

Out from the cold ... a new species of Australian Jacky Dragon *Amphibolurus* Wagler, 1830 from the region near the southern border between South Australia and Victoria as well as a new subspecies from New South Wales and Victoria.

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ABSTRACT

Hoser (2015) published a major review of the genus *Amphibolurus*, naming four new species, including two in the *Amphibolurus muricatus* (White, 1790) complex.

The southern Victorian population, now known as *A. jacky* Hoser, 2015 (type locality Winchelsea, Victoria), believed to be divergent from type *A. muricatus* by 3 MYA is in turn split into two well-defined clades (Pepper *et al.* 2014).

The population from far south-west West Victoria and nearby parts of South Australia, believed to be divergent from the central southern animals by more than 2 MYA was not named by Hoser (2015) pending inspection of further specimens of those lizards.

This has now occurred and because they are consistently morphologically identifiable as distinct from the central southern Victorian ones they are formally named as a new species, namely *A. boandikororum* *sp. nov.* in honour of the local indigenous peoples, the Boandik tribe.

The widespread and divergent population found south of the line between Berrima, through Robertson and east to Kiama in New South Wales south to include Victoria east of the Latrobe Valley and including most of the Western slopes of New South Wales and nearby parts of north-east Victoria is also formally named as a subspecies of *A. muricatus*, being *A. muricatus absconditus* *subsp. nov.*

Keywords: Taxonomy; nomenclature; lizard; agamid; Jacky dragon; *Amphibolurus*; *jacky*; *muricatus*; *adelyn*; *eipperii*; *wellsi*; Victoria; South Australia; new species; *boandikororum*; new subspecies *absconditus*.

INTRODUCTION

As part of a wide-ranging audit of the Australian herpetofauna by myself spanning some decades, potentially undescribed forms within all Australian snakes and lizards have been inspected and if deemed sufficiently divergent, formally named as species or subspecies.

A small number were "passed over" awaiting further inquiries, including the newly identified taxa subject of this paper.

Hoser (2015) published a major review of the genus *Amphibolurus* Wagler, 1830, naming four new species, including two in the *Amphibolurus muricatus* (White, 1790) complex.

These were *A. jacky* Hoser, 2015 and *A. eipperii* Hoser, 2015 in the *A. muricatus* complex in addition to *A. adelyn* Hoser, 2015, being most closely related to *A. norrisi* Witten and Coventry, 1984 and *A. wellsii* Hoser, 2015 being most similar to *A. centralis* (Loveridge, 1933).

The southern Victorian population, now known as *A. jacky* Hoser, 2015 (type locality Winchelsea, Victoria), believed to be divergent

from type *A. muricatus* by 3 MYA was named by Hoser (2015).

That there was a well-defined split, likely to be in excess of 2 MYA between the south-west Victorian lizards and those of the type population was known before Hoser (2015) was published (see Pepper *et al.* 2014), so to this extent that there was a divergent unnamed population in south-west Victoria is not a discovery made here.

Preceding the publication of Hoser (2015) which was a wide-ranging paper naming 18 species, some species and groups were passed over pending further inspections of specimens, including the south-west Victorian putative *A. jacky*. This non-description of the taxon at the time was not because I did not believe it was a valid species or subspecies worthy of recognition, but rather that I had trouble identifying a means to separate it from the nominate population of *A. jacky* from central southern Victoria.

A similar situation existed for specimens in north-east Victoria, which I have known for decades appear different to those from Sydney, the type locality for *A. muricatus*.

Because Pepper *et al.* (2014) indicated a lesser divergence of this population from the type form, I inspected specimens with a view to separating them at the subspecies level.

MATERIALS AND METHODS

In the ensuing 8 years, I have had the opportunity to inspect several dozen specimens of the south-west Victorian population, including specimens from the adjoining parts of far south-east South Australia to see if I could confirm consistent identifiable differences between these lizards and those from central southern Victoria.

Same applied to newly inspected material from north and east Victoria and most parts of Eastern New South Wales, including the region between Sydney and Melbourne along the coast and nearby hinterland.

RESULTS

I was able to confirm consistent identifiable differences between the lizards from south-west Victoria as well as nearby parts of South-east South Australia and those from central southern Victoria.

Therefore I have no hesitation in formally naming and describing the south-west Victorian / far south-east South Australian population of putative *A. jacky* as a new species in accordance with the *International Code of Zoological Nomenclature* (Ride *et al.* 1999) as amended (ICZN 2012).

In terms of the north-east Victorian animals, previously diagnosed by Hoser (2015) as being within putative, *A. muricatus*, consistent differences between the two forms were identified allowing me to formally identify it as a new subspecies being *A. muricatus absconditus subsp. nov.*

That taxon occurs south of a line from Berrima, through Robertson and east to Kiama in New South Wales (a line being on the east coast and nearby ranges to the west) south to include Victoria east of the eastern Latrobe Valley and including most of the Western slopes of New South Wales and nearby parts of north-east Victoria.

Significantly both newly identified taxa have ranges extending to relatively cold parts of southern Australia, which is why the title of this paper included the phrase "out from the cold".

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 the species or subspecies 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).

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.

It is worth noting here that the colouration intensity of the relevant species varies strongly with temperature, shedding cycle and diurnal / nocturnal cycles, but a normal unstressed adult dragon during daytime hours that is moderately warm but not overheating will display the colourations described herein.

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.

AMPHIBOLURUS BOANDIKORUM SP. NOV.

LSIDurn:lsid:zoobank.org:act:DFC6875E-CE0B-4247-8A58-158D64C7EBA9

Holotype: A preserved specimen at the South Australian Museum, Adelaide, South Australia, Australia, specimen number R49374 collected from Donovans, South Australia, Australia, Latitude -38.00778 S., Longitude 140.96250 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 R49376 collected from Donovans, South Australia, Australia, Latitude -38.00778 S., Longitude 140.96250 E.

2/ A preserved specimen at the South Australian Museum, Adelaide, South Australia, Australia, specimen number R49467 collected from Nangwarry, South Australia, Australia, Latitude -37.45444 S., Longitude 140.87528 E.

Diagnosis: The species *A. boandikorum sp. nov.* is similar in most respects to *A. jacky* Hoser, 2015 and like that species separated from all others in the *A. muricatus* (White, 1790) complex (also including *A. eipperri* Hoser, 2015), as well as *A. norrisi* Witten and Coventry, 1984 and *A. adelyn* Hoser, 2015 as defined in Hoser (2015) for *A. jacky* on pages 41 and 42.

A. boandikorum sp. nov. is separated from *A. jacky* by having three prominent thin dark stripes radiating out from the upper eye, versus the same being ill-defined or absent in *A. jacky*.

Furthermore, the nuchal spines in adult male *A. boandikorum sp. nov.* are thin, pointed and all black, versus moderate in thickness and not necessarily all black in *A. jacky*.

A. jacky and *A. boandikorum sp. nov.* are separated from the morphologically similar *A. muricatus* and *A. eipperri* Hoser, 2015, the fourth species in the complex by the dark colouration, being dark under the eye, this being a continuation of the canthal streak from above the back of the upper jawline. This dark under the eye is not seen in typical *A. muricatus* or *A. eipperri*.

A. eipperri distributed in north-east NSW and adjacent parts of southern Queensland, are readily separated from *A. muricatus*, *A. jacky* and *A. boandikorum sp. nov.* by the fact that in the males, they possess a large dark black patch behind the ear and above the leg. This patch is small in the other taxa. Males of *A. eipperri* differ from males of the other three species by their smallish to medium sized well-defined black triangles running in a pattern along the inner dorsolateral stripes on the back. Female *A. eipperri* are readily separated from the other three species by the presence of seven moderately well-defined stripes running in a dorsolateral direction, radiating from the back of the head, behind the eyes to the neck.

The forelimbs of female *A. eipperri* are characterised with well-defined dark and light crossbands and while these are sometimes seen in specimens of the other three species, in *A. eipperri* the difference is that these well-defined crossbands extend onto the toes.

Female *A. eipperri* differ from the other species in that the dark patches across the mid back are wider than the light patches. In *A. muricatus* (White, 1790), *A. jacky* and *A. boandikorum sp. nov.* the reverse is the case.

On the tail of male *A. eipperri* the lighter part of the crossbands flare significantly outwards. The flaring is only minor in *A. muricatus* and not present in *A. jacky* or *A. boandikorum sp. nov.*

Male *A. muricatus* have a large and well-defined nuchal crest. It is only of moderate size in *A. jacky* and *A. boandikorum sp. nov.* In *A. eipperri*, the nuchal crest is small, separating it from the other two species.

The four species *Amphibolurus jacky*, *A. boandikorum sp. nov.*, *A. eipperri* and *A. muricatus* are separated from the closely related *A. norrisi* Witten and Coventry, 1984 and *A. adelyn sp. nov.* by the fact that the dark canthal stripe extends only to the nostril or to the lower eye, versus to the tip of the snout in the

other taxa.

Amphibolurus jacky, *A. boandikorom* sp. nov. and *A. muricatus* also have dark transverse markings on the snout in the intermarial region, which is not seen in the other taxa.

Adult male *A. muricatus* invariably have two distinct light-coloured stripes running down either side of the back, partially broken with dark triangular incursions, the degree of intrusion being dependent on the relevant subspecies. In adult male *Amphibolurus jacky* and *A. boandikorom* sp. nov. the same striping is significantly broken tending towards the female colouration.

The closely related taxon *A. burnsi* (Wells and Wellington, 1985) a taxon from the northern interior of New South Wales and south-west Queensland is readily separated from the preceding species by the possession of an exceptionally long and prominent nuchal crest, without any black or black-tipped spines; thick heavy white bands on the forelimbs, both upper and lower as well as a strongly rounded tail, without any spines or strongly keeled scales.

The other species in the genus, namely *A. wellsi* Hoser, 2015 along with the closely related *A. centralis* (Loveridge, 1933) are readily separated from the preceding species by having mainly heterogenous dorsal and upper lateral body scales; lower lateral scales being homogenous or subequal; the lining of the mouth is pink or flesh coloured, as opposed to yellow/orange in the other species.

A. boandikorom sp. nov. is depicted in life online at:

<https://www.inaturalist.org/observations/205564381>

and

<https://www.inaturalist.org/observations/10386061>

and

<https://www.inaturalist.org/observations/5403575>

A. jacky is depicted in life online at:

<https://www.inaturalist.org/observations/197391271>

and

<https://www.inaturalist.org/observations/56020974>

and

<https://www.inaturalist.org/observations/202763835>

Male *A. muricatus* is depicted in life in Hoser (1989) on page 57 bottom and a female is depicted in life in Hoser (1989) on page 58 at top.

Distribution: The species *A. boandikorom* sp. nov. appears to be confined to the general region near the South Australian, Victorian border, in a generally colder part of the region, where it is separated from other related taxa by excessively arid zones to the north, east and west and the wetter Otway Ranges to the south-east.

The more drier areas to the north appear to be occupied by the morphologically similar and presumably competing species *Calotella josephburkei* Hoser, 2023, which as a rule are not found in the same localities.

C. josephburkei is a taxon until recently treated as a population of the formerly widespread species *C. nobbi* (Witten, 1972), split several ways by Hoser (2023). That putative taxon was originally described as *Amphibolurus nobbi* Witten 1972. Some texts also place the species (and associated forms) in *Wittenagama* Wells and Wellington, 1985, *Diporiphora* Gray, 1842 or the most recently allocated *Calotella* Steindachner, 1867.

Conservation: In terms of habitat conservation, there is sufficient habitat in public reserves to secure the future of the species *A. boandikorom* sp. nov.. The hobbyist/pet trade also poses no real threat as these lizards breed easily and any substantive demand would invariably be met mainly by captive breeding.

Therefore it should be treated as being of least concern.

However the comments in Hoser (2019a-b) are relevant to this taxon.

Etymology: *A. boandikorom* sp. nov. is named in honour of the local indigenous peoples of the area this species occurs being the Boandik tribe. They had a well-established farming culture in operation at the time the King's troops invaded from England. Because of the value of the region's agricultural lands members of the tribe were either killed on sight or forced to flee before they were killed. Even in 2024, surviving descendants of the frontier wars generally eke out a miserable existence scavenging in and around urban areas. Those caught in the "wrong places" usually get arrested, put in front of cocaine addicted magistrates and judges and invariably get imprisoned, where they are used as free labour for government owned or backed corporations.

It is an Australian variant of slavery.

AMPHIBOLURUS MURICATUS ABSCONDITUS SUBSP. NOV.

LSIDurn:lsid:zoobank.org:act:94CCBDA1-5999-4A9C-9E5F-C80B36D2421C

Holotype: A preserved specimen at the Australian Museum, Sydney, New South Wales, Australia, specimen number R.64826 collected from Nadgee Nature Reserve, New South Wales, Australia, Latitude -37.45 S., Longitude 149.983 E.

This government-owned facility allows access to its holdings.

Paratypes: Two preserved specimens at the Australian Museum, Sydney, New South Wales, Australia, specimen numbers R.45786 and R.45787 both collected from Nadgee Nature Reserve, New South Wales, Australia, Latitude -37.45 S., Longitude 149.983 E.

Diagnosis: *Amphibolurus muricatus absconditus* subsp. nov. are separated from the nominate subspecies of *A. muricatus* as follows:

On adult male *A. muricatus absconditus* subsp. nov. the more-or-less continuous grey line running down either side of the the back is reduced somewhat to appear as a series of tightly spaced ovoid rectangles, joined at the outer edge, meaning they form a continuum but not in the form of obvious lines running down the back.

While this outer edge is also more-or-less straight in *A. muricatus* of the type form, *A. muricatus* of the type form differs in that the inner edge is also relatively straight (slight inflections only), giving the appearance of two well-defined dorsolateral stripes.

In male *A. muricatus* of the type form this line is greyish in colour, versus cream to yellowish in *A. muricatus absconditus* subsp. nov..

To some extent this makes the colouration of adult male *A. muricatus absconditus* subsp. nov. somewhat intermediate between that of the type form of *A. muricatus* and the duo of *Amphibolurus jacky* and *A. boandikorom* sp. nov. in which the dorsolateral stripes are even further reduced.

In *Amphibolurus jacky* and *A. boandikorom* sp. nov. the width of the joined squares (taken to be from the dorsolateral line) is reduced further making the inner mid-dorsal line wider.

Preanal pores in *A. muricatus absconditus* subsp. nov. do not as a rule reach halfway along the thigh, versus usually does so in the type form of *A. muricatus*.

The nuchal crest of male *A. muricatus absconditus* subsp. nov. does not extend onto the neck, versus slightly in the nominate form of *A. muricatus*, which again is intermediate in form between the type form of *A. muricatus* and the duo of *Amphibolurus jacky* and *A. boandikorom* sp. nov., the latter two of which have a smaller nuchal crest.

Adult female *A. muricatus absconditus* subsp. nov. have a pattern on the dorsum in which the light yellow-grey spots running down the back are reduced in size so that they do not join and are well spaced (with rare exceptions in some specimens anteriorly), versus larger spots that are joined both anteriorly and posteriorly as a rule and are otherwise very close

across their proximal edges.

The anterior part of the visible surfaces of the tail of adult female *A. muricatus absconditus* subsp. nov. are more dark than light, versus more light than dark in the nominate form of *A. muricatus*.

A. muricatus absconditus subsp. nov. has an iris that is usually yellow to yellow-grey or with a slight reddish hue. The nominate form of *A. muricatus* has a slight orange hue in the iris.

Differences between *A. muricatus* of the type form of *A. muricatus* and *A. muricatus absconditus* subsp. nov. treated collectively as "*A. muricatus*" and all other species in the genus *Amphibolurus* Wagler, 1830 as defined by Hoser (2015) are given in the formal description of *A. boandikorom* sp. nov. in this paper, which is treated herein as an integral part of this formal description.

Male *A. muricatus* of the type form is depicted in life in Hoser (1989) on page 57 bottom and a female is depicted in life in Hoser (1989) on page 58 at top and middle.

Male *A. muricatus absconditus* subsp. nov. is depicted in life online at:

<https://www.inaturalist.org/observations/65295732>

Female *A. muricatus absconditus* subsp. nov. is depicted in life online at:

<https://www.inaturalist.org/observations/128960019>

Distribution: *A. muricatus absconditus* subsp. nov. occurs south of a line from Berrima, through Robertson and east to Kiama in New South Wales (on the coast and nearby ranges to the west) south to include Victoria east of the eastern Latrobe Valley and including most of the Western slopes of New South Wales and nearby parts of north-east Victoria.

Conservation: As for *A. boandikorom* sp. nov. in this paper.

Etymology: The name "*absconditus*" comes from the Latin word meaning hidden, which reflects that this taxon was hidden or concealed from science until now.

REFERENCES CITED

Cogger, H. G. 2014. *Reptiles and Amphibians of Australia* (Seventh edition), CSIRO. Sydney, Australia:1064 pp.

Cogger, H. G., Cameron, E. E. and Cogger, H. M. 1983. *Zoological Catalogue of Australia (1) Amphibia and Reptilia*. Australian Government Publishing Service, Canberra, ACT, Australia:319 pp.

Gray, J. E. 1842. Description of some hitherto unrecorded species of Australian reptiles and batrachians. *Zoological Miscellany*, Treuttel Würtz and Co, London, UK 2:51-57.

Hoser, R. T. *Australian Reptiles and Frogs*. Pierson and Co, Mosman, NSW, Australia:238 pp.

Hoser, R. T. 2015 Australian agamids: Eighteen new species from the genera *Amphibolurus* Wagler, 1830, *Lophognathus* Gray, 1842, *Rankinia* Wells and Wellington, 1984, *Diporiphora* Gray, 1842, *Tympanocryptis* Peters, 1863, as well as three new genera and six new subgenera. *Australasian Journal of Herpetology* 30:37-64.

Hoser, R. T. 2019a. 11 new species, 4 new subspecies and a subgenus of Australian Dragon Lizard in the genus *Tympanocryptis* Peters, 1863, with a warning on the conservation status and long-term survival prospects of some newly named taxa. *Australasian Journal of Herpetology* 39:23-52.

Hoser, R. T. 2019b. Richard Shine *et al.* (1987), Hinrich Kaiser *et al.* (2013), Jane Melville *et al.* (2018 and 2019): Australian Agamids and how rule breakers, liars, thieves, taxonomic vandals and law-breaking copyright infringers are causing reptile species to become extinct. *Australasian Journal of Herpetology* 39:53-63.

Hoser, R. T. 2023 An overdue break-up of the east Australian *Calotella* (*Wittenagama*) *nobbi* (Witten, 1972) species complex. *Australasian Journal of Herpetology* 66:5-25.

International Commission of Zoological Nomenclature (ICZN)

2012. Amendment of Articles 8, 9, 10, 21 and 78 of the *International Code of Zoological Nomenclature* to expand and refine methods of publication. *Zootaxa* (PRINO) (Online) 3450:1-7.

Loveridge, A. 1933. New agamid lizards of the genera *Amphibolurus* and *Physignathus* from Australia. *Proceedings of the New England Zoologists Club* 13:69-72.

Pepper, M., Barquero, M. D., Whiting, M. J. and Keogh, J. S. 2014. A multi-locus molecular phylogeny for Australia's iconic Jacky Dragon (Agamidae: *Amphibolurus muricatus*): Phylogeographic structure along the Great Dividing Range of south-eastern Australia. *Molecular Phylogenetics and Evolution*, 71:149-156.

Ride, W. D. L. (ed.) *et al.* (on behalf of the International Commission on Zoological Nomenclature) 1999. *International code of Zoological Nomenclature*. The Natural History Museum - Cromwell Road, London SW7 5BD, UK (also commonly cited as "The Rules", "Zoological Rules" or "ICZN 1999").

Steindachner, F. 1867. In: *Reise der Österreichischen Fregatte Novara um die Erde in den Jahren 1857, 1858, 1859 unter den Befehlen des Commodore B. von Wüllerstorff-Urbair* (Zoologie), Vol. 1, part 3 (Reptilien p.1-98). K. Gerold's Sohn/Kaiserlich-Königl. Hof- und Staatsdruckerei, Wien, Austria [1869 on title page].

Wagler, J. G. 1830. *Natürliches System der Amphibien : mit vorangehender Classification der Säugethiere und Vögel : ein Beitrag zur vergleichenden Zoologie*. J.G. Cotta'schen, München, Germany:i-vi+1-354.

Wells, R. W. and Wellington, C. R. 1984. A synopsis of the class Reptilia in Australia. *Australian Journal of Herpetology* 1(3-4):73-129.

Wells, R. W. and Wellington, C. R. 1985. A classification of the Amphibia and Reptilia of Australia. *Australian Journal of Herpetology Supplementary Series* 1:1-61.

White, J. 1790. *Journal of a voyage to new South Wales, with sixty-five plates of non descript animals, birds, lizards, serpents, curious cones of trees and other natural productions*. Debrett, London, UK:229 pp.

Witten, G. J. 1972. A new species of *Amphibolurus* from eastern Australia. *Herpetologica* 28:191-195

Witten, G. J. and Coventry, A. J. 1984. A new lizard of the genus *Amphibolurus* (Agamidae) from southern Australia. *Proceedings of the Royal Society of Victoria* 96(3):155-159.

CONFLICT OF INTEREST

None.



A. muricatus absconditus subsp. nov.