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A break up of the genus *Acrochordus* Hornstedt, 1787, into two tribes, three genera and the description of two new species (Serpentes: Acrochordidae).

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ABSTRACT

This paper presents a revised taxonomy for the living Acrochordidae.
The species *Acrochordus javanicus* Hornstedt, 1787 divided by McDowell in 1979 into two species is further divided, with two new species from south-east Asia formally named for the first time. The taxon *A. arafurae* McDowell, 1979 is placed in a separate genus, named for the first time.

A. granulatus Schneider, 1799 is placed in a separate genus, for which the name *Chersydrus* Schneider, 1801 is already available.

Keywords: Taxonomy; Australasia; Asia; *Acrochordus*; *Chersydrus*; new genus; *Funkiacrochordus*; new tribes; Acrochordidini; Funkiacrochordidini; new subgenus: *Vetusacrochordus*; new species; *malayensis*; *mahakamiensis*.

INTRODUCTION

This paper presents a revised taxonomy for the living Acrochordidae.

The genus *Acrochordus* Hornstedt, 1787 as recognized to date has been studied by myself since the early 1980's (see photo taken in the 1980's of an albino specimen from Alligator River, NT on the cover of this journal. This has included the examination of specimens and photos of all species recognized to date, including two formally named for the first time here.

The material and methods forming the basis of the taxonomic decisions within this paper has been a thorough review of my data as well as the relevant published literature, including the definitive papers of McDowell (1979), Sanders *et al.* (2010) and corroborative data in many other published findings.

Coupled with a review of the molecular data published to date, including Pyron *et al.* (2013), geological records, as outlined by Molengraaff 1921a, 1921b, Voris 2000, sources cited by these authors and many other similar published studies. I have made the following taxonomic and nomenclatural judgements based on the evidence before me.
The species *Acrochordus javanicus*, divided by McDowell in 1979 into two species is further divided, with two new species from south-east Asia formally named for the first time. The taxon *A. arafurae* McDowell, 1979 is placed in a genus, named for the first time, while *A. granulatus* Schneider, 1799 is placed in a separate genus, for which the name *Chersydrus* Schneider, 1801 is already available.

To make further sense of the generic arrangement created herein, two tribes are erected for each main grouping.

I note also the following: In 2006 an online petition sponsored by a group of animal-hating pseudoscientists including Wolfgang Wüster, Mark O'Shea, David John Williams, Bryan Fry and others posted at: http://www.aussiereptileclassifieds.com/phpPETITION (Hunter *et al.* 2006) called for my successful wildlife education business and all my other herpetological activity to be shut down by the government of Victoria, Australia. These men were successful in that after a ruthless five-year campaign, on 17 August 2011, 11 heavily armed police and wildlife officers conducted a highly illegal and violent raid on our family home and research facility. Myself, my wife and two young daughters were arrested at gunpoint and held hostage in the kitchen of the house for nine hours while the facility was ransacked and effectively destroyed. Besides the unspeakable acts of killing captive snakes and criminal damage to cages, household goods, the raiding officers illegally shut down our business and effectively placed myself under house arrest at gunpoint for some months after the raid.
An application by myself to the Supreme Court of Victoria led to the re-opening of our unlawfully shut down wildlife education business.

Of greater relevance here is that at the time of the raid, research files, and the like spanning more than 40 years were taken and never returned, including materials and records relevant to this paper.

Material taken included all the computers, disks, hard drives, backups, cameras, scientific literature and other forms of information storage at the facility. All were loaded into the back of a truck and a very large trailer and carted off.

Faced with the dilemma of deciding whether to spend another fourty years gathering data, by which time I may be dead from old age, being aged 52 as of 2014 (and with a family history of deaths from heart disease from the 40's onward), or publishing

the relevant paper/s with minimal data, I have opted to publish. Underlying this motivation has been an increasing concern that a delay to formally identify and name undescribed biodiversity may lead to its extinction before another scientist gets around to the matter.

Engstrom *et al.* (2002) wrote: "The documentation of this diversity must be seen as an activity that is done not just for posterity but for immediate action and protection."

A number of authors including Kaiser (2012a, 2012b, 2013 and 2014), Kaiser *et al.* (2013), Naish (2013) and Wüster *et al.* (2014), all part of the group of people effectively controlled by Wüster, have been highly critical of the fact that I have assigned names to unnamed clades of snakes. Their unscientific and childish attacks, continued incessantly on social media such as Facebook and Twitter are rejected herein as destabilizing the nomenclature and impeding the progress of science.

Their ridiculous comments and false and defamatory statements are systematically rebutted by Hoser (2013).

I also note that many taxa formally named by myself for the first time in earlier publications (e.g. Hoser 2000a, 2000b) are in fact threatened species.

Therefore I note the sensible remarks of Engstrom *et al.* (2002) as a perfectly reasonable explanation for the publishing of taxon descriptions for such unnamed groups. This remains the case even if a sizeable amount of my original research, files, photos and data have been stolen and therefore cannot be relied upon and incorporated into these contemporary publications.

***ACROCHORDUS* HORNSTEDT, 1787**

The taxonomic treatment of the genus *Acrochordus* Hornstedt, 1787 has been relatively stable. For most of the past two centuries, two well-defined species have been widely recognized. These are the Large Wart Snake *Acrochordus javanicus* Hornstedt, 1787 and the lesser wart snake *A. granulatus* (Schneider, 1799).

More recently *Acrochordus arafurae* McDowell, 1979 from northern Australia and southern New Guinea was described. This taxon was previously being regarded as *Acrochordus javanicus* Hornstedt, 1787.

A number of recent authors have placed the species *granulatus* within Schneider's monotypic 1801 genus *Chersydrus*, including most recently Sharma (2004). While people have argued about the morphological significance of the characters differentiating Schneider's species from the *javanicus* group, molecular evidence arguing for division of all three currently recognized species into three (separate) genera, remaining within the family Acrochordidae is clear and undeniable (Sanders *et al.* 2010, Pyron *et al.* 2013).

Sanders *et al.* (2010), found divergence times of 16 and 20 million years for each divergent group, which in the normal course of events would result in the relevant species being placed in separate genera and without argument.

However the relevant authors did not even go so far as to place each within subgenera. Noting that all remain within the all-encompassing family Acrochordidae, there is no instability in nomenclature caused by such division of the genus *Acrochordus* as presently understood.

Hence I have corrected the nomenclature of the group based on known phylogeny, while maintaining stability of the nomenclature in a broad sense as per the rules of the ICZN (Ride *et al.* 1999) including all the optional recommendations of the code.

Resurrecting *Chersydrus* leaves just one unnamed group to be named which I do so herein.

In answer to the repeated criticisms by Wüster *et al.* that I have named too many species of reptiles, thereby depriving them or other as yet unborn herpetologists of their alleged "right" to name species, I again refer to Engstrom *et al.* (2002).

Therefore I have no hesitation whatsoever in naming the clade first properly identified by Sanders *et al.* in 2010. In my view that clade should have been named by them at the time and I have no hesitation whatsoever in doing what is in effect inevitable.

That clade is described herein as *Funkiacrochordus gen. nov.*.

Noting that Sanders *et al.* (2010), found divergence times of 16 and 20 million years for each divergent group, the lower time period being that where *Chersydrus* and the *arafurae* group (herein defined as *Funkiacrochordus gen. nov.*.) split, it is entirely appropriate that the two main groups be given recognition as tribes, even though such designations are currently rarely used in herpetology.

Therefore each new tribe Acrochordidini *tribe nov.* and Funkiacrochordidini *tribe nov.* are both formally defined herein.

The genus *Acrochordus* (*sensu lato*), including the species *A. javanicus* as recognized to date was subject to audit by myself since before I published images of specimens of different specimens of *A. arafurae* in Hoser (1989).

It has been apparent for some time that specimens from mainland south-east Asia, including Peninsula Malaysia and nearby Thailand are different morphologically from those of Indonesian islands Java and Borneo. However Sumatran specimens appeared to fit both forms and due to the apparent absence of major geographical barriers it was initially thought that the differences observed were both relatively insignificant in a phylogenetic sense and/or likely to have intermediates that I had not observed or seen.

Notwithstanding this issue, my own inspections of specimens and photos from Sumatra, found that specimens from the Batanghari River and south corresponded to the nominate form, while those from the Kampar River drainage and north corresponded with the specimens from the Malay Peninsula.

Further investigations by myself seeking evidence of a biogeographical barrier revealed that each group did in fact correspond with the two main drainages of the composite Molengraaff River systems (Molengraaff 1921a, 1921b, Voris 2000). These being present during peaks of recent ice-age maxima, when sea levels were at their lowest (see maps within Voris 2000)
The two basins corresponding to the species distributions were one drainage basin flowing north and the other flowing north-east, (Sepentrional running north and Molengraaff running north-east). It is has also become clear that each form remains separated from one another in the present interglacial period and so each warrant species recognition.

With no available name for the Peninsula Malaysian species (Sepentrional basin), it is formally named as *Acrochordus malayensis sp. nov.* herein.

A similar situation existed in terms of specimens from Eastern Borneo (Kalimantan).

By observation of the consistent differences in patterning alone, these snakes are consistently more divergent from the South Sumatran and Javanese form than those from Peninsula Malaysia. Even in times of recent glacial maxima, this population was clearly cut off from the others and so must by simple logic be a different species. With no available name for the east Borneo population, they are formally described herein as *Acrochordus mahakamiensis sp. nov.*.

The literature reports that all these snakes (Acrochordidids) have considerable marine tolerance, (e.g. Cogger 1975, p. 362), who for *A. arafurae* in Australia, then identified as *A. javanicus* wrote: "Largely restricted to fresh-water streams and lagoons, wherever monsoonal floods permit them to enter permanent waters; however, they freely enter estuarine waters and the sea".

As Cogger's works remain definitive authorities, the same sorts of comments have been repeated widely.

However my own studies show that regular movements in salt water only seem to be the case for the widely distributed taxon *Chersydrus granulatus* (Schneider, 1801), this being a common species distributed continuously in marine environments from Australasia to southern Asia. My own observations of the other

two genera as defined herein show that they are not able to colonise areas separated by sea boundaries and while not able to cross seas very well are able to cross limited flat land barriers with some ease; especially at times of flooding.

While this is in part corroborated by the non-intermingling of the two Sumatran populations, this is further corroborated by the modern distribution of the relevant species. None are known from Sulawesi, which according to Voris (2000), Fig. 1, has never been joined by land to the physically nearby Borneo, or alternatively the apparent absence of any *Funkiacrochordus* in the north of island New Guinea.

While the absence of relevant species (excluding *Chersydrus*) from smaller islands is noted and perhaps due to a lack of potentially available habitat, my belief is that a better explanation is the relative inability of the species to be able to cross sea barriers.

Sanders *et al.* (2010) also noted that this hypothesis is "corroborated by the occurrence of all fossil *Acrochordus* in inland fluvial deposits (Hoffstetter, 1964; Head, 2005; Head *et al.* 2007; Rage and Ginsburg, 1997).

What hasn't yet been speculated is reasons why all Acrochordidae do not readily cross seawater barriers except for the single species *granulatus* in light of a distribution across two continental plates.
My belief is that upon the genus *Chersydrus* developing good sea water tolerance, it was able to spread widely across the range of other Acrochordids. With each species competing with one another, a degree of character displacement took place, in effect pushing *Chersydrus* to the more marine environments and while keeping the other species more firmly in freshwater habitats and at the same time reducing potential tolerance to salt water that they may have once had.

This also explains the phylogenies produced on the basis of the molecular evidence.

Finally I note the comments of McDowell in 1979 who wrote: "The three living species of *Acrochordus*, *A . javanicus*, *A . arafurae*, and *A. granulatus*, differ from one another anatomically as much as do genera of Boidae and Colubridae, but it seems pointless to recognise three genera, each monotypic."
That was clearly the case in 1979 and in line with prevailing herpetological consensus at the time. In the period post-dating the publications of Wells and Wellington (1983, 1984), there has been an increased desire for groups to be split along phylogenetic lines and utilizing all levels of classification available.
Added to that is the clear recognition of at least two more species of *Acrochordus* (this paper), in addition to fossil material, meaning that the genus *Acrochordus*, even when split from the Australasian species is no longer monotypic.
In light of this situation the argument in favour of splitting *Acrochordus* as recognized to date is now compelling and I have no doubt that in spite of the non-stop unscientific conduct of Wüster *et al.* as detailed by Hoser (2013), herpetologists will eventually use the classification and taxonomy proposed within this paper.

Brief diagnoses of both *Acrochordus* and *Chersydrus* as defined in this paper are given below. For further diagnostic information in terms of these two genera and *Funkiacrochordus gen. nov.* refer to McDowell (1979). The family Acrochordidae is also defined at length by McDowell (1979).

GENUS *ACROCHORDUS* HORNSTEDT, 1787

Type species: *Acrochordus javanicus* Hornstedt, 1787.

Diagnosis: Scales of lower sides with three posterior cusps, the middle cusp only slightly longer than the flanking dorsal and ventral cusps; sides with isolated dark spots that usually fuse into a longitudinal stripe on the side of the neck; compound bone of lower jaw with coronoid process immediately posterior to rear of dentary; nasal bones (unfused) with broadly rounded and transverse anterior border; ectopterygoid with posterior end abruptly flexed mediad, its shaft with a flange-like expansion; maxillary teeth 20 or more; dentary teeth 21 or more, the last 4 short and mitre-shaped; hemipenis forked for more than half its length (the branches with spines or papillae).

Distribution: South-east Asia. Fossil material from southern Asia (see below).

Content (Living species): *Acrochordus javanicus* Hornstedt, 1787; *A. malayensis sp. nov.* (this paper); *mahakamiensis sp. nov.* (this paper).

***CHERSYDRUS* SCHNEIDER, 1801.**

Type species: *Acrochordus granulatus* Schneider, 1799.

Diagnosis: Scales of lower sides with middle cusp much longer than flanking dorsal and ventral cusps, the latter sometimes so short that scale may be one-cusped; dark markings on sides either forming vertical bars being either with dark cross-bands or nearly uniform dark coloration; compound bone of lower jaw without coronoid process; nasal bones tapered anteriorly, together forming a median anterior point; ectopterygoid smoothly arched, without flange on shaft; maxillary teeth 19 or fewer; dentary teeth 17 or fewer, the most posterior similar in form to the other teeth; pterygoid teeth 5-7; nostrils directed strongly upward; nasal-eye scales 5-7; eye-lip scales 5-7; nasal bones completely separated by suture; hemipenis forked for about one-third its length and always less than half its length, the branches with spines or papillae.
Distribution: Southern Asia, across to Australasia, including northern Australia, New Guinea and the Solomon Islands.

Content: *Chersydrus granulatus* (Schneider, 1799).

FUNKIACROCHORDUS GEN. NOV.

Type species: *Acrochordus arafurae* McDowell, 1979.

Diagnosis: *Funkiacrochordus gen. nov.* is monotypic for the species *F. arafurae* (McDowell, 1979). As a result, the diagnosis for the species by McDowell in 1979 applies herein.

Funkiacrochordus gen. nov. are most easily separated from other living *Acrochordids* with which they have been confused, by the following suite of characters: 11-14 scales between the nasal and the eye, 9-11 scales between the lip and the eye (as opposed to 5-7 in both for *Chersydrus granulatus*), 11-16 pterygoid teeth (as opposed to 5-7 in *Chersydrus granulatus*); a fused nasal bone (unfused in both *Chersydrus* and *Acrochordus*); forward facing nostrils (upward facing in *Chersydrus*) and their distinctive colour pattern. This consists of being grey to dark brown above with broad darker brown to black reticulations extending from a broad vertebral band to form either vague cross-bands or a series of circular or oblong blotches within the reticulated pattern along the upper surface of the body; whitish below, the dark reticulations of the dorsal surface extend to the belly. Even in old and faded specimens, this pattern can be detected. The skin is very loose and flabby.

By contrast the three *Acrochordus* species (*A. javanicus*, *A. malayensis sp. nov.* and *mahakamiensis sp. nov.* described below) lack this colour pattern. Their patterning is described below.

Until now the taxon *Acrochordus malayensis sp. nov.* has been defined as a variant *of A. javanicus*. Besides being readily separated on the basis of distribution as defined below, the taxon *Acrochordus malayensis sp. nov.* is readily separated from *A. javanicus* (including the taxon described as *Acrochordus mahakamiensis sp. nov.* herein) on the basis of colouration.

In *Acrochordus malayensis sp. nov.* the dorsal colouration invariably consists of the following pattern, this being a thick dorsal line bound by thick lighter lines for the entire length of the body, the upper mid-flanks consisting of either a thick dark line or large ovoid blotches (usually in the configuration of lines anterior and blotches throughout the mid-body). By contrast *A. javanicus* has a dorsal colouration that invariably does not include a preponderance of large ovoid blotches on the lower flanks. While in both taxa there are markings within the dark

thick dorsal mid-line, this is indistinct in A. *malayensis sp. nov*., whereas these markings are well defined in *A. javanicus* and the region is also punctuated by small patches of light pigment.

For the third species *A. mahakamiensis sp. nov*. currently only reported from East Borneo, the pattern is a distinctive one including numerous small dark jagged edged markings on the lower flanks within lighter pigment, being a configuration not seen in the other two species.

All three *Acrochordus* species are most easily separated from *Funkiacrochordus gen. nov.* by the distinctive colour pattern of the latter genus. This consists of being grey to dark brown above with broad darker brown to black reticulations extending from a broad vertebral band to form either vague cross-bands or a series of circular or oblong blotches within the reticulated pattern along the upper surface of the body encircling the lighter areas; whitish below, the dark reticulations of the dorsal surface extend to the belly. Even in old and faded specimens, this pattern can be detected.

By contrast the three *Acrochordus* species (*A. javanicus*, *A. malayensis sp. nov*. and *A. mahakamiensis sp. nov*. described above) lack this colour pattern.

The skin is very loose and flabby.

Funkiacrochordus and *Chersydrus* differ from all living and extinct *Acrochordus* by the absence of a parazygosphenal foramina (Sanders *et al.* 2010).

Acrochordus and *Funkiacrochordus* species are separated from *Chersydrus granulatus* (in most texts identified as *Acrochordus granulatus*) by not having 5-7 scales between the nasal and the eye, and 5-7 scales between the lip and the eye.

Species within all three living genera of Acrochordids (as defined herein) can be readily separated by hemipenal morphology as detailed by McDowell (1979).

In *Funkiacrochordus* the hemipenis is forked only at its extreme tip, with the sulcus forking at the furcation of the hemipenis; there are no spines or papillae, nor are there any calyces or flounces, but each distal lobe of the organ bears a thickened pallet containing the distal extremity of the sulcus spermaticus.

In *Chersydrus* the hemipenis is forked for one-third its length, with the sulcus forked much more proximally, at the midpoint of the organ; the branches of the organ, except for the lips of the sulcus, are covered with proximally directed pointed papillae or spines (presumably depending on age) and a

few spines (or papillae) extend just proximal to furcation of the organ, but not to the level of furcation of the sulcus.

In *Acrochordus* (as defined within this paper) the hemipenis is forked for more than half its length,

with the sulcus forked at the furcation of the organ; each branch of the organ (except at the extreme tip) is covered with spines or spine-like papillae (presumably depending on age), which occur on the lips of the sulcus but are longest opposite the sulcus; a few short spines extend proximally onto the unforked part of the organ, flanking the sulcus; the tip of each lobe is smooth, with a pallet-like expansion of the lips of the sulcus.

Distribution: Drainages running into the Arafura Sea from northern Australia and southern New Guinea, west of Cape York and the equivalent point in New Guinea. There are unconfirmed records east of this point. The genus does not occur west of Wallace's Line. There it is replaced by *Acrochordus. Chersydrus* occurs throughout south-east Asia to northern Australia, New Guinea and nearby islands including the Solomon Islands.

Etymology: Named in honour of Mesa, Arizona, USA-based herpetologist, Dr. Richard Funk.

The "acrochordus" part of the etymology refers to the warty nature of the snake's epidermis.

ACROCHORDUS MALAYENSIS SP. NOV.

Holotype: A juvenile specimen at the US National Museum (USNM), Washington DC, USA, specimen number 142402 from Kuala Lumpur, Prince's Road, under bridge, near T.P.C.A., Selangor Province, Peninsula, Malaysia. The US National Museum, Washington DC, USA, is a facility that allows scientists access to specimens.

Paratype: A juvenile specimen at the US National Museum (USNM), Washington DC, USA, specimen number 142403 from Kuala Lumpur, Prince's Road, under bridge, near T.P.C.A., Selangor Province, Peninsula, Malaysia. The US National

Museum, Washington DC, USA, is a facility that allows scientists access to specimens.

Diagnosis: Until now the taxon *Acrochordus malayensis sp. nov*. has been defined as a variant *of A. javanicus*. Besides being readily separated on the basis of distribution as defined below, the taxon *Acrochordus malayensis sp. nov*. is readily separated from *A. javanicus* (including the taxon described as *Acrochordus mahakamiensis sp. nov*. herein) on the basis of colouration.

In *Acrochordus malayensis sp. nov*. the dorsal colouration invariably consists of the following pattern, this being a thick dorsal line bound by thick lighter lines for the entire length of the body, the upper mid-flanks consisting of either a thick dark line or large ovoid blotches (usually in the configuration of lines anterior and blotches throughout the mid-body). By contrast *A. javanicus* has a dorsal colouration that invariably does not include a preponderance of large ovoid blotches on the lower flanks. While in both taxa there are markings within the dark thick dorsal line, this is indistinct in A. *malayensis sp. nov*., whereas these markings are well defined in *A. javanicus* and the region is also punctuated by small patches of light pigment. For *A. mahakamiensis sp. nov*. the pattern is a distinctive one including numerous small dark jagged edged markings on a lighter background on the lower flanks, this configuration not seen in the other two species.

All three *Acrochordus* species are most easily separated from *Funkiacrochordus gen. nov.* by the distinctive colour pattern of the latter genus. This consists of being grey to dark brown above with broad darker brown to black reticulations extending from a broad vertebral band to form either vague cross-bands or a series of circular or oblong blotches within the reticulated pattern along the upper surface of the body; whitish below, the dark reticulations of the dorsal surface extend to the belly. Even in old and faded specimens, this pattern can be detected.

By contrast the three *Acrochordus* species (*A. javanicus*, *A. malayensis sp. nov*. and *A. mahakamiensis sp. nov*. described above) lack this colour pattern.

The skin is very loose and flabby.

Acrochordus species are separated from *Chersydrus granulatus* (in most texts identified as *Acrochordus granulatus*) by not having 5-7 scales between the nasal and the eye, and 5-7 scales between the lip and the eye.

Distribution: Thailand, West and East Peninsula Malaysia, including Singapore, North Sumatra, south to the province of Riau, central Sumatra including the Kampar River drainage.

The species *A. javanicus* is herein confined from south-central Sumatra in the region of the province of Jambi, including the Batanghari River and further South in Sumatra and Java, this including the central part of the so-called Molengraaff River system as defined by (Molengraaff 1921a, 1921b and Voris 2000).

A. javanicus may also occur in south and west Borneo (Kalimantan), but this is not known.

A. mahakamiensis sp. nov. occurs in eastern Borneo (Kalimantan), known at this stage only from the region of the type locality the Mahakam River drainage system.

Etymology: Named in reflection of the centre of distribution of the taxon and in recognition of the fact that the other species in the genus are similarly named on the basis of locality of origin of the type specimens as seen in *A. mahakamiensis sp. nov.* and *Acrochordus javanicus* Hornstedt, 1787, or for that matter as seen in *Funkiacrochordus arafurae* (McDowell, 1979).

ACROCHORDUS MAHAKAMIENSIS SP. NOV.

Holotype: Specimen number 49964 at the US National Museum, (USNM), Washington DC, USA, collected from the Mahakam River, Kalimantan (Borneo). The US National Museum, Washington DC, USA, is a facility that allows access to its collection by scientists.

Paratype 1: Specimen number 49780 at the US National Museum, (USNM), Washington DC, USA, collected from the Mahakam River, Kalimantan (Borneo).

Further paratypes: A collection of embryo's (individual) numbers 49965-49974 at the US National Museum, (USNM), collected from the Mahakam River, Kalimantan (Borneo).

The US National Museum, Washington DC, USA, is a facility that allows access to its collection by scientists.

Diagnosis: *Acrochordus mahakamiensis sp. nov*. from eastern Borneo (Kalimantan) is readily identified and separated from all other *Acrochordus* by its colour pattern arrangement. The pattern is a distinctive one including numerous small dark jagged edged markings on a lighter background on the lower flanks, this configuration not seen in the other two species. It is also often reddish-brown in colour as opposed to a more-greyish brown in the other species of *Acrochordus.*

Until now the taxon *Acrochordus malayensis sp. nov*. has been defined as a variant *of A. javanicus*. Besides being readily separated on the basis of distribution as defined within this paper, the taxon *Acrochordus malayensis sp. nov*. is readily separated from *A. javanicus* (including the taxon described as *Acrochordus mahakamiensis sp. nov*. herein) on the basis of colouration.

In *Acrochordus malayensis sp. nov*. the dorsal colouration invariably consists of the following pattern, this being a thick dorsal line bound by thick lighter lines for the entire length of the body, the upper mid-flanks consisting of either a thick dark line or large ovoid blotches (usually in the configuration of lines anterior and blotches throughout the mid-body). By contrast *A. javanicus* has a dorsal colouration that invariably does not include a preponderance of large ovoid blotches on the lower flanks. While in both taxa there are markings within the dark thick dorsal line, this is indistinct in A. *malayensis sp. nov*., whereas these markings are well defined in *A. javanicus* and the region is also punctuated by small patches of light pigment. For *A. mahakamiensis sp. nov*. the pattern is a distinctive one including numerous small dark jagged edged markings on a lighter background on the lower flanks, this configuration not seen in the other two species.

All three *Acrochordus* species are most easily separated from *Funkiacrochordus gen. nov.* by the distinctive colour pattern of the latter genus. This consists of being grey to dark brown above with broad darker brown to black reticulations extending from a broad vertebral band to form either vague cross-bands or a series of circular or oblong blotches within the reticulated pattern along the upper surface of the body; whitish below, the dark reticulations of the dorsal surface extend to the belly. Even in old and faded specimens, this pattern can be detected.

By contrast the three *Acrochordus* species (*A. javanicus*, *A. malayensis sp. nov*. and *A. mahakamiensis sp. nov*. described above) lack this colour pattern.

The skin is very loose and flabby.

Acrochordus species are separated from *Chersydrus granulatus* (in most texts identified as *Acrochordus granulatus*) by not having 5-7 scales between the nasal and the eye, and 5-7 scales between the lip and the eye.

Distribution: *A. mahakamiensis sp. nov.* occurs in eastern Borneo (Kalimantan), known at this stage only from the region of the type locality the Mahakam River drainage system.

Acrochordus malayensis sp. nov. is found in Thailand, West and East Peninsula Malaysia, including Singapore, North Sumatra, south to the province of Riau central Sumatra including the Kampar River drainage.

The species *A. javanicus* is herein confined from south-central Sumatra in the region of the province of Jambi, including the Batanghari River and further South in Sumatra and Java, this including the central part of the so-called Molengraaff River system as defined by (Molengraaff 1921a, 1921b and Voris 2000).

A. javanicus may also occur in south and west Borneo (Kalimantan), but this is not known.

Etymology: Named in reflection of the centre of distribution of the taxon and in recognition of the fact that the other species in the genus is similarly named on the basis of locality of origin of the type specimen as was *Funkiacrochordus arafurae* (McDowell, 1979) and *Acrochordus javanicus* Hornstedt, 1787.

ACROCHORDININI *TRIBE NOV.*

(Terminal taxon: *Acrochordus javanicus* Hornstedt, 1787).

Diagnosis: All three living *Acrochordus* species (the entire living content of this tribe) are most easily separated from *Funkiacrochordus gen. nov.* (*tribe* Funkiacrochordidini *tribe nov.*) by the distinctive colour pattern of the latter genus. This consists of being grey to dark brown above with broad darker brown to black reticulations extending from a broad vertebral band to form either vague cross-bands or a series of circular or oblong blotches within the reticulated pattern along the upper surface of the body; whitish below, the dark reticulations of the dorsal surface extend to the belly. Even in old and faded specimens, this pattern can be detected.

By contrast the three *Acrochordus* species (*A. javanicus*, *A. malayensis sp. nov*. and *A. mahakamiensis sp. nov*. described above) lack this colour pattern.

The skin is very loose and flabby.

Acrochordus species are separated from *Chersydrus granulatus* (in most texts identified as *Acrochordus granulatus*) (also now placed in tribe Funkiacrochordidini *tribe nov.*) by not having 5-7 scales between the nasal and the eye, and 5-7 scales between the lip and the eye.
Acrochordus species have 11-14 scales between the nasal and the eye, 9-11 scales between the lip and the eye.

Other than *A. javanicus*, *A. malayensis sp. nov*. and *A. mahakamiensis sp. nov*., there are no other living species within the tribe Acrochordidini.
The mainly Miocene fossil species *Acrochordus dehmi* Hoffstetter, 1964, with relevant material dated from 18 MYA and the most recent material dated to 6.35 MYA (Head 2005) is clearly within the genus *Acrochordus* as defined herein and therefore within the same tribe as well (Head 2005, Sanders *et al.* 2010).

However in the light of the following important facts:
1/ The taxon is readily separated from extant *Acrochordus* species by the following suite of characters; larger adult size, possession of lymphapophyseal foramen and tall neural spines with

straight dorsal margins; 2/ Its known distribution centering on India and Pakistan and not the extant range of living *Acrochordus* and 3/ the relative antiquity of the species, it is appropriate that it be placed within a separate subgenus. This is formally defined and named herein as *Vetusacrochordus subgen. nov.*.

Distribution: Living species are confined to South-east Asia and not east of Wallace's line. An extinct taxon, now placed in the subgenus *Vetusacrochordus subgen. nov.* is known from Pakistan, India, Nepal and Thailand.

Content: *Acrochordus* Hornstedt, 1787.

SUBGENUS *VETUSACROCHORDUS SUBGEN. NOV.*

(Terminal taxon: *Acrochordus dehmi* Hoffstetter, 1964).

Diagnosis: *Vetusacrochordus subgen. nov.* are known only from the fossil record (Head 2005).

While the snakes of this subgenus would normally key as *Acrochordus* (see above), they are readily separated from living *Acrochordus* by the following suite of characters: larger adult size (up to 2.5 metres total length as opposed to 2 metres), possession of lymphapophyseal foramen, and tall neural spines with straight dorsal margins.
Distribution: The fossil taxon is known from the lower and middle Siwalik Group of the Potwar Plateau, Pakistan, as well as middle Siwalik Group of Nepal and middle-upper Siwalik Group of Jammu, India and Thailand (Hoffstetter, 1964, Rage and Ginsburg, 1997, Head, 2005, Head *et al.*, 2007, West *et al.* 1991, Rage *et al.* 2001).

Content: *Acrochordus* (*Vetusacrochordus*) *dehmi* Hoffstetter, 1964.

FUNKIACROCHORDIDINI *TRIBE NOV.*

(Terminal taxon: *Acrochordus arafurae* McDowell, 1979).
The above terminal taxon is herein defined as *Funkiacrochordus arafurae* (McDowell, 1979).

Diagnosis: Species within the component genera *Funkiacrochordus* and *Chersydrus* differ from all living and (known) extinct *Acrochordus* (Acrochordidini) by the absence of a parazygosphenal foramina (Sanders *et al.* 2010).

Colour pattern differences between living members of this tribe and species within Acrochordidini are as follows:

All three living *Acrochordus* species (the entire living content of that tribe) are most easily separated from *Funkiacrochordus gen. nov.* (*tribe* Funkiacrochordidini *tribe nov.*) by the distinctive colour pattern of the latter genus. This consists of being grey to dark brown above with broad darker brown to black reticulations extending from a broad vertebral band to form either vague cross-bands or a series of circular or oblong blotches within the reticulated pattern along the upper surface of the body; whitish below, the dark reticulations of the dorsal surface extend to the belly. Even in old and faded specimens, this pattern can be detected.

By contrast the three *Acrochordus* species (*A. javanicus*, *A. malayensis sp. nov*. and *A. mahakamiensis sp. nov*. described above) lack this colour pattern.

The skin is very loose and flabby.

Acrochordus species are separated from *Chersydrus granulatus* (in most texts identified as *Acrochordus granulatus*) (also now placed in tribe Funkiacrochordidini *tribe nov.*) and the only other known taxon in this tribe by not having 5-7 scales between the nasal and the eye, and 5-7 scales between the lip and the eye.
Acrochordus species have 11-14 scales between the nasal and the eye, 9-11 scales between the lip and the eye.

Other than *A. javanicus*, *A. malayensis sp. nov*. and *A. mahakamiensis sp. nov*., there are no other known living species within the tribe Acrochordidini.

Distribution: South Asia, south-east Asia across all of Indonesia and including northern Australasia, including New Guinea and the Solomon Islands.

Content: *Funkiacrochordus gen. nov*. (this paper); *Chersydrus* Schneider, 1801.

NOMENCLATURAL STATEMENT IN TERMS OF THE DESCRIPTIONS WITHIN THIS PAPER

Unless mandated by the zoological code, no names proposed within this paper should be amended in any way for the purposes of correction, gender change or the like. In terms of priority of names in the event of conflict, where more than one newly named taxon is deemed conspecific or within a single taxon group by a later author, the priority to be taken is by page priority, this meaning the first taxon described in full is the one to take precedent.

CONFLICT OF INTEREST

This author reports no conflict of interest in terms of any material within this paper.

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