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A new subgenus and a new subspecies within the lizard genus *Isopachys* Lönnberg, 1916 (Squamata:Sauria: Scincomorpha).

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ABSTRACT

A review of the lizard genus *Isopachys* Lönnberg, 1916 as currently recognized found that one species in the group, namely *Isopachys anguinoides* (Boulenger, 1914), originally named "*Lygosoma anguinoides*" is sufficiently divergent from all other species to be recognized at the genus level. It is therefore placed in a new subgenus formally named for the first time according to the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

Furthermore the northern population of *Isopachys roulei* (Angel, 1920) from the vicinity of Nakhon Ratchasima Province, Thailand, is also significantly divergent from the southern population from the Chonburi Province, Thailand. It is herein formally named as a new subspecies.

Noting the extreme human population growth and habitat degradation in the relevant region, it is important that the diversity in the genus be formally recognized so that relevant populations can be afforded proper conservation protection before they may be exterminated due to a misguided belief that they are not distinct from other genus or species level taxa.

Keywords: Lizard; skink; taxonomy; nomenclature; *Isopachys*; *anguinoides*; *borealis*; *gyldenstolpei*; *roulei*; new subgenus; *paraisopachys*; new subspecies; *rosswellingtoni*.

INTRODUCTION

An audit was conducted on the south-east Asian skink genus *Isopachys* Lönnberg, 1916 as currently recognized with a view to confirming that the current taxonomy and nomenclature were correct and if not, then to correct any obvious errors.

This included a review of published studies, both morphological and molecular, a review of the literature, including formal descriptions and type material and inspection of specimens, photos and the like from known localities in order to confirm the relevant taxonomy.

This was done as part of a wider-ranging audit into the south-east Asian herpetofauna that has been ongoing for some decades.

The preceding also sums up the materials and methods in terms of this paper.

The results of the audit found that the current taxonomy and nomenclature in terms of the genus is effectively sound save for the fact that one species, *Isopachys anguinoides* (Boulenger, 1914), originally named "*Lygosoma anguinoides*" is sufficiently divergent from all other species to be recognized at the genus level. This finding is based both on molecular divergence as seen in published phylogenies cited herein as well as the corresponding morphological differences between this and the other species in the genus *Isopachys.*

While the divergence between the two groups warrants a genus level differentiation, I am aware of the fact that there is a widespread disdain among some herpetologists for the creation of monotypic genera. Therefore in terms of this paper, I take the conservative position and herein formally name a new subgenus to accommodate this most divergent member of the putative genus *Isopachys* in accordance with the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

Because it seems that all other species of *Isopachys* are the closest relatives of the species *I. anguinoides*, I have called the new genus *Paraisopachys*, meaning in Latin, "not quite *Isopachys*".

The species *Isopachys roulei* (Angel, 1920) was originally described from a specimen in the Chonburi Province, Thailand, and until recently was only known from that province.

Kunya *et al.* (2011), detailed a new specimen, that they treated as being of the same species from the Nakhon Ratchasima Province, Thailand. The authors also treated this population as being a range extension of the same species, noting that their specimen and others of this species had either similar or same scale counts and/or morphology and within the same known range.

This included in terms of the following statistics:

Nasal scales in contact,
frontonasal larger than frontal,
Frontoparietals separated,
Prefrontal scales paired,
Third temporal scale present,
Post mental scale fused,
4 supralabials,
22 scales at neck,
18 midbody scale rows,
15 scales at tail,
133 scales parietal-vent,
75.2 mm snout-vent length ,
Tail tip shape was tapering.

However an inspection of the northern specimen showed that it had a different colouration to a large series of specimens from

the southern population, which in turn were consistent in their differences to the single known northern specimen.

While the distance between the two populations (at closest known points) is only about 100 km in a straight line, the bulk of the intervening region is unsuitable habitat for this species or any others in the genus, being largely riverine flats and the like, versus elevated hills or sandy soils in proximity to same, as preferred by species in this genus.

This indicates that the two populations are both separated and have been for a significant period of time.

Clearly the northern population should be regarded as different at the species level. However in the absence of robust molecular data, I herein conservatively describe this northern taxon as a new subspecies. By doing so, this will afford this population immediate recognition and allow for proper conservation and management plans to be implemented and before this population is potentially exterminated inadvertently in the belief it is in fact part of a more widely distributed species (see Hoser 2019a and 2019b for examples of such occurring).

The conservation record of governments in the region is detailed by Hoser (1989, 1991, 1993 and 1996) giving further urgency to the need to formally recognize at the appropriate level the relevant forms described herein.

Published literature relevant to the taxonomic conclusions within this paper include: Angel (1920), Boulenger (1914), Brygoo (1985), Chan-ard *et al.* (2011, 2015), Chuaynkern *et al.* (2015), Das (2010), Greer (1997), Heyer (1972), Honda *et al.* (2000), Kamsook *et al.* (2006), Kunya *et al.* (2011), Lang and Böhme (1990), Lönnberg (1916), Nabhitabhata (2000), Nabhitabhata *et al.* (2004), Pauwels *et al.* (2003, Pyron *et al.* (2013), Smith (1935, 1937), Stuart and Emmett (2006), Taylor (1963) Teynié *et al.* (2004) and Trautmann (2006) and sources cited therein.

In terms of the following formal descriptions the following points should be noted:

1/ All descriptions of specimens in terms of form and colour relate to normal adult specimens of typical form for each taxon unless otherwise stated.

2/ Spellings of names assigned to taxa should not be altered in any way unless mandated by the *International Code of Zoological Nomenclature* (Ride *et al.* 1999) or superseding nomenclatural rules.

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

PARAISOPACHYS SUBGEN. NOV.

LSIDurn:lsid:zoobank.org:act:AC68DF0C-69D5-46C1-9196-4DE4642D48A5

Type species: *Lygosoma anguinoides* Boulenger, 1914.

Diagnosis: Until now, the species now known as *Isopachys anguinoides* (Boulenger, 1914), has been treated as a member of the genus *Isopachys* Lönnberg, 1916, type species *Isopachys gyldenstolpei* Lönnberg, 1916.

However *Paraisopachys gen. nov.* are separated from *Isopachys* by the following suite of characters: nasals are separated, versus in contact in *Isopachys*; the frontoparietals are in contact, versus separated in *Isopachys*; 5 supralabials, versus 4 or 5 in *Isopachys*; less than 110 scales parietal to vent, versus more than 120 in *Isopachys.*

Skinks in the genus *Isopachys* and *Paraisopachys* are defined and separated from other skinks as follows: Vermiform and lacking limbs having only vestiges of pectoral and pelvic girdles. The head is continuous with the body and lacking any obvious external neck segment. The snout is covered by a series of enlarged heavily keratinized shields to facilitate burrowing. Eyes are vestigial. The tympanum is encapsulated and not externally visible (derived from Chan-ard *et. al.* 2015).

Boulenger's original 1914 description of "*Lygosoma anguinoides*" with a type locality of Bangtapham, Siam (Thailand) can also be regarded as an accurate description and diagnosis of this subgenus.

Distribution: Known only from upper Peninsula Thailand.

Etymology: In Latin, *Paraisopachys*, means, "not quite *Isopachys*".

Content: *Isopachys* (*Paraisopachys*) *anguinoides* (Boulenger, 1914) (monotypic). The nominate subgenus includes the following species: *I. gyldenstolpei* Lönnberg, 1916 (type species); *I. borealis* Lang and Böhme, 1990 and *I. roulei* (Angel, 1920) (two subspecies, one formally named below).

ISOPACHYS ROULEI ROSSWELLINGTONI SUBSP. NOV.

LSIDurn:lsid:zoobank.org:act:00166334-A697-4193-97A2-1B7F41560821

Holotype: A preserved specimen at the Thailand Natural History Museum, Specimen number: THNHM 15362 collected from Ban Lampiakpattana, Tambon Nonsomboon, Amphoe Soeng Sang, Nakhon Ratchasima, Thailand, Lat. 14.19 N., Long 102.25 E.

Diagnosis: The subspecies *Isopachys roulei rosswellingtoni subsp. nov*. is similar in most respects to nominate *Isopachys roulei* (Angel, 1920). However it is separated by consistent colour difference.

In nominate *I. roulei roulei* head and back are a slightly pinkish-fawn with two broad dark bluish-brown longitudinal stripes running along the length of the body and well onto the tail. In *I. roulei rosswellingtoni subsp. nov.* the longitudinal stripes are narrow and at times broken on the dorsum and do not present as distinct like in nominate *I. roulei roulei.* In *I. roulei rosswellingtoni subsp. nov.* the longitudinal stripes are brown in colour and lack any bluish tinge.

Both *I. roulei roulei* and *I. roulei rosswellingtoni subsp. nov.* are separated from all other members of the genus *Isopachys* Lönnberg, 1916 by having the following suite of characters: 18 midbody rows, nasals in contact and frontoparietals separated, the latter two characters separating this and other species in the nominate genus from the species *Isopachys* (*Paraisopachys*) *anguinoides* (Boulenger, 1914), monotypic for the subgenus *Paraisopachys subgen. nov..*

I. borealis Lang and Böhme, 1990 has 20-22 midbody rows and *I. gyldenstolpei* Lönnberg, 1916 has 24-28 midbody rows, separating both species from both *I. roulei roulei* and *I. roulei rosswellingtoni subsp. nov..*

Further descriptive detail about this new subspecies including a photo of the holotype and relevant habitat information is seen in Kunya *et al.* (2011).

Distribution: Known only from the type locality of Ban Lampiakpattana, Tambon Nonsomboon, Amphoe Soeng Sang, Nakhon Ratchasima Province, Thailand, Latitude 14.19 N., Longitude 102.25 E.

Etymology: Named in honour of herpetologist Cliff Ross Wellington of New South Wales, Australia in recognition of his many contributions to herpetology and wildlife conservation in general including for example Wells and Wellington (1984, 1985) and Wellington (2015), including his standing up against the reckless taxonomic vandalism of Wolfgang Wüster and his band of thieves who engage in such nefarious practices as stealing wildlife from educational wildlife displays, attacking private property, making threats to kill by telephone, pseudoscience in the form of stealing works of others and acts of taxonomic vandalism in breach of the rules of the ICZN and other acts of scientific fraud as detailed by Goodman (2019), Hoser (2009, 2012a-b, 2013a-b, 2015a-f, 2016, 2019a-b) and sources cited therein. Wellington has also worked extensively in terms of wild life in Thailand, where his contribution has been lengthy, intense and significant.

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CONFLICTS OF INTEREST - NONE.