

**Yet another new species in the Australian *Ctenotus taeniolatus* (White, 1790) species group (Squamata:Scincidae), including detailed notes on sexual dimorphism and ecology.**

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**ABSTRACT**

As of early 2023 there were three recognized species in the *Ctenotus taeniolatus* (White, 1790) complex. These were:

1/ *Ctenotus taeniolatus* (White, 1790), with a type locality of New South Wales, of the form found around Sydney and environs.

2/ *C. miowera* Wells and Wellington, 1985 with Miowera, north Queensland as the type locality and of the form found in most of that state,

3/ *C. robertcooki* Hoser, 2022, type locality of collected from Kingsgate Road, about 34km east of Glen Innes, New South Wales, Australia, Latitude -29.80166 S., Longitude 151.98249 E, being from the New England Region of northern New South Wales and far south-east Queensland and with a divergence of 1.75 MYA or more from the nominate form of *C. taeniolatus* as found by Colgan *et al.* (2009).

This paper names a divergent fourth species in the complex from north-east Victoria, nearby parts of far southern New South Wales and the ACT as *Ctenotus sonnemannorum* sp. nov..

Externally, it is readily separated from the preceding three taxa by a consistently different configuration of stripes at the anterior part of the dorsum and head, being black in the mid stripe, versus brown in the other three taxa.

Separate to the preceding, the following important fact should be noted.

*Innocuascincus* Hoser, 2022 as proposed by Hoser in 2022 is an objective junior synonym of *Serenitas* Wells, 2009 as proposed in Wells (2009) for the same taxonomic concept.

**Keywords:** Taxonomy; nomenclature; Australia; Queensland; New South Wales; Victoria; ACT; New England; lizard; skink Copper-tailed skink; *Ctenotus*; *taeniolatus*; *miowera*; *robertcooki*; *Innocuascincus*; *Serenitas*; new species; *sonnemannorum*.

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## INTRODUCTION

For decades it has been known that species diversity in Australia's lizards has been severely under-estimated (Wells and Wellington, 1983, 1985).

To 10 August 2023, I (Raymond Hoser) have added more than 230 species of reptiles to the Australian total over the preceding two and a half decades, the bulk of these being lizards and yet more forms await formal description.

In terms of the putative species *Ctenotus taeniolatus* (White, 1790), Hoser (2022a) published the most recent work on the taxonomy of the group and cited all relevant references.

The three named and recognized species were:

1/ *Ctenotus taeniolatus* (White, 1790), with a type locality of New South Wales, of the form found around Sydney and environs.

2/ *C. miowera* Wells and Wellington, 1985 with Miowera, north Queensland as the type locality and of the form found in most of that state,

3/ *C. robertcooki* Hoser, 2022, type locality of collected from Kingsgate Road, about 34km east of Glen Innes, New South Wales, Australia, Latitude -29.80166 S., Longitude 151.98249 E, being from the New England Region of northern New South Wales and with a divergence of 1.75 MYA or more from the nominate form of *C. Taeniolatus* as found by Colgan *et al.* (2009).

In the face of the preceding, a fourth and very divergent form has been identified in far north-east Victoria and nearby parts of southern New South Wales and the ACT. While molecular data is unavailable, it is so divergent from the others, allopatric to them and with no intermediate form specimens known, so quite clearly appeared to be of a different species. Therefore it was inspected more closely with a view to formally name it as a new species in accordance with the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

## MATERIALS AND METHODS

Specimens were inspected from across the putative range for the complex, from north-east Queensland to north-east Victoria.

Consistent differences were noted and readily matched with relevant species.

However in the case of southern specimens, there were two different forms noted.

These were more closely inspected to quantify differences and to confirm the absence of any intermediate forms and to try to ascertain the distributional limits of the type form (AKA Sydney basin form) and that from north-east Victoria, the two being proximal in distribution to one another.

Relevant literature as cited in Hoser (2022a) was also consulted to confirm the absence of any possible synonym forms or names to the potential Victorian taxon.

## RESULTS

Comparative inspection of specimens of *C. taeniolatus* from the Sydney region, being of the type form and what is perhaps best described as "the north east Victorian form" revealed consistent differences between the two enabling me to make a reliable species level diagnosis.

As a result of the preceding, I herein formally name as new, "the north east Victorian form" as *C. sonnemannorum* sp. nov..

Based on inspections of many specimens, those from the Canberra, ACT region and south appear to be of this new species, while those from the Sandstone regions to the north are of the nominate form of *C. taeniolatus*.

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

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

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



*Ctenotus sonnemannorum* sp. nov.



Granite habitat of  
*Ctenotus sonnemannorum* sp. nov.  
immediately west of Beechworth,  
Victoria, Australia, and adult specimen.





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

Any online citations within this paper, including copied emails and the like, are not as a rule cited in the references part of this paper and have the same most recent viewing and checking date of 12 November 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 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.

#### **CTENOTUS SONNEMANNORUM SP. NOV.**

**LSIDurn:lsid:zoobank.org:act:F6520468-C183-40A4-9528-CAB5C36EB497**

**Holotype:** A preserved specimen at the National Museum of Victoria, Melbourne, Victoria, Australia, specimen number D60940 collected from Mount Leinster, Victoria, Australia, Latitude -36.9083 S., Longitude 147.907 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 D49716 collected from 6 km North-north-east of Tongio, Victoria, Latitude -37.17 S., Longitude 147.73 E.

**Diagnosis:** Until now the species *Ctenotus sonnemannorum* sp. nov. has been treated as a north-east Victorian population of *Ctenotus taeniolatus* (White, 1790).

However *C. sonnemannorum* sp. nov. is readily separated from *C. taeniolatus* (White, 1790), *C. robertcooki* Hoser, 2022 and *C. miowera* Wells and Wellington, 1985 as follows:

On the upper dorsum of all four species are two thin yellowish white lines running longitudinally down the back, either side of the black mid-line, as well as another two similar yellowish white lines running longitudinally down the back on the interface between dorsum and flank.

Between the middle and edge line on either side, the dorsum colour is brown or mainly brown, effectively forming another line.

Each of these lines starts at the back of the head and ends just beyond the pelvic girdle.

In terms of the brown line near the lateral edges of the dorsum, in *C. taeniolatus*, this narrows anteriorly, with black appearing on either side of this and between the white line border, in effect forming a pair of narrow black lines, either side of the brown and in turn bound by the whitish-yellow lines. However in this species as well as *C. robertcooki* sp. nov. and *C. miowera* this brown line extends well anterior of the front limbs.

Readily separating *C. sonnemannorum* sp. nov. from the following is that the brown line effectively ends about half-way up the body, meaning that anteriorly there is only black between the four thin yellow-white lines. In no adult specimens seen does the brown ever come close to being more anterior of the front limbs, whereas the reverse consistently applies in the three other species.

*C. sonnemannorum* sp. nov. is further separated from the other three species in that the black stripe from nostril to eye is thick and noticeably expanding up on the upper edge, versus thin and not expanding up on the upper edge in the other species.

In terms of separating the other three previously described species within the complex, the following applies.

The species *Ctenotus taeniolatus* (White, 1790) is readily

separated from *Ctenotus robertcooki* sp. nov. by the possession of a pale snout with distinctive dark spots or blotches versus none in *C. robertcooki* sp. nov.. Furthermore *C. taeniolatus* has black on the outer side of the two middle whitish lines, versus not so in *C. robertcooki* sp. nov..

In common with *C. robertcooki* sp. nov., *C. miowera* Wells and Wellington, 1985 has a dark coloured snout and does not have black on the outer side of the two middle whitish lines. However in contrast to all of *C. sonnemannorum* sp. nov., *C. robertcooki* sp. nov. and *C. taeniolatus* the black band running down the midline of the body in *C. miowera* extends all or most of the way down the (original) tail, versus less than a third of the way down in *C. robertcooki* sp. nov. and less than halfway down in *C. taeniolatus* and *C. sonnemannorum* sp. nov..

The black band running down the midline of the body terminates on the tail less than the length of the extended hind limb and toes in *C. robertcooki* sp. nov., versus always past this in *C. taeniolatus* and *C. sonnemannorum* sp. nov.. The black band running down each flank of the tail is thin in *C. robertcooki* sp. nov., medium in *C. taeniolatus* and *C. sonnemannorum* sp. nov. and thick in *C. miowera*.

*C. taeniolatus*, *C. robertcooki* sp. nov., *C. sonnemannorum* sp. nov. and *C. miowera* as a foursome are separated from all other East Australian lizards in the genus *Ctenotus* Storr, 1964 by the following suite of characters:

Well defined, black mid-dorsal stripe running from nape past the base of the tail; no prominent spots on the body of the adult; nasal is not or is only very weakly grooved; 18-22 subdigital lamellae under the fourth toe, each with a blunt keel; eight yellow-white longitudinal stripes on the flanks and back, with well-defined brown or black stripes intervening; a narrow pale upper lateral stripe is always continuous from the ear opening to the groin; original tail is commonly, but not always a copper-red colour at the posterior end.

*C. sonnemannorum* sp. nov. is depicted in life in images in this paper as well as on the front cover of this issue of this journal, which should be treated as part of this formal publication, as well as online at:

<https://www.inaturalist.org/observations/151190052>

and

<https://flickr.com/photos/ryanfrancis/51915698862/>

(specimen is not Tasmanian as identified in the caption)

and

<https://collections.museumsvictoria.com.au/species/15230>

and

<https://www.inaturalist.org/observations/91513632>

and

<https://www.inaturalist.org/observations/152103146>

*Ctenotus taeniolatus* (White, 1790) in life is depicted in Hoser (1989) on pages 11 and 88 (at bottom left), Cogger (2014) at page 525 at bottom right (and front cover), Swan, Shea and Sadlier (2009) on page 119 and online at:

<https://www.inaturalist.org/observations/27179813>

and

<https://www.inaturalist.org/observations/41436549>

*C. robertcooki* sp. nov. in life is depicted in Wilson and Swan (2017) on page 275 at bottom left and online at:

<https://www.inaturalist.org/observations/39394957>

and

<https://www.inaturalist.org/observations/41586030>

and

<https://www.inaturalist.org/observations/103123932>

*C. miowera* Wells and Wellington, 1985 in life is depicted online at:

<https://www.inaturalist.org/observations/111504510>

The "Additional notes on *C. sonnemannorum* sp. nov. and other sympatric reptile species" below explicitly form part of this formal species description.

#### Distribution:

*C. sonnemannorum* sp. nov. is found from the ACT and Bateman's Bay in the north, south, through nearby parts of southern New South Wales to north-east Victoria to near Mount Buller in the south and Tatong in the south-west.

*C. robertcooki* sp. nov. appears to be restricted to the northern New England region of New South Wales and immediately adjacent southern Queensland in the so-called Granite-belt only. This is an area generally between Armidale in the South in New South Wales and Girraween in the north in Queensland, not including the nearby slopes and plains to the east or west.

*Ctenotus taeniolatus* as defined herein is distributed generally south and also to the immediate west and south-west of the northern New England region of northern New South Wales, south along the coast, ranges and slopes to include the sandstone plateaus of the Sydney basin, including those west of Nowra, with a southern extremity of known distribution being Ulladulla.

This is a different distribution for this species as was given in Hoser (2022), because *C. sonnemannorum* sp. nov. was included with that species.

*C. miowera* as defined herein appears to occupy most of the east coast, ranges and nearby slopes of Queensland south of about Cooktown and not including the Granite Belt of the southern highlands near the New South Wales border.

**Etymology:** *C. sonnemannorum* sp. nov. is named in honour of Neil and Cathy Sonnemann of Murmungee, north-east Victoria in recognition of many decades contributions to herpetology in Australia.

#### ADDITIONAL NOTES ON *C. SONNEMANNORUM* SP. NOV. AND OTHER SYMPATRIC REPTILE SPECIES.

In this species there is also a well-defined sexual dimorphism.

Adult males are slightly smaller and more gracile in build than females.

On first light in the morning of 21 October 2023, 52 specimens were caught and measured in a 150 minute period, arising from lifting of rocks in an area of suitable habitat.

All were adults.

Specimens were released after being measured and sexed.

This was in the vicinity of Flat Rock Road, 3 km east of Beechworth, Victoria. Females (n=28) averaged 6 cm S-V and with a 16 cm tail and body combined, with the largest / longest being 18.5 cm in total length.

The males (n=24), were both thinner in build and 1 cm shorter in total length on average, with the largest / longest being 6 cm snout-vent and 16 cm in total length.

Significantly the tail morphology between the sexes is also noticeably consistently different.

The adult female lizard has a tail that is thick at the base and continues thick further down from the base, implying the presence of hemipenes within.

However hemipenes are obviously absent, the relevant part of the tail simply being thick and muscular.

By contrast, the tail in the male rapidly thins shortly past the base and is thin below this point.

The hemipenes are in the thicker part of the base of the tail and are also relatively small and short when extruded, explaining the relatively small and short swelling of the relevant anterior part of the tail.

The preceding facts means that on external examination alone, it would be easy to confuse and reverse identification of males and females as the relevant tail morphology is in effect opposite to that seen in most adult Australian elapids, being what is familiar to most Australian herpetologists.

I was able to confirm the preceding by virtue of the fact that all caught lizards were carefully probed with appropriate sized snake/lizard sexing probes and as a result there was no error in my sexing of any of the lizards.

While conditions were seasonally warm, all lizards were located sheltering under rocks, usually in a rock on rock situation, but with dirt also under the rock, allowing the lizards to occupy a well defined burrow. This was primarily because of the time of day the searching was done, (as in first thing in the morning and before the sun rose to a height sufficient to warm the rocks). No specimens were located under complete rock on rock situations in the absence of dirt although the sympatric species, *Diplodactylus fiacummingae* Hoser, 2023 was only found in that situation.

In the time that 52 specimens of *C. sonnemannorum* sp. nov. were located, just one *D. fiacummingae* was.

Noting that it was evident that the area had been searched at least once previously in the recent past by reptile collector/s (almost all liftable rocks had obviously been lifted and moved before), the disparity in numbers may be an artefact of collection as opposed to original differences in numbers in a virgin habitat. The geckos are sought after in the pet trade, while the small skinks are not.

This implied that geckos found had been taken, while the skinks had not been.

It is also possible that if skinks had been taken by collectors in the past, then they had been able to recover their populations more quickly.

Sympatric also in the area (being a habitat dominated by granite rock outcrops and exfoliations), were several other species, the following numbers which were found in the same 150 minutes of searching: One half grown Blind Snake *Anilius nigrescens* Gray, 1845 (male), 14 *Hemiergis talbinoensis* Copland, 1946 (of assorted sizes of both sexes), 8 *Ctenotus robustus* Storr, 1970 (one half grown and the rest adult of both sexes), 7 *Morethia boulengeri* (Ogilby, 1890) (all adult of both sexes), 1 *Amphibolurus muricatus* (White, 1790) (adult female), *Lampropholis guichenoti* (Duméril and Bibron, 1839) (one adult male) found in grassy area not near rock and adjacent to a log), *Egernia jossae* Wells and Wellington, 1985 (half grown female found under a large rock on rock).

The *C. sonnemannorum* sp. nov. displayed a preference for flat rocks, exposed to open sunlight (not shaded), typically about 3 to 9 cm thick on the edges of rock outcrops, being either rock on rock, with dirt on one part, or rock on dirt (but not deeply embedded), types of situations.

Significantly the sympatric *Ctenotus robustus* preferred situations either away from the rock outcrops, or in the alternative, occupied the underneath's of much larger and heavier rocks.

However the half grown *Ctenotus robustus* and a *C. sonnemannorum* sp. nov. were found occupying the underside of a single large rock.

The rock was about 30 cm high, 30 cm wide and about 45 cm long. The two lizards occupied burrows under different parts of the rock and were not immediately proximal to one another.

Without exception all the other preceding reptiles were otherwise found alone, strongly implying that as a rule the individual reptiles do not like the company of other reptiles.

The *Diplodactylus fiacummingae* Hoser, 2023 found occupied a large rock, wholly on rock and partially shaded by a small tree, which also sat on the west side of the rock, effectively shielding the gecko from the most extreme heat of the day.





Sexual dimorphism in *Ctenotus sonnemannorum* sp. nov.  
Top photo, female on left. Bottom photo, female at bottom.



Hoser 2024 - Australasian Journal of Herpetology 67:3-9.



There were numerous other rock on rock situations immediately nearby, not occupied by any specimens of this species or any other reptile, implying that the *D. fiacummingae* found, had latitude to occupy various nearby sites by day, depending on season and thermal constraints.

Also found were two species of frogs, being four *Limnodynastes tasmaniensis* Günther, 1858 (adults, being 2 of each sex) and one *Crinia (Ranidella) fiacummingae* Hoser, 2023 (adult female), all found in damp situations between rock outcroppings.

Almost all liftable rocks had some kind of animal underneath, these being either reptiles or centipedes, with large spiders left often seen, and in the warmer situations ant nests.

This clearly indicated that the limiting factor on species and abundance in this area was habitat in the form of rocks and in the long term either removal of liftable rocks or addition of them could cause populations to fluctuate accordingly.

Obviously at warmer times of the year in warmer weather, the species found on the above date would have to take refuge elsewhere to avoid excessive heat, be it down burrows under the rocks if available, or elsewhere.

#### AN URGENT FORMAL CORRECTION TO AN EARLIER NOMENCLATURAL ACT.

The following important fact should be noted.

*Innocuascincus* Hoser, 2022 as proposed in Hoser (2022b) is an objective junior synonym of *Serenitas* Wells, 2009 as proposed in Wells (2009) for the same taxonomic concept.

Under the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999), the earlier (Wells) name is the correct name and is the one that should be used.

That is, the name I proposed, should not be used as the first available name because it simply is not!

It is important that nomenclatural mistakes are corrected at the first available opportunity, even if as an author, one would prefer not to have their mistakes made public.

Science must sit above personal egos and attempts to present as perfect and mistake free when one does in fact get something wrong.

The error arose following an unlawful police raid on our property at the time the relevant paper was being prepared and in order to complete it, an earlier draft was used (safe from raiding police), which had not used the correct name.

A newer name was coined in error.

The mistake was not picked up in peer review.

Enquires of three reviewers confirmed that all of them had checked for synonyms using the Peter Uetz site, "*The Reptile Database*", in the misguided belief it was a complete dataset of available names and synonyms in herpetology, when it was not.

In this case Uetz had made sure that the Wells (2009) name was not on the database, along with over 1,000 other names and papers he has recently censored (see Hoser 2023a-c for details).

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#### CONFLICTS OF INTEREST

THERE ARE NONE.