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Two new legless lizards from Eastern Australia (Reptilia: Squamata: Sauria: Pygopodidae).

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ABSTRACT

Two new subspecies of legless lizards from south-eastern Australia within the genus *Aprasia* Gray, 1839 are formally identified and named according to the rules of the *International Code of Zoological Nomenclature.*

Both are morphologically distinct from their nominate forms and both are allopatric in distribution with respect to the nominate forms.

One of these populations, this being from Bendigo, Victoria and currently referred to as a population of *Aprasia parapulchella,* Kluge, 1974 has long been recognized as being taxonomically distinct from the nominate form (Osborne and Jones, 1995).

The second taxon, referred to as being within *Aprasia inaurita* Kluge, 1974, was found to be distinct for the first time as part of this audit.

Keywords: Taxonomy; nomenclature; Lizards; *Aprasia*; *parapulchella*; *pseudopulchella*; *inaurita*; new subspecies; *gibbonsi*; *rentoni*.

INTRODUCTION

As part of an audit of the reptiles in Victoria, Australia, two regionally isolated of legless lizards in the genus *Aprasia* Gray, 1839 were inspected with a view to assess their relationships with the nominate forms.

Both were within the genus *Aprasia* Gray, 1839, these being *Aprasia parapulchella,* Kluge, 1974 and *A. inaurita* Kluge, 1974.

For both species, the Victorian animals were found to be different from those from interstate and sufficiently so as to warrant taxonomic recognition. The Victorian populations were also allopatric in distribution and with no known point of contact.

For the species *Aprasia parapulchella,* Kluge, 1974, the type locality is Coppins Crossing in the ACT, and the population in and around Bendigo, Victoria is apparently isolated from the next nearest population in Albury, NSW, by some 120 km in a straight line measurement, being an area of habitat known to be unsuitable for the taxon.

For the species *A. inaurita* Kluge, 1974, type locality Sunset Country, Victoria, the specimens from West of the Flinders Ranges in South Australia were found to be allopatric from the nominate form and also morphologically distinct.

The barrier between these populations of this taxon appears to be a population of another recognized taxon, known as *Aprasia pseudopulchella*, Kluge 1974, type locality Burra, South Australia and generally restricted to this region. In terms of *A. inaurita* Kluge, 1974, there is no known zone of contact between the two main populations.

The same applies in terms of the Bendigo, Victoria, the ACT/ NSW and the South Australian populations of *A. parapulchella* and *A. pseudopulchella.*

MATERIALS, METHODS AND RESULTS

The audit consisted of looking at specimens from all relevant species, herein effectively treated as two groups, namely *A. inaurita* and *A. parapulcella* / *A. pseudopulchella* (the latter two species being near identical in features) with a view to identifying obvious morphological differences between the populations in order to decide whether or not any unnamed populations were worthy of taxonomic recognition.

Added to this was an audit of the relevant published literature and available molecular data for species and species complexes affected by similar geographical barriers.

On a morphological level, each population was distinct, albeit only slightly, and on the basis of this alone, worthy of taxonomic recognition. However on the basis of molecular results for species affected by the same geographical barriers (e.g. the *Varanus rosenbergi* group, Smith *et al.* 2007, as cited by Hoser 2013), these recognized differences were decided to be only significant enough to warrant designation as subspecies.

Hence the formal descriptions below.

APRASIA PARAPULCHELLA AND *A. PSEUDOPULCHELLA.*

The species *Aprasia parapulchella,* Kluge, 1974, with the type locality of Coppins Crossing in the ACT and *Aprasia pseudopulchella*, Kluge 1974, from the type locality of Burra, South Australia when described by Arnold Kluge, were known from two widely scattered locations about 800 km apart and separated by an arid zone of clearly unsuitable habitat.

While morphologically similar, Kluge no doubt relied on this geographical separation to decide each should be treated as separate species.

The more recent discovery of a third population of similar lizards

in and around Bendigo, Victoria, in part midway between the other two populations has confused things somewhat.

While some authorities have treated this population as being either an undescribed or unidentified species, most recent authors have treated it merely as an outlying population of *A. parapulchella*.

Notwithstanding this, it appears that no one has actually compared this population with *A. pseudopulchella*.

When doing so, I found all three to be very similar and quite likely of one and the same species.

However in order to maintain nomenclatural stability for the time being and in the absence of molecular data, I herein provisionally treat *A. pseudopulchella* as a separate species.

This is in itself problematic, as the Bendigo population is in many ways intermediate in form and location between the ACT/NSW animals (*A. parapulchella*) and the South Australian animals (*A. pseudopulchella*).

This is even if one accepts the likelihood of specimens attributable to *A. parapulchella* being found in likely habitats south of the NSW/Victoria border in areas near Beechworth and Myrtleford, Victoria.

However in view of the fact that two, and possibly all three of the relevant major populations are conspecific (ignoring for the time being the mid-northern NSW outlier populations, which also differ from the nominate group), I herein take the conservative step of formally naming the Victorian population as a subspecies of *A. parapulchella*, pending a more detailed molecular study that will determine whether or not it should be elevated to full species status.

Relevant literature in terms of *A. parapulchella* and *A. pseudopulchella* include the following: Barrer (1992), Brown (2009), Cogger (2000, 2014), Henle (1989), Jennings *et al.* (2003), Jones (1992, 1999),

Kluge (1974, 1976), Michael (2004), Michael and Herring (2005), Michael *et al.* (2008), Osborne and Jones (1995), Osborne and McKergow (1993), Osborne *et al.* (1991), Patchell and Shine (1986), Rankin (1976), Robertson and Heard (2008), Robinson (1996), Wong *et al*. (2011) and sources cited therein.

APRASIA INAURITA

This species (*A. inaurita*) is readily separated from *A. parapulchella* and *A. pseudopulchella* in form and habitat preferences (as outlined in Cogger 2014), so much so that Wells (2007), placed this and related species into a new genus *Abilaena* Wells, 2007.

This generic name has been little used since 2007, but certainly has merit in use, at least to the subgenus level as each group *Aprasia* and *Abilaena* describe distinctive species groups, of different form and ecology.

Abilaena species are found in arid desert-type regions across southern Australia as opposed to cooler, more temperate and usually rocky habitats for *Aprasia*. Significantly and not reported in the literature (e.g. Cogger 2014) is a distinct gap in the population of specimens attributed to the species *A. inaurita* in the region of the Flinders Ranges in South Australia.

This is however ascertained quite easily via a search of the specimens lodged in Australian museums and plotting them on a map of Australia, all easily done via a computer.

It is also worth noting that *A. inaurita* is found in the lower foothills of the ranges near the coastal strip.

While there would be a presumption that the habitat, especially on the eastern side of the ranges is the barrier to movement of *A. inaurita*, this may only be a part of the situation. This is because within the relevant area, another species, namely *A. pseudopulchella* occurs and is reasonably abundant there, implying that it may also aid the excusion process.

The species groups *A. parapulchella* and *A. pseudopulchella* versus *A. inaurita* may well have a strong process of mutual exclusion.

In any event, it is clear that the eastern (east of the Flinders Ranges) population and western (west side of the Flinders ranges) populations are disjunct and also morphologically different. In the absence of molecular data, there is no effective way to ascertain how long each population has been divergent and it is for that reason the unnamed western population is herein described conservatively as a new subspecies.

Further significant literature in terms of *A. inaurita*, include the following: Cogger (2014), Kluge (1974, 1976), Wells (2007) and Wilson and Swan (2010).

SUBSPECIES *APRASIA PARAPULCHELLA GIBBONSI SUBSP. NOV.*

Holotype: A specimen at the National Museum of Victoria (NMV), specimen number: D61531 from Whipstick Forest, Bendigo, Victoria, Lat. -36.67 Longitude 144.25, collected by Peter Robertson in a pitfall trap. The National Museum of Victoria (NMV) is a government-owned facility that allows access to its specimens.

Paratypes: Specimens at the National Museum of Victoria (NMV), specimen number: D61534, D61535, and D61646 from Whipstick Forest, Bendigo, Victoria, Lat. -36.67 Longitude 144.25, collected by Peter Robertson in a pitfall trap. The National Museum of Victoria (NMV) is a government-owned facility that allows access to its specimens.

Diagnosis: *Aprasia parapulchella gibbonsi subsp. nov.* is separated from *Aprasia pulchella* Gray, 1839, nominate *A. parapulchella* Kluge, 1974 and *A. pseudopulchella* Kluge 1974 by the presence of a lightish coloured head (versus darkish grey in the others) and well-defined tail stripes, versus ill defined in the others.

A comparative study of large numbers *Aprasia parapulchella gibbonsi subsp. nov.* and nominate *A. parapulchella* found the new subspecies to attain a larger adult size on average.

The species *Aprasia pulchella* Gray, 1839, *A. parapulchella* Kluge, 1974 and *A. pseudopulchella* Kluge 1974 are all separated from from all other *Aprasia* Gray, 1839 by the following suite of characters: External ear opening absent; prefrontal not in contact with the subocular labial; five supralabials bordering the upper lip on each side; colour of the head and tail tip not contrasting with the remainder of the body; nasal and first supralabial are completely or partially fused posterior to the nostril.

Aprasia pulchella Gray, 1839 is separated from *A. parapulchella* Kluge, 1974 and *A. pseudopulchella* Kluge 1974 by having two preanal scales, versus three in the other two species. *A. pseudopulchella* Kluge 1974 is separated from *A. parapulchella* Kluge, 1974 (both subspecies) by having a single preocular scale and usually a well defined lateral head pattern, versus usually two preoculars and a weak or absent lateral head pattern.

Distribution: Known only from the Bendigo area in central Victoria, Australia, with all known specimens coming from within 25 km of the centre of the city of Bendigo.

According to Wong (2013), "In NSW, *A. parapulchella* has a widespread, though disjunct distribution, being recorded mostly at isolated sites, including near Tarcutta, Bathurst, Cootamundra, Adelong, Lake Burrinjuck, Yass, Wee Jasper, West Wyalong, Buddigower, Bredbo, Cooma, Queanbeyan, Googong Foreshores, Holbrook, Howlong, Walbundrie (Goombargana Hill), Albury (Nail Can Hill), Goulburn River National Park (Hunter Valley), Mudgee and Gunnedah (Cogger 1992; Ecology Partners Pty Ltd 2009; Jenkins and Bartell 1980; Michael and Herring 2005; NSW National Parks and Wildlife Service 1999; Osborne *et al.* 1991; Sass *et al.* 2008)."

The ACT fits within this range.

Within the ACT, according to Wong (2013), "*A. parapulchella* is mainly distributed along the Murrumbidgee and Molonglo River

corridors and surrounding areas as well as on some of the hills found within Canberra Nature Park (Osborne *et al*. 1991; Osborne and McKergow 1993)." The species appears to be asbent from areas of apparently suitable habitat, indicating a fragmented range.

Etymology: Named in honour of Bendigo-based herpetologist, Dale Gibbons, now of Maiden Gully (City of Bendigo), Victoria, for his valuable contribution to the herpetology of Bendigo, including through considerable fieldwork spanning some decades.

SUBSPECIES *APRASIA INAURITA RENTONI SUBSP. NOV.*

Holotype: A specimen at the Western Australian Museum, Perth, number: R92012 collected from 2 km North-west of Middini Beach, Western Australia, Australia, Lat -32.22, Longitude 127.43. The Western Australian Museum is a government-owned facility that allows access to its specimens.

Paratype: A specimen at the Western Australian Museum, Perth, number: R137756 collected from 12 km East of the Western Australia and South Australia border in South Australia, Australia, Latitude -31.65, Longitude 129.12. The Western Australian Museum is a government-owned facility that allows access to its specimens.

Diagnosis: *Aprasia inaurita rentoni subsp. nov*. are readily separated from *A. inaurita inaurita* Kluge, 1974 by the following suite of characters: The distance from the snout to the eye is twice or more than twice that of the eye itself, versus less than twice the width of the eye in *A. inaurita inaurita.* Furthermore *A. inaurita rentoni subsp. nov*. are characterized by white on the upper labials which has a well defined upper border, versus an ill defined upper border in *A. inaurita inaurita.*
A. inaurita rentoni subsp. nov. is also separated from *A. inaurita inaurita* by having well-defined dark etching on the scales of the upper body, versus poorly defined in *A. inaurita inaurita.*

Both *A. inaurita rentoni subsp. nov*. and *A. inaurita inaurita* are separated from all other *Aprasia* Gray, 1839 by the following suite of characters: External ear opening absent; prefrontal not in contact with the subocular labial; five supralabials bordering the upper lip on each side; colour of the head and tail tip not contrasting with the remainder of the body; nasal and first supralabial are not fused posterior to the nostril; there is usually 14, or occasionally 12 mid-body scale rows; there are usually three preanal scales; the snout is rounded and not strongly projecting when viewed from above or the side.

Distribution: *A. inaurita rentoni subsp. nov*. is found from coastal far south-eastern Western Australia, east to the western slopes of the Flinders Ranges and the Adelaide Hills. *A. inaurita inaurita* is found in drier areas east of the Flinders Ranges and the Adelaide Hills into nearby parts of Victoria and southern New South Wales.

Etymology: Named in honour of Ian Renton of Snake-away services (AKA "snake away"), a registered trademark/s (TM numbers 1670772, 1354355), of Paradise, (Adelaide) South Australia, in recognition of his many services to herpetology in Australia spanning some decades.

FIRST REVISOR'S INSTRUCTIONS

Unless mandatory under the rules of zoological nomenclature of the time, no new scientific names are to have spellings altered in any way. The spellings of the new scientific names, if lacking the usual suffixes attached to such names or other deemed proper name formations, are deliberate on the part of the author. The same applies to all other names published by this author prior to this date in other earlier papers.

Should a reviser decide that more than one described subspecies herein are of the same taxon (extremely unlikely in this case), then name priority is given to the taxon named first, as in by page priority in this paper.

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CONFLICT OF INTEREST

The author has no known conflicts of interest in terms of this paper and conclusions within.

Aprasia parapulchella gibbonsi subsp. nov. from the southern outskirts of Bendigo, Victoria.

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