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A redefinition of the *Tiliqua* Gray, 1825 (*sensu lato*) group of lizards from the Australian bioregion including the erection of a new genus to accommodate a divergent species.

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ABSTRACT

The genus *Tiliqua* Gray, 1825 includes the iconic Australian Bluetongue Lizards (several species) and other large well-known livebearing skinks.

Cogger *et al.* (1983) treated the genus as including a broad swag of species including the so-called She-oak skinks, Shingleback and Pink-tongued Skink.

More recently and reflecting the position of most Australian herpetologists, Cogger (2014) restricted *Tiliqua* to include only the Blue-tongued Lizards and Stumpy Tailed Skinks, while resurrecting the genus *Cyclodomorphus* Fitzinger, 1843 to include the She-oak skinks and the Pink-tongued Skink.

Other authors, including Wells and Wellington (1985), have gone further than Cogger (2014) and resurrected the name *Hemisphaeriodon* Peters, 1867 for the Pink-tongued Skink, and *Trachydosaurus* Gray, 1825 for the Shinglebacks.

A recent phylogeny published (Pyron *et al.* 2013), not only supports the divisions by Wells and Wellington (1985), but further supports the division of *Cyclodomorphus* as currently recognized into two well-defined and distinct genera, which was done by Wells (2007) and derided as being without evidence by Kaiser *et al* (2013).

The correct name for that clade is *Zeusius* Wells, 2007 and it should be used, even if illegally over-written by another name coined by the so-called Wüster gang as urged by Kaiser *et al.* (2013).

The unique species, *T. adelaidensis* Peters, 1863, which has had varying positions in published phylogenies and yet is distinct from other species in significant ways is also herein placed in a new genus formally named for the first time.

This paper also defines all relevant genera within the *Tiliqua* group as defined by Cogger *et al.* (1983).

Keywords: Taxonomy; lizards; genus; *Tiliqua*; *Cyclodomorphus; Hemisphaeriodon; Trachydosaurus; Zeusius*; species; Shingleback; Stumpy tailed skink; Bluetongued skink; Pink tongued skink; She-oak skink; Slender bluetongue; Adelaide Bluetongue Lizard; Australia; Western Australia; South Australia; Northern Territory; Victoria; Tasmania; New South Wales; genera; new genus; *Lazarusus*.

INTRODUCTION

The genus *Tiliqua* Gray, 1825 includes the iconic Australian Bluetongue Lizards (several species) and other large well-known livebearing skinks.

Cogger *et al.* (1983) treated the genus as including a broad swag of species including the so-called She-oak skinks, Shingleback and Pink-tongued Skink.

More recently and reflecting the position of most Australian herpetologists, Cogger (2014) restricted *Tiliqua* to include only the Blue-tongued Lizards and Stumpy Tailed Skinks, while resurrecting the genus *Cyclodomorphus* Fitzinger, 1843 to include the She-oak skinks and the Pink-tongued Skink.

Other authors, including Wells and Wellington (1985), have gone further than Cogger (2014) and resurrected the name *Hemisphaeriodon* Peters, 1867 for the Pink-tongued Skink, and *Trachydosaurus* Gray, 1825 for the Shinglebacks.

Hoser (1989) relied on the consensus taxonomy and nomenclature of the time and placed the Shinglebacks in *Trachydosaurus*, but left all other species in *Tiliqua*, noting here that the book in question followed accepted taxonomy and did not as a rule make detailed taxonomic judgements.

A recent phylogeny published (Pyron *et al.* 2013), not only supports the divisions by Wells and Wellington, but further supports the division of *Cyclodomorphus* as currently recognized into two well-defined and distinct genera.

On its own the molecular data would be perhaps ignored, but it does in fact corroborate the very different morphologies of the two species groups, as outlined in Cogger (2014) or also in the review of the group by Shea and Miller in 1995.

The review by Shea and Miller (1995) not only comprehensively

reviewed the past literature on these lizards (not necessarily re-cited here), but in effect gave a very solid morphological basis for splitting the genus as understood at the time and adopted by them.

Hence there is no sensible option other than to split the genus into two at the present time. This was done by Wells (2007) and derided as being without evidence by Kaiser *et al* (2013), a paper which is notable in that it defined itself by lacking evidence for the claims made within.

The correct name for that clade is *Zeusius* Wells, 2007.

The unique species, *T. adelaidensis* Peters, 1863, which has had varying positions in published phylogenies and yet is distinct from other species in significant ways is also herein placed in a new genus.

Numerous herpetologists have privately to myself suggested making this move to erect a new genus for this taxon, but for various reasons have never got around to it.

The molecular phylogeny published by Pyron *et al.* 2013 shows the species being most closely related to the Shinglebacks (*Trachydosaurus*) and based on the alleged divergence, could easily be placed in the same genus.

However these species are so radically different from one another both in form and habit, it seems untenable to continue to place each in the same genus.

Another issue to arise is that the species *T. adelaidensis* Peters, 1863 is clearly physically most like species of Bluetongues (*Tiliqua sensu-stricto*) as opposed to the very divergent Shinglebacks, thereby creating a quandary of whether to merge all together or to divide into three.

Adding to this is that Pyron *et al.* (2013) show *T. adelaidensis* Peters, 1863 and *Trachydosaurus* being more closely related to *Cyclodomorphus branchialis* Günther, 1867 than to the other Bluetongues (*Tiliqua sensu stricto*).

While one could argue that this gives an alternative view that all relevant species should be merged back into a single large *Tiliqua* as defined by Cogger *et al.* (1983), the depth of most divergences suggests that the generic splits should be maintained to retain effective parity in level of divisions across the Lygosominae.

Based on morphology, to place *T. adelaidensis* within *Trachydosaurus* is untenable, while to merge *T. adelaidensis* with *Cyclodomorphus* is similarly untenable, as is the concept of merging all back to *Tiliqua.*

It is similarly untenable to place *T. adelaidensis* in a subgenus of *Trachydosaurus* or for that matter the apparently more distant (according to Pyron *et al.* 2013) *Tiliqua.*

Faced with this quandary, the only sensible way to deal with the issue is to erect a new genus, (not subgenus for the reasons just explained) for the taxon, *T. adelaidenesis*. This paper does exactly that!

In order to define the new genera, it also makes sense to redefine extant recognized genera and list the recognized species within each.

This is done below.

Subspecies are ignored herein, even though some may subsequently be elevated to full species.

Material relevant to this paper and that would have greatly assisted in its preparation, was illegally stolen by wildlife officers in an illegal armed raid on 17 August 2011 (Court of Appeal, Victoria 2014, VCAT 2015). It was hoped this would be returned shortly after the raid, but as of this date (2016), the material has not yet been returned.

GENUS *TILIQUA* GRAY, 1825.

Type species: *Lacerta scincoides,* White, 1790.

Diagnosis: Herein restricted to the so-called Bluetongued skinks.

These large mainly diurnal, live-bearing lizards are separated from all other Australian skinks and defined as follows: Short pentadactyle limbs and short rounded tails ending in a point which is usually much shorter than the body. Dorsal scales are moderate and smooth. Head shields are smooth, symmetrical and unfragmented; subdigital lamellae are undivided. No supranasals or divided nasal scales. A scaly movable lower eyelid; parietal scales when distinct are not in contact behind the interparietal; third and fourth toes are either subequal or the third toe is slightly longer than the fourth.

Lazarusus gen. nov. is separated from the otherwise similar *Tiliqua* by the following suite of characters: Anterior temporal scales are more or less equal to others, being not much longer than broad; more than 32 mid-body rows; body without distinct cross bands; at most a single row of enlarged scales on the neck between the interparietal and the smaller body scales.

Distribution: Australia, including Tasmania, Papua New Guinea and nearby Indonesia, west to Halmahera and Ambon/Ceram.

Content: *Tiliqua sincoides* (White ex Shaw, 1790) (type species); *T. gigas* (Schneider, 1801) (including subspecies). *T. intermedia* Mitchell, 1955; *T. multifasciata* Sternfeld, 1919; *T. nigrolutea* (Quoy and Giamard, 1824); *T. occipitalis* (Peters, 1863).

GENUS *TRACHYDOSAURUS* GRAY, 1825.

Type species: *Trachydosaurus rugosus* Gray, 1825.

Diagnosis: Herein restricted to the so-called Shinglebacked skinks.

These large diurnal, live-bearing lizards are separated from all other Australian skinks and defined as follows: Short pentadactyle limbs and very short depressed blunt ended tail, with a body and tail characterised by grossly enlarged dorsal scales that are strongly but bluntly rugose. The head shields are fragmented with little symmetry and the subdigital lamellare are divided, at least basally.

No supranasals or divided nasal scales. A scaly movable lower eyelid; parietal scales when distinct are not in contact behind the interparietal; third and fourth toes are either subequal or the third toe is slightly longer than the fourth.

Distribution: Drier parts of southern Australia, south of the most arid parts of central and western Australia, extending north in the eastern states as far north as central Queensland and midway up the Western Australian coast.

Content: *Trachydosaurus rugosus* Gray, 1825 (including three recognized subspecies).

GENUS *CYCLODOMORPHUS* FITZINGER, 1843.

Type species: *Cyclodus casuarinae* Duméril and Bibron, 1839.

Diagnosis: A group of medium-sized lizards similar in many respects to Bluetongues (*Tiliqua*), but with slender heads, necks, bodies and a long-slender tail which is at least as long as the body if an original tail. Anterior ear lobules present ; scales smooth, subequal; no supranasals or divided nasal scales; a scaly movable lower eyelid; parietal scales not in contact behind the interparietal; third and fourth toes subequal or the third toe is slightly longer than the fourth; subdigital lamellae undivided. Separated from the similar *Zeusius* Wells, 2007 by the absence of a post narial groove.

Separated from *Hemisphaeriodon* Peters, 1867 by having two infralabial scales contacting the postmental scale on each side (versus one).

They may be diurnal, crepuscular or nocturnal.

Distribution: Tasmania and cooler parts of eastern Victoria, New South Wales (NSW) and the Australian Capital Territory (ACT).

Content: *Cyclodomorphus casuarinae* (Duméril and Bibron, 1839) (type species); *C. michaeli* Wells and Wellington, 1984; *C. praealtus* Shea, 1995.

GENUS *HEMISPHAERIODON* PETERS, 1867.

Type species: *Hinulia gerrardi* Gray, 1845.

Diagnosis: A group of medium-sized lizards similar in many respects to Bluetongues (*Tiliqua*), but with slender heads, necks, bodies and a long-slender tail which is at least as long as the body if an original tail. Anterior ear lobules present ; scales smooth, subequal; no supranasals or divided nasal scales; a scaly movable lower eyelid; parietal scales not in contact behind the interparietal; third and fourth toes subequal or the third toe is slightly longer than the fourth; subdigital lamellae undivided. Separated from the similar *Zeusius* Wells, 2007 by the absence of a post narial groove. Separated from *Cyclodomorphus* Fitzinger, 1843 by having one infralabial scale contacting the postmental scale on each side (versus two).

They may be diurnal, crepuscular or nocturnal.

Distribution: Coastal NSW, from west of Sydney, along the east coast of Australia to lower Cape York.

Content: *Hemisphaeriodon gerrardi* (Gray, 1845) (treated here as monotypic, which may be in error).

GENUS *ZEUSIUS* WELLS, 2007.

Type species: *Hinulia branchialis* Günther, 1867.

Diagnosis: A group of medium-sized lizards similar in many respects to Bluetongues (*Tiliqua*), but with slender heads, necks, bodies and a long-slender tail which is at least as long as the body if an original tail. Anterior ear lobules present; scales smooth, subequal; no supranasals or divided nasal scales; a scaly movable lower eyelid; parietal scales not in contact behind the interparietal; third and fourth toes subequal or the third toe is slightly longer than the fourth; subdigital lamellae undivided. Separated from the morphologically similar *Cyclodomorphus* Fitzinger, 1843 by the presence of a post narial groove.

They may be diurnal, crepuscular or nocturnal.

Distribution: Broadly found in the drier parts of the western two-thirds of Australia, including parts of Victoria, New South Wales, Queensland, the Northern Territory, South Australia and Western Australia.

Etymology: See Wells (2007).

Content: *Zeusius branchialis* **(**Günther, 1867) (type species); *Z. celastus* (Shea and Miller, 1995); *Z. maximus* (Storr, 1976); *Z. melanops* (Sterling and Zeitz, 1893) (including at least three recognized subspecies); *Z. venustus* (Shea and Miller, 1995).

GENUS *LAZARUSUS GEN. NOV.*

Type species: *Cyclodus adelaidensis* Peters, 1863.

Diagnosis: These medium sized mainly diurnal and crepuscular, live-bearing lizards are separated from all other Australian skinks and defined as follows: Short pentadactyle limbs and short, thinnish rounded tails ending in a point which is usually slightly shorter than the body. Dorsal scales are moderate and smooth. Head shields are smooth, symmetrical and unfragmented; subdigital lamellae are undivided. No supranasals or divided nasal scales. A scaly movable lower eyelid; parietal scales when distinct are not in contact behind the interparietal; third and fourth toes are either subequal or the third toe is slightly longer than the fourth.

Lazarusus gen. nov. is separated from the otherwise similar *Tiliqua* by the following suite of characters: Anterior temporal scales are more or less equal to others, being not much longer than broad; more than 32 mid-body rows; body without distinct cross bands; and at most a single row of enlarged scales on the neck between the interparietal and the smaller body scales.

Distribution: Mount Lofty Range and adjacent slopes and lowlands of South Australia from near Peterborough in the north south to Kapunda.

Etymology: The species monotypic for this genus, was regarded as being probably extinct (Hoser, 1991), before it was rediscovered shortly after the book was published. As the species was brought back from the dead, so to speak, it makes sense that its genus should be named in honour of Lazarus who according to the Bible was also brought back from the dead.

Lazarus of Bethany, also known as Saint Lazarus or Lazarus of the Four Days, is the subject of a prominent (alleged) miracle attributed to Jesus in the Gospel of John, in which Jesus allegedly restored him to life four days after his death.

Content: *Lazarusus adelaidensis* (Peters, 1863) (monotypic).

NOTES ON THE NEW DESCRIPTION FOR ANY POTENTIAL REVISERS

Unless mandated by the rules of the *International Code of Zoological Nomenclature*, the spelling of the newly proposed name should not be altered in any way.

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CONFLICT OF INTEREST

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