular evidence of species-level divergence of this population from all others sampled by them in their paper.

There has not been an available name for this population and so it is formally named herein as *U. wellsi sp. nov.*.

The centralian population of putative *U. milii* has long been known to be divergent and isolated from all others further south, west or east. It appears to be confined to rocky parts of the Macdonnell Ranges.

Specimens recently examined from this area have shown

consistent morphological differences from those further south. In terms of the South-east Queensland specimens, clearly most similar to *U. husbandi* Wells and Wellington, 1984 they are morphologically divergent from them and separated near the NSW / Qld border by more than 100 km, this gap not being an artefact of an absence of collection, but rather of specimens. As the south-east Queensland population appears to be evolving separately, it makes sense for it to also be formally named as a new species.

#### MATERIALS AND METHODS

Inspected were live and dead specimens from across the range of the putative species *Underwoodisaurus milii sensu lato* as generally defined (*sensu* Cogger 2014), predating the publication of Hoser (2016).

Obviously the emphasis of this paper were specimens from south-east Queensland, central Australia and the northern Flinders Ranges and with respect to those taxa formally recognized and defined in Hoser (2016).

All relevant literature was reviewed as well.

Publications relevant to the ultimate taxonomic conclusions within this paper included all those cited and listed by Hoser (2016) and these are not re-cited here to save space.

There have been no significant publications regarding the taxonomy of this species complex since the publication of Hoser (2016).

Hoser (2016) remains available as hard copy as of 2023 and is also available as an identical pdf file for free download at: http://www.smuggled.com/issue-32-pages-3-25.pdf

# Australasian Journal of Herpetology

#### RESULTS

As already inferred, inspection of specimens yielded consistent morphological differences between populations and so the three flagged species are formally named herein.

While there is no molecular data supporting the designation of the south-east Queensland or Centralian populations as species, (conversely there is none refuting the proposition), both populations are separated from their nearest relatives by uninhabitable (by them) zones of known antiquity and affecting similarly constrained species groups, enabling speciation to have occurred.

This is why there has been no hesitation in formally identifying the two relevant populations as full species.

The Centralian population is separated by sand dune habitat and black soil to the south from all other populations within the *U. milii* complex.

Competing gecko species within the Carphodactylidae occur there.

The south-east Queensland population appears to be separated from that in northern New South Wales by the Border Ranges biogeographical barrier, with a gap between the north and south population being about 100 km in a straight line.

That gap appears to be artefact of absence of lizards as opposed to absence of collection, because it is within a heavily populated (by people) region and is an area heavily collected by herpetologists and museums. It is a relatively rock free upland zone south of the NSW and Queensland border.

The northern Flinders Ranges population was flagged as a distinct species by the molecular data of Oliver and Bauer (2011), but as already mentioned, formal description was deferred pending further material to be inspected.

# 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 2 December 2022, 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.

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 them 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).

#### UNDERWOODISAURUS WELLSI SP. NOV. LSIDurn:Isid:zoobank.org:act:121F2100-E236-4D8A-ABC8-ECD96BB0FB75

**Holotype:** A preserved specimen at the South Australian Museum, Adelaide South Australia, Australia, specimen number R53051 collected from "site 5" at a Magnesite Mine, 20 km south-east of the Leigh Creek township in South Australia, Australia, Latitude -30.4283 S., Longitude 8.3106 E.

This government-owned facility allows access to its holdings. **Paratypes:** Three preserved specimens at the South Australian Museum, Adelaide South Australia, Australia, specimen number R53044 collected from "site 6" at a Magnesite Mine, 20 km south-east of the Leigh Creek township in South Australia, Australia, Latitude -30.4367 S., Longitude 138.3653 E.; specimen number R28099 collected from 5 km north of Copley, South Australia, Australia, Latitude -30.50 S., Longitude 138.42 E. and specimen number R66547 collected from 17.8 km east of Mulgaria Homestead, South Australia, Australia, Latitude -30.0942 S., Longitude 137.7489 E.

Diagnosis: Underwoodisaurus wellsi sp. nov. is separated from the other six species (and one subspecies) in the U. milii species complex as described and diagnosed by Hoser (2016) at pages 16 and 17 under the heading "UNDERWOODISAURUS MILII (BORY DE SAINT-VINCENT, 1825)", as well as U. wellingtoni sp. nov. and U. dorsei sp. nov. as described in this paper, by the following combination of characters: The dorsum is a medium purplish brown to brown in colour, with minimal yellow spotting. There is dull indistinct spotting on the front dorsum of the head, sides and across the back of the head. Between the forelimbs on the dorsum is a thick bold yellow cross-band, sometimes broken at the midline. Behind this are two rows of large dots forming bands across the body and a third across the pelvis, which also runs onto the upper hind limbs. The first such band on the upper surface of the tail is bound by black posteriorly. There are either very few, or no scattered yellow spots on the body other than the bands as mentioned already and this is in stark contrast to most other species in the complex which have scattered yellow spots across the dorsum which are more-or-less evenly spread (e.g. as seen in U. husbandi Wells and Wellington, 1984 or U. perthensis Hoser, 2016), or a greater number of dorsal bands formed by the yellow spots as seen for example in U. milii (Shark Bay, WA form), which typically has five bands on the dorsum formed by scattered yellow spots, excluding the band across the pelvis. Upper surfaces of the legs are purplish-pink and spotted with bold medium-sized yellow spots.

Underwoodisaurus Wermuth, 1965 is separated from Uvidicolus Oliver and Bauer, 2011, this latter genus being the totality of the subtribe Uvidicolina Hoser, 2016 as defined by Hoser (2016) by having the anterior loreals minute, granular and strongly differentiated from the posterior loreals, versus the anterior and posterior loreals being more or less subequal, without marked differentiation anteriorly in Uvidicolus.

## Australasian Journal of Herpetology

The species within the tribe Nephruriini Hoser, 2016 are separated from all other geckoes in the family Carphodactylidae by one of the following two suites of characters: 1/ The (unregenerated) tail ends in a small but distinctive knob (genus *Nephrurus* Günther, 1876), or 2/ The tail does not end in a small but distinctive knob; the claw is between 2 scales, the lower scale may be deeply grooved or even divided to form 3 scales; digits with two rows of lateral scales; tail is swollen without spines and less than twice as broad as thick (genera *Underwoodisaurus* Wermuth, 1965; *Uvidicolus* Oliver

and Bauer, 2011).

*Underwoodisaurus* now consists of nine defined species and one subspecies.

U. wellsi sp. nov. is depicted in life online at:

https://www.inaturalist.org/observations/156374721

**Distribution:** *U. wellsi sp. nov.* is believed to be confined to the northern Flinders Ranges, and adjacent areas in northern South Australia, Australia.

**Etymology:** *Underwoodisaurus wellsi sp. nov.* is named in honour of pioneering Australian herpetologist Richard Wells of Drake, New South Wales, in recognition of a lifetime's work in Australian herpetology, including sensible generic-level classifications of most of Australia's herpetofauna including as published by Wells and Wellington (1984, 1985).

#### UNDERWOODISAURUS WELLINGTONI SP. NOV. LSIDurn:lsid:zoobank.org:act:E18B19A1-7971-4A22-BED1-9074773F7454

**Holotype:** A preserved specimen at the Museum and Art Gallery of the Northern Territory, Australia, specimen number R37527, collected from Owen Springs Reserve, south-west of Alice Springs, Central Australia, Northern Territory, Australia, Latitude -23.84966 S., Longitude 133.49124 E.

This government-owned facility allows access to its holdings. **Paratypes:** 1/ Three preserved specimens at the Museum and Art Gallery of the Northern Territory, Australia, specimen number R34320, collected from Owen Springs Station, south-west of Alice Springs, Central Australia, Northern Territory, Australia, Latitude -23.883 S., Longitude 133.55 E., specimen number R15281 collected from 1km west of the Junction of Larapinta and Nanajird Drives, Alice Springs, Northern Territory, Australia, Latitude -23.7 S., Longitude 133.867 E. and specimen number R37320 collected from Simpsons Gap National Park, Central Australia, Northern Territory, Australia, Latitude -23.72527 S., Longitude 133.73472 E.

2/ A preserved specimen at the South Australian Museum, Adelaide, South Australia, Australia, specimen number R18717 collected from north of Rodinga, Northern Territory, Australia, Latitude -24.0583 S., Longitude 134.0417 E.

**Diagnosis:** Underwoodisaurus wellingtoni sp. nov. is separated from the other six species (and one subspecies) in the *U. milii* species complex as described and diagnosed by Hoser (2016) at pages 16 and 17 under the heading "UNDERWOODISAURUS MILII (BORY DE SAINT-VINCENT, 1825)", as well as *U. wellsi* sp. nov. and *U. dorsei sp. nov.* as described in this paper, by the following combination of characters:

The yellow spotting on the back is in the form of light yellow to cream in colour, as opposed to being bright yellow, with the spots being enlarged and at times forming thick bands on the body, especially at the back of the head and between the forelimbs, where the light band is wide and distinct and without any darker peppering, spots or incursions. White bands on the original tail are exceptionally wide, but often with darker interiors or incursions and the yellow spots on the legs join to form numerous elongated and/or irregularly shaped blotches. There are also extensive areas of yellow on the sides of the head formed by large blotches of yellow that may or may not be joined. Spots on the dorsum sometimes join in a linear manner (running from anterior to posterior) forming short lines running down the body, this usually occurring at the rear of the body.

Dorsum is typically coloured a dark purple-brown colour or

otherwise a light brown colour.

Between the fore and hind limbs, spots on the dorsum often cluster to form two semi-distinct and wide crossbands and are invariably more dense at these parts than between, where there is little or no spotting. The mid to lower flanks have numerous fairly evenly spaced white spots on a lighter brownish background, not strictly corresponding to the bands above, but rather being more continuous along the flank.

*Underwoodisaurus* Wermuth, 1965 is separated from *Uvidicolus* Oliver and Bauer, 2011, this latter genus being the totality of the subtribe Uvidicolina Hoser, 2016 as defined by Hoser (2016) by having the anterior loreals minute, granular and strongly differentiated from the posterior loreals, versus the anterior and posterior loreals being more or less subequal, without marked differentiation anteriorly in *Uvidicolus*.

The species within the tribe Nephruriini Hoser, 2016 are separated from all other geckoes in the family Carphodactylidae by one of the following two suites of characters: 1/ The (unregenerated) tail ends in a small but distinctive knob (genus *Nephrurus* Günther, 1876), or 2/ The tail does not end in a small but distinctive knob; the claw is between 2 scales, the lower scale may be deeply grooved or even divided to form 3 scales; digits with two rows of lateral scales; tail is swollen without spines and less than twice as broad as thick (genera *Underwoodisaurus* Wermuth, 1965; *Uvidicolus* Oliver

#### and Bauer, 2011).

Underwoodisaurus now consists of nine defined species and one subspecies.

**Distribution:** *U. wellingtoni sp. nov.* is confined to the Macdonnell Ranges in Central Australia and suitable habitats immediately to the south.

**Etymology:** *U. wellingtoni sp. nov.* is named in honour of herpetologist Cliff Ross Wellington, of Ramornie, New South Wales, Australia in recognition of a lifetime's services to herpetology, including the writing of numerous species recovery programs for rare and threatened species in New South Wales, Australia and also for his ongoing vigilance in combating taxonomic vandalism (e.g. Wellington, 2015).

#### UNDERWOODISAURUS DORSEI SP. NOV.

#### LSIDurn:Isid:zoobank.org:act:FCE81E0F-209F-4FE9-B516-A2474F20B5FC

**Holotype:** A preserved specimen in the Queensland Museum, Brisbane, Queensland, Australia, specimen number J74951 collected from the Blackdown Tableland National Park, Queensland, Australia, Latitude -23.791667 S., Longitude 149.041667 E.

This government-owned facility allows access to its holdings. **Paratype:** A preserved specimen in the Queensland Museum, Brisbane, Queensland, Australia, specimen number J78956 collected from Mount Morgan, Queensland, Australia, Latitude -23.644722 S., Longitude 150.357222 E.

**Diagnosis:** Underwoodisaurus dorsei sp. nov. is separated from the other six species (and one subspecies) in the *U. milii* species complex as described and diagnosed by Hoser (2016) at pages 16 and 17 under the heading "UNDERWOODISAURUS MILII (BORY DE SAINT-VINCENT, 1825)", as well as *U. wellsi sp. nov.* and *U. wellingtoni sp. nov.* as described in this paper (before this description), by the following combination of characters: It is similar to *U. husbandi* Wells and Wellington, 1984 as defined in Hoser (2016), but separated from that taxon (and by extension all others in the species complex) by a lack of obvious yellow spots on the limbs, a lack of dark spots on the dorsum (unique to that species) and a lower size, density and colour intensity of yellow spots forming a crossband pattern on the dorsum. Any yellow on the head of *U. dorsei sp. nov.* is also faded and relatively indistinct.

Some specimens of *U. dorsei sp. nov.* have light brown spots in place of the equivalent dark spots seen in *U. husbandi* on the dorsum.

Both U. dorsei sp. nov. and U. husbandi are characterised by a

distinctively black tail (original tail), without greying as seen in other species in the complex and particularly strongly contrasting white bands, which may or may not have darker infusions.

U. dorsei sp. nov. in life is depicted online at:

https://www.inaturalist.org/observations/8651979

*U. husbandi* is depicted in life in Swan *et al.* (2022) on page 53 and online at:

https://www.inaturalist.org/observations/143334947

*Underwoodisaurus* Wermuth, 1965 is separated from *Uvidicolus* Oliver and Bauer, 2011, this latter genus being the totality of the subtribe Uvidicolina Hoser, 2016 as defined by Hoser (2016) by having the anterior loreals minute, granular and strongly differentiated from the posterior loreals, versus the anterior and posterior loreals being more or less subequal, without marked differentiation anteriorly in *Uvidicolus*.

The species within the tribe Nephruriini Hoser, 2016 are separated from all other geckoes in the family Carphodactylidae by one of the following two suites of characters: 1/ The (unregenerated) tail ends in a small but distinctive knob (genus *Nephrurus* Günther, 1876), or 2/ The tail does not end in a small but distinctive knob; the claw is between 2 scales, the lower scale may be deeply grooved or even divided to form 3 scales; digits with two rows of lateral scales; tail is swollen without spines and less than twice as broad as thick (genera *Underwoodisaurus* Wermuth, 1965; *Uvidicolus* Oliver

and Bauer, 2011).

The genus *Underwoodisaurus* now consists of nine defined species, all commonly known as Thick-tailed geckoes and one subspecies.

**Distribution:** *U. dorsei sp. nov.* is found in most of southeast Queensland, Australia in a region generally bound by Rockhampton in the north-east, the Gold Coast in the south, Bogantungan in the north-west and Wallumbilla in the southwest.

**Etymology:** *U. dorsei sp. nov.* is named in honour of wildlife displayer and herpetologist Marc Dorse of Toowoomba, Queensland, Australia, in recognition of his contributions to wildlife conservation over many decades. He was also the first person in the world to breed the rare and potentially endangered Manning River Turtle *Wollumbinia purvisi* (Wells and Wellington, 1985).

The genus name *Myuchelys* Thomson and Georges, 2009 is an illegally coined junior synonym of *Wollumbinia* Wells, 2007, that was created in an act of egregious taxonomic vandalism and therefore should not be used as correct under any circumstance. It is not the correct ICZN name (ICZN 2021).

It is also worth noting that as Thomson and Georges (2009) was only published in the online only journal "*Zootaxa*" and not in hard copies in accordance with the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999) at the time and predating a 2012 amendment to the Code allowing for online only publications, the name *Myuchelys* is simply unavailable for zoological nomenclature.

Online publication was only allowed by the ICZN post-dating year 2012 (ICZN 2012).

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None

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