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New Bluetongue Lizard and Sailfin Dragon Lizard taxa from Indonesia (Squamata:Sauria).

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ABSTRACT

The Indonesian Bluetongued Skinks (Genus *Tiliqua* Gray, 1825) and the Indonesian Sailfined Dragon Lizards (Genus *Hydrosaurus* Kaup, 1828) are common in captivity and have been subjected to extensive studies.

Notwithstanding the publication of several major taxonomic revisions of both groups, there has been ongoing taxonomic confusion spanning many years.

This has not been properly resolved by the most recent publications.

This paper seeks to remove ongoing taxonomic instability by formally naming obvious and yet unnamed taxa from Indonesia for the first time.

The urgency of these actions is underscored by the combined effects of habitat destruction and increased interest in these taxa by traders and collectors. In terms of the latter, it is important that regional lineages be maintained should there arise a need to reintroduce species into the wild at a later date.

Keywords: Taxonomy; Australasia; New Guinea; Indonesia; *Tiliqua*; *Hydrosaurus*; species; *gigas*; Seram; Irian Jaya; Halmahera; Papua; New Guinea; subspecies; *keyensis*; *evanescens*; new species; *alburyi*; new subspecies; *grantturneri*; *glennsheai*.

INTRODUCTION

In spite of the global popularity of the Australasian Bluetongued Skinks (Genus *Tiliqua* Gray, 1825) and Sailfined Dragon Lizards (Genus *Hydrosaurus* Kaup, 1828) and relevant detailed taxonomic works in relation to both genera of lizards in recent years, there remain obvious unnamed taxa.

In view of the large number of specimens in both private herpetoculture and museum collections, this state of affairs is astounding.

In terms of the Bluetonged Skinks, the following is of relevance:

Hitz *et al.* 2004, pages 177 to 189, in a chapter written by Glenn M. Shea provide an accurate and current account of the taxonomic history of the species (or species group) currently referred to the taxon *Tiliqua gigas* (Schneider, 1801).

As the book remains widely available in both English and German language editions, there is no major need for me to rehash the material within that publication here or present an exhaustive bibliography of relevant source material.

The species *T. gigas* (Schneider, 1801) as recognized to date is similar in many respects to the Australian *T. scincoides*, but is instead found in the region encompassed by island New Guinea and nearby islands to the west as well as immediately adjacent outliers.

Recognized by Shea and the other authors of Hitz *et al.* 2004 were three subspecies, namely *T. gigas gigas* (Schneider, 1801) from Ceram, based on Shea's recently assigned neotype, *T. gigas keyensis* Oudemans, 1894 from the Kei Islands and *T. gigas evanescens* Shea, 2000, with a holotype from Port Moresby, Papua New Guinea, and believed to be distributed throughout the east of New Guinea, east of the Huon Peninsula, as well as across the drier parts of the southern half of the island, including eastern Irian Jaya in the region of Merauke.

Hitz *et al.* 2004 included specimens from Halmahera and northern New Guinea within the subspecies *T. gigas gigas* even though they recognized significant regional variation in specimens and indicated the likelihood that there may be one or more undescribed forms (see page 204).

I note herein that Hitz *et al.* (2004) is in effect an English-language version of the same book published in year 2000, in German which carried Shea's original descriptions.

Combined with the known ecological barriers between the relevant described populations and others within each subspecies group and known divergence times based on established geological evidence (e.g. Dow, 1977 and Macey *et al.* 2000 and sources cited therein), it is clear that at least two more subspecies of *T. gigas* should be formally named.

This is done below according to the Zoological Code (Ride *et al.* 1999) for the populations from Halmahera and those found in the north-east of island New Guinea.

The genus *Hydrosaurus* Kaup, 1828, including the formal description of a new species according to the Zoological Code (Ride *et al.* 1999) is dealt with in this paper after the descriptions of the *Tiliqua* species.

In terms of the following descriptions, the following points should be noted. That is no changes to the names should be made unless mandated according to the Zoological Code, even if there

is apparent error in formation of names. Priority order in the event of conflict in names (assuming a later author seeks to merge taxa) should be in page priority here, that being the first printed (description) takes priority.

TILIQUA GIGAS GLENNSHEAI SUBSP. NOV.

Holotype: Reptile specimen number USNM 237426 at the United States National Museum, Washington, DC, USA, collected from Kampung Pasir Putih, Jailolo District, Halmahera Island, Moluccas, Indonesia.

The United States National Museum, Washington, DC, USA is a government-owned facility that allows scientists access to their collection.

Paratype 1: Reptile specimen number USNM 237427 at the United States National Museum, Washington, DC, USA, collected from Kampung Pasir Putih, Jailolo District, Halmahera Island, Moluccas, Indonesia.

The United States National Museum, Washington, DC, USA is a government-owned facility that allows scientists access to their collection.

Paratype 2: Reptile specimen number USNM 215904 at the United States National Museum, Washington, DC, USA, collected from Besa, near Loleba, Wasile District, Halmahera Island, Moluccas, Indonesia.

The United States National Museum, Washington, DC, USA is a government-owned facility that allows scientists access to their collection.

Diagnosis: *Tiliqua gigas glennsheai subsp. nov*. is separated from all other subspecies of *Tiliqua gigas* by the following suite of characters: A striped pattern on the venter, and three temporals behind the eye as opposed to two in all the other subspecies of *T. gigas*. The temporal configuration in *T. gigas glennsheai subsp. nov*. is caused by an expansion of the scales at the expense of size in the rear supralabials which are smaller, and also a division of the larger lower one as seen in other *T. gigas* into two in *T. gigas glennsheai subsp. nov*..

T. gigas glennsheai subsp. nov. is the only subspecies where the fore-legs are totally black (with occasional light flecks) and with the black extending onto the body and foreward to include a large band or streak running in an anterior direction. In other subspecies of *T. gigas*, the dark from the fore-legs is broken by a band of lighter scales from the anterior running streak.

T. gigas glennsheai subsp. nov. is also characterised by having a large adult size in excess of 270 mm S-V, versus under 260 mm S-V in all other subspecies. In contrast to *T. gigas gigas*, there are no parietals that are divided into an anterior and posterior scale (this trait typical for many but not all specimens in *T. gigas gigas*).

Both *T. gigas glennsheai subsp. nov*. and *T. gigas grantturneri subsp. nov*. are characterised by dark black colouration on the lower flanks, unbroken by patches of light pigment, interspersed with thinner bands of dark brown.

Distribution: Known only from Halmahera Island, Indonesia and immediately adjacent outliers, including Ternate.

Etymology: Named in honour of Sydney, NSW-based herpetologist, Dr. Glenn M. Shea in recognition of a lifetime's work with skinks of the genus *Tiliqua*.

TILIQUA GIGAS GRANTTURNERI SUBSP. NOV.

Holotype: Specimen number R12970 at the Australian Museum, Sydney, NSW, Australia, collected from Yapen Island, Indonesia. The Australian Museum, Sydney, NSW, Australia is a government-owned facility that allows scientists access to their collection.

Paratype: Specimen number R8884 at the Australian Museum, Sydney, NSW, Australia, collected from Eitape (=Aitape), West Sepik District, Papua New Guinea. The Australian Museum, Sydney, NSW, Australia is a government-owned facility that allows scientists access to their collection.

Diagnosis: *Tiliqua gigas grantturneri subsp. nov*. is separated from all other subspecies of *Tiliqua gigas* except for *T. gigas glennsheai subsp. nov*. by the fact that the fore and hind limbs are black and with distinct whitish yellow spots. In other *T. gigas*, the limbs are either black or dark with peppering as opposed to distinctive spots on the legs, or alternatively greyish white with black-etched scales.

Colouration and form of *T. gigas grantturneri subsp. nov*. is similar in most other respects to *T. gigas glennsheai subsp. nov*., with some specimens also having a striped pattern on the venter. However in common with all other *T. gigas* (except *T. gigas glennsheai subsp. nov*.), the dark from the fore-legs is broken by a band of lighter scales from the anterior running streak.

Both *T. gigas glennsheai subsp. nov*. are *T. gigas grantturneri subsp. nov*. are characterised by dark black colouration on the lower flanks, unbroken by patches of light pigment, interspersed with thinner bands of dark brown.

Tiliqua gigas glennsheai subsp. nov. is separated from all other subspecies of *Tiliqua gigas* including *T. gigas grantturneri subsp. nov*. by the fact that there are three temporals behind the eye as opposed to two in all the other subspecies of *T. gigas*. The temporal configuration in *T. gigas glennsheai subsp. nov*. is caused by an expansion of the scales at the expense of size in the rear supralabials which are smaller, and also a division of the larger lower one as seen in other *T. gigas* into two in *T. gigas glennsheai subsp. nov*..

Distribution: *Tiliqua gigas grantturneri subsp. nov*. is found on the northern margin of the island of New Guinea, west of the Huon Peninsula, including the eastern section of the island and immediately adjacent islands and outliers, but not including most other parts of Papua New Guinea and the drier parts of southern New Guinea, including the lower section of Irian Jaya in the region of Merauke, that area being occupied by the subspecies *T. gigas evanescens.*

Etymology: Named in honour of Dr. Grant Turner, formerly of Bundoora, (Melbourne) Victoria, Australia, and more recently of north Queensland, Australia in recognition of many years of captive breeding and research into Blotched Bluetongued Skinks (*Tiliqua nigrolutea*), and the publications he has created on this and other Australian reptiles.

GENUS *HYDROSAURUS* KAUP 1828

The iconic Sailfined Lizards of the genus *Hydrosaurus* have been subject of considerable taxonomic changes in terms of the treatment of component species. This is seen in the contrasting treatments and comments within the relevant and significant publications of Duméril and Bibron (1837), Gray (1845), Peters (1872), Boulenger (1885), de Rooij (1915), Günther (1873), Colwell (1993), Werning (2002, 2004), Setiadi and Hamidy (2006) and most recently Siler *et al.* (2014).

Within the genus, different authors have recognized different taxa and species totals for the genus as a whole including in the recent post 2000 period.

Most recently in 2014 on the basis of robust molecular data, Siler *et al.* (2014) (fig. 2) found the genus to consist of four well defined species for which all had available names.

These were *Hydrosaurus pustulatus* (Eschscholtz, 1829), *H. amboinensis* (Schlosser, 1768), *H. weberi* Barbour, 1911 and *H. celebensis* (Peters, 1872).

However Siler *et al.* (2014) did not present any molecular analysis for the regional populations of the taxon *H. amboinensis* (Schlosser, 1768). For that taxon they only analysed a single pet trade specimen of unknown provenance.

In light of this, specimens attributed to this species were examined from known parts of the range of taxon.

It was almost immediately apparent that *Hydrosaurus* specimens from the mainland of northern New Guinea and large immediately adjacent outlier islands were significantly different

morphologically to those from elsewhere.

In the light of the known geological past of the relevant parts of the range of the genus and known divergence times of land bridges based on established geological evidence (e.g. Dow, 1977 and Macey *et al.* 2000 and sources cited therein), combined with the molecular data obtained by Siler *et al.* (2014) for the non-New Guinea *Hydrosaurus* taxa, the New Guinea *Hydrosaurus* are formally described herein as a new species.

HYDROSAURUS ALBURYI SP. NOV.

Holotype: A specimen at the US National Museum (USNM), Washington DC, USA, specimen number: USNM 101095, in the Amphibians and Reptiles Collection, from the Van Rees Mountains, Edi Falls, in Mamberano River, Irian Jaya, Indonesia. The specimen is a juvenile that is preserved dry, with a flat skin and the skull. The United States National Museum, Washington, DC, USA is a government-owned facility that allows scientists access to their collection.

A deliberate decision was made not to sacrifice another live specimen from the wild for the purposes of taxonomy due to the the following two factors, these being an inordinate amount of legal red-tape involved in legally acquiring the specimen to lodge in a Museum and the time and money being spent by myself as a diversion, caused by reckless ongoing litigation being conducted against myself and my family by corrupt and dishonest animal-hating Victorian government wildlife officers Ron Waters, Glenn Sharp and Emily Gibson.

Diagnosis: *Hydrosaurus alburyi sp. nov.* is similar in most respects to other *Hydrosaurus* species and until now has been regarded by most authors as a variant of *H. amboinensis* (Schlosser, 1768).

However in some traits including dorsal colouration this species is more similar to *H. weberi* than *H. amboinensis* and likewise including in terms of the configuration of the nuchal and dorsal crests not properly merging.

However, *Hydrosaurus alburyi sp. nov.* is most readily separated from *H. amboinensis* and *H. weberi* by the presence of markings on the tail which tend to form three distinct longitudinal lines on the thick part of the tail under the crest and then moderately distinct darker and lighter crossbands on the latter part of the tail, these being less distinct in juveniles than adults. No such markings in this combination are present in any of the four other described *Hydrosaurus* species.

H. alburyi sp. nov. is similar in pattern to *H. weberi*, in that its dorsal colouration consists of dark speckling on a lighter background, sometimes forming an indistinct pattern of blotches. Whereas this is of even consistency across the body in *H. weberi*, in *H. alburyi sp. nov.* on the upper part of the body the speckling clumps to form distinct darker blotches immediately beneath the spine. In life, adult *H. alburyi sp. nov.* presents as a greenish-yellow lizard.

Unlike *H. weberi* or any other *Hydrosaurus* species *H. alburyi sp. nov.* has a lower tail (that posterior to the crest) that is usually characterised by moderately distinct darker and lighter yellow and brown crossbands.

H. alburyi sp. nov. is separated from *H. celebensis* by the absence of melanism around the back legs. *H. alburyi sp. nov.* is separated from *H. pustulatus*, by the absence of prominent highlights around the mouth and upper dorsal sailfin (back of the neck) that are blue or purple and are seen in both sexes, this being diagnostic for the taxon *H. pustulatus*.

The five recognized species within the genus (including *H. alburyi sp. nov.*) are defined as follows: Tympanum distinct. Body compressed. A dorsal crest. Throat longitudinally plicate; a transverse gular fold. Toes covered inferiorly with small granular scales, with a lateral fringe of large united scales most developed on the outer side. Tail strongly compressed, in the adult with a very high crest supported by the enormously developed spinose processes of the caudal vertebrae. Femoral pores present. Head rather small; snout elongate, with a small longitudinal crest of enlarged scales in the male; tympanum large; upper headscales small, strongly keeled. Gular scales small, granular, of unequal size; a row of enlarged shields on each side, parallel with the infralabials, commencing from the very large mental. Dorsal and nuchal crests continuous, composed of compressed lanceolate spines. Dorsal scales small, imbricate, keeled, the keels directed upwards and backwards, intermixed with scattered, enlarged, roundish, shortly keeled scales, varying considerably in size. Ventral scales larger than dorsals, subquadrangular, smooth, forming transverse series ; enlarged scales on the sides of the chest. Limbs long; the adpressed hind limb reaches the eye or between the latter and the tip of the snout; scales enlarged on anterior face of forelimb. Femoral pores seven to sixteen on each side. Tail covered with minute quadrangular keeled scales above and on the sides, with much larger ones inferiorly; caudal crest very high in the males, with feebly denticulated border, present only on the anterior part of the tail; length of tail more than twice that of head and body. Olive above, spotted or vermiculated with black; oblique fold in front of the shoulder is black.

The Philippine's Sailfin Lizard, *H. pustulatus*, begins life mostly as a brown lizard. Later, they develop prominent highlights around the mouth and upper dorsal sailfin (back of the neck) that are blue or purple and are seen in both sexes, this being diagnostic for the taxon.

H. amboinensis from Ceram and Ambon is diagnosed by having dorsal and nuchal crests continuous; tympanum is half the diameter of the orbit; tail more than twice the length of the head and body. The general colour is a dullish olive colour.

H. weberi from Halmahera, is defined by having the dorsal and nuchal crests separated by unraised tissues; tympanum one third the diameter of the orbit; tail is not quite twice the length of head and body. The body is of a generally greenish colour.

H. celebensis from Sulawesi, has until recently been viewed by most authors as a variant of *H. amboinensis.* It is readily identified by melanism towards the head and hind limbs area, not seen in any of *H. amboinensis* or *H. weberi. H. alburyi sp. nov.* does have melanism around the head, but in contrast to *H. celebensis* not at the rear body.

H. celebensis is also characterised by three broken rows of raised coloured (whitish, greyish, or blackish) scales across the body on an even speckled background of variable colour, but usually orangeish, brown or olive-green.

Distribution: *H. alburyi sp. nov.* is found in North-west Island New Guinea, in a region from the Mamberamo basin (Richards and Suryadi 2002) and west along the coast, to include nearby islands such as Waigeo. In both the lower and middle Mamberamo basin and Waigeo the species is commonly encountered. There are reports from other intervening areas on both north and south coasts, usually based on sightings only (e.g. Various authors 2003), but it should be noted that there are very few herpetological surveys completed in the area to date. There are no reliable records for the species *H. alburyi sp. nov.* or any other *Hydrosaurus* species from Papua New Guinea, in spite of literature records (e.g. Siler *et al.* 2014).

All five described and recognized species of *Hydrosaurus* have mutually allopatric distributions.

Etymology: Named in honour of Wayne Thomas Albury of Melbourne, Victoria, Australia. In 1988 and in the face of unlawful threats from the Victoria Police, Albury took a great personal risk and gave evidence in a court of law against a police-protected criminal named Phillipa O'Shannessy. Details of the case are in Hoser (1994).

CONFLICT OF INTEREST

This author reports no conflict of interest.

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