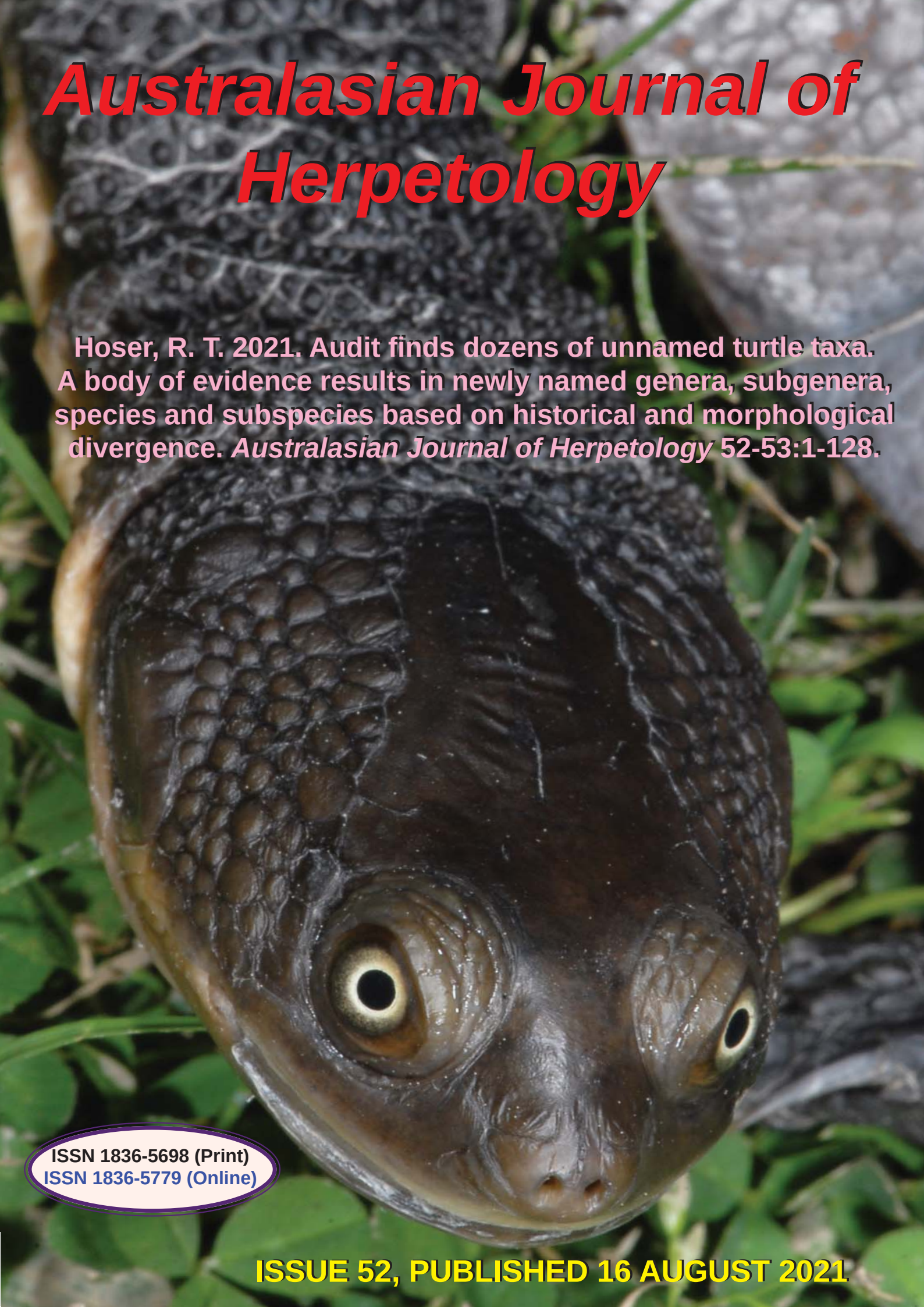
# Australasian Journal of Herpetology



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# Audit finds dozens of unnamed turtle taxa. A body of evidence results in newly named genera, subgenera, species and subspecies based on historical and morphological divergence.

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**ABSTRACT**

An ongoing audit of the taxonomy and nomenclature of the world's turtles has revealed that a number of generally recognized genera have species that are sufficiently divergent from the type form to warrant being placed in new genera or subgenera.

The audit also revealed a number of undescribed forms at the species and subspecies level.

With a sizeable percentage of the world's turtles under real threat of extinction, the urgency of the need to formally identify and manage relevant taxa has never been greater.

This monograph takes the significant first step of naming the relevant forms in accordance with the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

In summary a number of genera are split, including *Cryptochelys* Iverson, Le, and Ingram 2013 (until recently the species were grouped in *Kinosternum* Spix, 1824), *Rhinoclemmys* Fitzinger, 1835, *Acanthochelys* Gray, 1873, *Manouria* Gray, 1854, *Homopus* Duméril and Bibron, 1834, *Sternotherus* Bell 1825, *Lissemys* Smith, 1931, *Pelodiscus* Fitzinger, 1835, *Geoemyda* Gray, 1834 and *Chelonoidis* Fitzinger 1835 with new genera or subgenera formally named for the first time.

New species and/or subspecies within various genera are formally named for the first time, including taxa within *Chelydra* Schweigger, 1812, *Oxychelys gen. nov.*, *Pelomedusa* Wagler, 1830, *Pelusios* Wagler, 1830, *Geoemyda* Gray, 1834, *Manouria* Gray, 1854, *Chelonoidis* Fitzinger, 1835, *Cyclemys* Bell, 1834, *Cuora* Gray, 1856, *Chersina* Gray, 1830, *Homopus* Duméril and Bibron, 1834, *Funkichelys gen. nov.*, *Kinosternum* Spix, 1824, *Graptemys* Agassiz, 1857, *Clemmys* Ritgen, 1828, *Actinemys* Agassiz, 1857, *Heosemys* Stejneger, 1902, *Hieremys* Smith, 1916, *Vijayachelys* Praschag, Schmidt, Fritzsch, Müller, Gemel and Fritz, 2006, *Chitra* Gray, 1844, *Kinixys* Bell, 1827, *Rhinoclemmys* Fitzinger, 1835 (*sensu lato*), *Emys* Duméril, 1805, *Amyda* Schweigger in Geoffroy Saint-Hilaire, 1809, *Cyclanorbis* Gray, 1854, *Cycloderma* Peters, 1854, *Heptathyra* Cope, 1960, *Orlitia* Gray, 1873, *Emydura* Bonaparte, 1836; *Wollumbinia* Wells, 2007 and *Hydromedusa* Wagler, 1830.

**Keywords:** taxonomy; nomenclature; turtle; terrapin; tortoise; *Macrochelys*; *Chelydra*; *Kinosternum*; *Cryptochelys*; *Rhinoclemmys*; *Acanthochelys*; *Manouria*; *Sternotherus*; *Geoemyda*; *Chelonoidis*; *Hieremys*; *Vijayachelys*; *Chitra*; *Cyclemys*; *Pelusios*; *Platythyra*; *Graptemys*; *Clemmys*; *Cuora*; *Chersina*; *Homopus*; *Chersobius*; *Amyda*; *Cyclanorbis*; *Heptathayra*; *Cycloderma*; *Lissemys*; *Pelodiscus*; *Pelomedusa*; *Emydura*; *Tropicochelymys*; *Elseya*; *Wollumbinia*; *Supremechelys*; *Chelodina*; *Macrochelodina*; new genus; *Martinekchelys*; *Crottychelys*; *Oxychelys*; *Sloppchelys*; *Freudchelys*; *Funkichelys*; *Piersonchelys*; *Wittchelys*; *Lovelinaychelys*; Synonyms; *Myuchelys*; *Macrodiremys*; *Chelydera*; new subgenus; *Parasternotherus*; *Parageoemyda*; *Parachelonoidis*; *Keillerchelys*; *Parapelodiscus*; new species; *haydnmcphiei*; *oxyi*; *daranini*; *freudi*; *maxinehoserae*; *turneri*; *hoserae*; *woolfi*; *fiacummingae*; *mcdermottorum*; *adelynhoserae; jackyhoserae*; *oxyslopp*; *boxboyi*; *elfakariorum*; *richardwellsi*; *rosswellingtoni*; *swileorum*; *mandela*; *funki*; *trevorhawkeswoodi*; *tismorum*; *marcdorsei*; *ashphillipsi*; *darrenkeilleri*; *alexstaszewskii*; *dannygoodwini*; *shannonmcgrathi*; *lynnrawi*; *wellingtoni*; *wellsi*; *hawkeswoodi*; *georgefloydi*; *darnellafrazierae*; *meyeyouchelys*; new subspecies; *ipsumtenebris*; *divergens*; *grantturneri; malayensis*; *mekongensis*; *whittoni*; *indusensis*; *maximus*; *praetortus*; *varians*; *flavooculus*; *brunneisoculus*; *aurantiacooculus*; *repens*; *knysaensis*; *bloemfonteinensis*; *nileensis*; *occultatum* ; *magnapapulae*; *divergentens*; *perakensis*; *wittorum.*

## INTRODUCTION

An ongoing audit of the taxonomy and nomenclature of the world's turtles (treated herein as including tortoises and terrapins, with all terms deemed and used as interchangeable herein), has been ongoing for some years.

As the audit has continued, it has emerged that a number of generally recognized genera have species that are sufficiently divergent from the type form to warrant being placed in new genera or subgenera.

This revelation has come about with the publication of numerous molecular studies on the relevant species groups.

These studies have revealed ancient divergences in morphologically similar forms.

In most cases where this has happened there have been available names for the relevant divergent forms.

However in some cases this has not been the case and those groups flagged as being divergent were subjected to further scrutiny with a view to confirming the need for them to be formally identified and named in terms of taxonomy and associated nomenclature.

The audit also revealed a number of apparently undescribed forms at the species level, which will surprise a lot of herpetologists as the turtles in particular have been heavily scrutinized by taxonomists over the past 2 centuries and are in many respects regarded as an "over-split" order within the reptiles.

With a sizeable percentage of the world's turtles under threat of extinction, the urgency of the need to formally identify and manage relevant taxa has never been greater.

Engstrom *et al.* (2004) correctly 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.*"

Therefore this paper summarizes the relevant findings and as needed, it takes the significant first step of naming the relevant forms in accordance with the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

## MATERIALS AND METHODS

Relevant literature on the flagged species groups or potentially composite species was scrutinized to confirm the likelihood of potentially unnamed taxa at the genus or species level.

In the first instance there were numerous genera and species flagged as unrecognized in most recent taxonomic treatments, including that of Rhodin *et al.* (2017).

That online paper is cited here because it is freely available online, claims to represent a consensus view within Turtle experts, although it does not, but does fortuitiously have a relatively complete listing of synonymies for the relevant genera and species. Another online publication known as "The Reptile Database", also on the internet and with a near complete synonymy list for extant turtles has flaws similar to Rhodin *et al.* (2017), but is a useful means by which to find available names for divergent forms that are not necessarily recognized by the authors of the said publications.

Flagged genera for which there appeared to be unnamed genus-level divergent species or species-level divergent species were numerous, but on crude audit, was quickly culled to reveal a relatively small number of unnamed taxa.

These were dealt with in terms of the exercise herein.

Other taxa were excluded from further scrutiny on the basis I was aware of people working on the said forms and I had no desire to intrude on the ongoing works of others, including persons who claim to be working on relevant forms, but may in fact not be.

For all relevant taxa, each were also compared with the available literature, any available molecular data and/or sequences publicly available, specimens, photos, known synonimies and all other relevant and available means of checking.

In summary a number of genera were flagged that appeared to have divergent and unnamed genus or subgenus-level splits.

This audit did however include every known species of living turtle on the planet and while explicitly not including fossil forms, some of these were audited in the context of the audit of living forms.

Rather than listing all genera as being flagged, I shall here list those genera for which genus or species level splits were identified and found not have available names that could be resurrected from synonymy.

In summary the splittable genera included *Cryptochelys* Iverson, Le, and Ingram 2013 (until recently the species were grouped in *Kinosternum* Spix, 1824), *Rhinoclemmys* Fitzinger, 1835, *Acanthochelys* Gray, 1873, *Manouria* Gray, 1854, *Homopus* Duméril and Bibron, 1834, *Sternotherus* Bell 1825, *Lissemys* Smith, 1931, *Pelodiscus* Fitzinger, 1835, *Geoemyda* Gray, 1834 and *Chelonoidis* Fitzinger 1835 all without appropriate names available.

New species and/or subspecies within various genera formally named and identified for the first time, (as in previously unnamed) included taxa within *Chelydra* Schweigger, 1812, *Oxychelys gen. nov.*, *Pelomedusa* Wagler, 1830, *Pelusios* Wagler, 1830, *Geoemyda* Gray, 1834, *Manouria* Gray, 1854, *Chelonoidis* Fitzinger, 1835, *Cyclemys* Bell, 1834, *Cuora* Gray, 1856, *Chersina* Gray, 1830, *Homopus* Duméril and Bibron, 1834, *Funkichelys gen. nov.*, *Kinosternum* Spix, 1824, *Graptemys* Agassiz, 1857, *Clemmys* Ritgen, 1828, *Actinemys* Agassiz, 1857, *Heosemys* Stejneger, 1902, *Hieremys* Smith, 1916, *Vijayachelys* Praschag, Schmidt, Fritzsch, Müller, Gemel and Fritz, 2006, *Chitra* Gray, 1844, *Kinixys* Bell, 1827, *Rhinoclemmys* Fitzinger, 1835 (*sensu lato*), *Emys* Duméril, 1805, *Amyda* Schweigger in Geoffroy Saint-Hilaire, 1809, *Cyclanorbis* Gray, 1854, *Cycloderma* Peters, 1854, *Heptathyra* Cope, 1960, *Orlitia* Gray, 1873, *Emydura* Bonaparte, 1836; *Wollumbinia* Wells, 2007 and *Hydromedusa* Wagler, 1830.

All were flagged and inspected with a view to see if they needed to be formally named for the first time according

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to the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

In terms of each taxon, all available publications relevant to them were inspected.

If the taxa checked out as appearing to be unnamed, specimens of each were inspected to see if they appeared to fit the relevant criteria for division at the relevant taxonomic level.

As stated already, this was also matched with all available information, be it genetic studies, morphological studies, effects of known biogeographic barriers, climate changes in the past and any other factors deemed worthy of consideration.

In terms of the taxa identified within this paper, the auditing process took some years and the taxonomic acts taken herein were made only on the basis of overwhelming scientific evidence and an abundance of caution.

This was however coupled with the important need to identify unnamed taxa in a timely manner, knowing full well that as a group, the world's tortoises are among the most threatened by ongoing human overpopulation and related activities including usage of species for food, introduced competing species, diseases and so on.

The papers and other published material relevant to the decison to name various forms at any level are cited in the results section of this paper. Material not relied upon in any way is generally excluded from citation unless relevant in some way to the decisions made herein.

While I note that by strict definition, turtles have flippers, tortoises have feet and terrapins have webbed feet, the three terms are used interchangeably and to define any shelled living reptile in this paper.

**RESULTS**

***MACROCHELYS* GRAY, 1856**

The literature cited in Hoser (2013b) and sources cited within these, remains the basis of the taxonomic conclusions of Hoser (2013b).

The taxonomy and nomenclature of Hoser (2013b) formally naming two taxa is formally confirmed as valid on all relevant criteria.

I note the fact that the names for Alligator Snapping Turtle species and subspecies formally allocated by myself (Raymond Hoser) in Hoser (2013b) are valid under the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999) and were confirmed as such by ICZN (2021).

This means that the name *Macrochelys suwanniensis* Thomas, Granatosky, Bourque, Krysko, Moler, Gamble, Suarez, Leone, Enge, and Roman, 2014 is a junior synonym of *Macrochelys maxhoseri* Hoser, 2013.

The other coined name of the same authors, *Macrochelys apalachicolae* Thomas, Granatosky, Bourque, Krysko, Moler, Gamble, Suarez, Leone, Enge, and Roman, 2014 is a junior synonym of *Macrochelys temminckii muscati* Hoser, 2013.

Rhodin *et al.* (2017) in their catalogue of Turtle species of the world, in using the improperly coined junior synonym *Macrochelys suwanniensis* wrote in their synonyms account:

> "*Macrochelys maxhoseri* Hoser 2013:56 (unavailable name pending ICZN decision; Rhodin *et al.* 2015)".

Rhodin *et al.* (2015) was a (now) discredited submission by the Wolfgang Wüster gang of thieves petitioning the ICZN to strike all my (Hoser) works from the official scientific record in order to allow their cohort to rename many hundreds of taxa (see Hoser 2015a-f), including both *M. maxhoseri* and *M. temminckii muscati* .

In any event the petion of Rhodin *et al.* (2015) was voted on by the ICZN in 2020 and formally rejected in 2021 (ICZN 2021), meaning that the correct names for the relevant taxa are *Macrochelys maxhoseri* Hoser, 2013 and *Macrochelys temminckii muscati* Hoser, 2013 and the later coined names should not be used.

The holotype for *M. maxhoseri* was cited in Hoser (2013b) as:

> "*A specimen in the Florida Museum of Natural History (FM) at the University of Florida, specimen number: 165801, from Alachua, Florida, USA*.",

the details of which was taken from the various online databases for the facility.

For the other taxon *Macrochelys temminckii muscati* Hoser, 2013 it was:

> "*A specimen in the Florida Museum of Natural History (FM) at the University of Florida, specimen number: 155266, from Liberty, Florida, USA*."

Prior to the publication of Thomas *et al.* (2014) this cohort, most of whom worked at the University of Florida, altered the online database to have the record changed to a sighting record only.

The paper Thomas *et al.* (2014) was published in a notorious online, PRINO (peer reviewed in name only) "journal" called *Zootaxa* in order to justify their attempt at "name theft".

In doing so they wrote:

> "*Hoser (2013) attempted to describe a new species,* Macrochelys maxhoseri, *and subspecies,* M. temmincki (sic) muscati, *in his self-published, non peer-reviewed "journal," but he erred in his methods. In designating holotypes using an online database in lieu of actually examining specimens, Hoser declared "specimens" UF 155266 and UF 165801 as primary types. However, the curator of herpetology at the FLMNH indicated that physical specimens bearing either of these numbers have never existed among their holdings; the corresponding records in the FLMNH database refer to unvouchered field sightings of* Macrochelys *(M. A. Nickerson, Pers. Comm. 2013). Hoser's holotypes are therefore designated in violation of ICZN Code Article 16.4 (they are not based on specimens; ICZN, 1999), and his names for* Macrochelys *are rendered unavailable*."

The plot thickened when the online databases showed

the alterations of the records to show that they still existed, but as sighting records only.

As the specimens actually existed (albeit allegedly "sighted" swimming in a river or similar), Article 16.4 of the ICZN Code (Ride *et al.* 1999) did not apply and the earlier Hoser names were still valid.

Screen shots of these altered records were taken to confirm that the type specimens actually existed in one form or other (making the 2013 names valid) and at the same time it was noted that Mr. Paul Moler was listed as the person who had caught the said specimens.

Moler was also listed as an author in the paper of Thomas *et al.* (2014), although if truth were known, Thomas probably wrote the entire paper and merely tacked his mates names on at the end.

In order to attempt to get to the bottom of the fiasco caused by the alteration of museum records by the Thomas *et al.* cohort, I sent an email to Moler and got a reply.

It is reproduced in full below:

"*From: Paul.Moler@MyFWC.com*

*To: viper007@live.com.au*

*CC: s.nikolaeva@nhm.ac.uk; rwrossco@gmail.com; tthomas46@live.com; envirodata@hotmail.com; studiomartinek@bigpond.com; richard.funk@vcahospitals.com; scott_eipper@hotmail.com; drtjhawkeswood@calodema.com; h.cogger@bigpond.com; dyanega@ucr.edu; dewanandmakhan@yahoo.co.uk*

*Date: Fri, 11 Apr 2014 16:42:27 -0400*

*Subject: RE: Macrochelys*

*Good Sir,*

*Your paper provides only museum numbers without any collection data or type locality. Since I don't have the Museum data at hand, I don't know what specimens you might be referencing. Over the last 40 years, I have deposited hundreds of reptile and amphibian specimens in the Florida Museum, but I don't recall having deposited even a single specimen of Macrochelys. Beginning in the early 90s, I trapped Macrochelys extensively throughout the Florida range, and I deposited dozens of photographs in the Florida Museum collection to document locality records. However, after being measured, weighed, marked, and photographed, all of those turtles were released where caught. If indeed you examined any physical specimens in the Florida collection, they were not specimens that I collected.*

*Paul*"

The reply as written, while maintaining that there were no bodies in the University of Florida collection that matched the numbers I had given for the holotypes, the letter did confirm that they did in fact exist and had been measured, weighed, marked, and photographed before being released, meaning that in terms of both *Macrochelys maxhoseri* and *M. temmincki muscati* holotypes did exist and were probably still swimming around in Florida, blissfully unaware of the commotion being caused in their name!

The correspondence was posted in the ICZN list server (an online email list) and confirmed emphatically that the names *Macrochelys maxhoseri* and *M. temmincki muscati* were in fact valid under the ICZN Code (Ride *et al.* 1999) and had priority over the later coined names.

The holotypes themselves were merely "lost" which is not uncommon in science and has never invalidated a scientific name under the rules of the ICZN.

Moler when replying to my email had clearly been unaware of the fact that a specimen in a museum is not mandatory in order to make a name "available" under the Code.

It merely has to exist!

In spite of this knowledge, within days of the publication of Thomas *et al.* (2014), the Wolfgang Wüster gang of thieves had continued to peddle their names coined in one of many acts of taxonomic vandalism.

One hopes that with the ICZN voting against the taxonomic vandalism of the Wolfgang Wüster gang of thieves and publishing their formal rejection of their actions (ICZN 2021), that the correct ICZN names of *Macrochelys maxhoseri* and *M. temmincki muscati* will now be used instead of the illegally coined names.

Because there is no doubt that the Wolfgang Wüster gang of thieves will continue beyond 2021 to claim that their illegally coined name names *Macrochelys suwanniensis* and *M. apalachicolae* should be used instead of the corrrect ICZN names, I have reproduced below some emails from 2014 as posted on the ICZN list exposing the Wolfgang Wüster gang's acts of fraud for the world to see.

Now just to make it clear that Thomas *et al.* had engaged in a deliberate act of theft and sabotage of the rules of the ICZN, one needs look no further than a thread started by another thief and taxonomic vandal, Bill Branch, on Facebook on 9 January 2014.

Branch wrote:

"*2014 has started well !*

*I know he's delusional - but I amost feel I've made it as a herpetologist when Hoser calls me an intellectual thief ! Note also how peer review is now "a pay wall" to hide it from the masses !*

*From Hoser's website in response to the recent Gerrhosaurus phylogeny (Zootaxa 2013) that ignored his 'work' !*

*"Well, well, well, it turns out that Bill Branch and the other thieves have misquoted the Zoological rules to falsely claim I have acted outside them.*

*They do this is part of a bogus justification for renaming the lizard genera Funkisaurus a...nd Swilesaurus after their own mates (i.e. Broadleysaurus .... are you kidding!!!!).*

*They hid their paper behind a pay wall so most people wouldn't see their disgraceful act of taxonomic vandalism, but I was sent a copy today by a very concerned herpetologist, who*

*was absolutely outraged at the misconduct of Bates, Branch and the other taxonomic vandals and intellectual thieves.*

*It will be interesting to see how the ICZN commissioners feel when they realise that their written rules are being deliberately misquoted by thieves to engage in acts of taxonomic vandalism and recklessly cause immense instability of nomenclature.*

*By the way, for those who don't know exactly what taxonomic vandalism is, it is "the deliberate renaming of taxa (species and genera) in the full knowledge that there are already available names for the said species and in doing so, knowingly breaching the rules of zoological nomenclature".*

*The Wuster gang, including Bill Branch and Don Broadley have now engaged in reckless taxonomic vandalism several times, as has that other taxonomic vandal in the gang, Wulf Schleip.*"

Wolfgang Wüster offered his own encouragement by writing:

"*Tattoos are so yesterday. Overwriting taxonomic vandalism is just so much more fun as an initiation rite*."

This in turn was responded to by Paul Moler who wrote:

"*Bill, I will soon be joining the gang as well, but I'm not too keen on tattoos. Might we instead (or in addition) develop a gang handshake*."

The paper, Thomas *et al*. (2014) claimed a publication date of 9 April 2014 and was in fact published at about that date (3 months after the above online thread). This needs to be mentioned explicitly herein as Hoser (2015a-f) gives examples of the Wolfgang Wüster gang of thieves backdating the publication dates of a lot of their papers in order to claim "priority" for naming in terms of the *International Code of Zoological Nomenclature* (Ride *et al*. 1999)..

The ICZN did show their displeasure at the acts of taxonomic vandalism by the Wolfgang Wüster gang of thieves, including Wolfgang Wüster, Bill Branch and Thomas *et al*. (including Moler), by voting against their attempt to usurp the legitimate ICZN (Hoser 2013a) names with their own illegally coined collection, via ICZN (2021).

**ICZN AND TAXACOM LIST EMAILS RELATING TO THOMAS *ET AL*'S ATTEMPT TO ERASE THE HOSER-NAMED *MACROCHELYS* GRAY, 1856 TAXA FROM THE SCIENTIFIC RECORD.**

*[Taxacom] [iczn-list] provisions to the Code*

*Neal Evenhuis neale@bishopmuseum.org*
*Sun Apr 13 18:09:04 CDT 2014*

*I unfortunately have to agree with Stephen here.*

*I've again read the relevant Articles dealing with holotype and "type series" and Hoser has met the conditions required, although, granted, merely on a technicality because there are no restrictions in the current Code to what he has done, and this type of methodology of selecting a holotype will definitely not make it to the examples in the "Best practices in taxonomy" handbook (although he probably had no choice since I doubt anyone will ever loan him specimens).*

*The critical thing is he gave a specimen number for a holotype, which was based on an actual specimen. There is nothing in the FLMNH database to indicate that the specimen number he gave was NOT based on a specimen - it even specifies that there was 1 specimen, not 0. The Herpnet database gives no numbers of specimens for those specimen numbers, but lists the word "Occurrence" for those same numbers (and some on this list have said they all refer to observations). Yet Herpnet also gives the word "Occurrence" for the specimen numbers in the appendix in the Thomas et al. paper that they say is "Material examined!" (how could they have examined an observation?). Again there is nothing in either database to indicate that a "Specimen number" would be associated with anything other than a specimen. Unvouchered or not, if these pertain to observations, why then give them specimen numbers? If each observation by those people listed as collector(s) for those entries was NOT based on a specimen, then what were they based on? A ghost? A hallucination?*

*In the midst of all this, no one has pointed out the irony here: Hoser has been consistently labeled a taxonomic "vandal" for producing questionable new taxa and people want to suppress or synonymize his names. Well, here is one case where the Thomas et al. team actually agree that Hoser was correct! But rather than alert Hoser to a potential problem that could be rectified by Hoser or a co-authored article — because he is so despised, they took it upon themselves to name the creatures themselves.*

*You herp guys are indeed an amusing bunch.*

*.. and to follow on with what others have said: YES! The next edition of the Code needs to be more clear on what does and does not fulfill the requirements of a type "specimen". But whatever changes are made, it cannot be done retroactively.*

*-Neal*

And:

*From: taxacom-bounces at mailman.nhm.ku.edu [taxacom-bounces at mailman.nhm.ku.edu] On Behalf Of Stephen Thorpe [stephen_thorpe at yahoo.co.nz]*

*Sent: Sunday, April 13, 2014 11:05 AM*

*To: Doug Yanega; Raymond Hoser - The Snakeman; iczn-list; taxacom at mailman.nhm.ku.edu; rwrossco at gmail.com; envirodata at hotmail.com; drtjhawkeswood at calodema.com*

*Subject: Re: [Taxacom] [iczn-list] provisions to*

*the Code*

*None of this is relevant! Observational records or not, there is nothing in the Code which clearly invalidates Hoser's holotype designations! People are reading into the Code what suits their agenda, and not what is actually written!*

*Specifically, the Code states (basically) that a holotype specimen must be designated. That means that a particular specimen must be specified, but it doesn't say in what ways it may be specified. Therefore, specifying a specimen by way of an observational record of that specimen is OK. The Code makes it clear that an author doesn't actually have to have seen or examined the holotype itself.*

*There is NO problem, Houston!*

*Stephen*

And;

*From: taxacom-bounces at mailman.nhm.ku.edu*

*taxacom-bounces at mailman.nhm.ku.eduon behalf of Michael A. Ivie <*

*mivie at montana.edu>*

*Sent: 16 April 2014 19:06*

*To: taxacom at mailman.nhm.ku.edu*

*Subject: Re: [Taxacom] [iczn-list] provisions to the Code*

*OK, everyone step back and breath. This is not that simple. How much worse is AJH than Calodema? How much worse is Calodema than Mélanges Exotico-Entomologiques? Than L'Échange? Those last 2 journals, privately published by the author of tens of thousands of poorly documented species were proposed for suppression decades ago, and that*

*was voted down. What about the allegedly back-dated "Cicindelidae: Bulletin of Worldwide Research"? If I remember correctly, some Scandinavian acarologist who published a large number of very poor descriptions ordered his types all destroyed upon his death.*

*Herpetologists have probably never heard of these other journals/cases and don't care about them, but the the same applies by non-herpetologists about AJH. Once you decide that AJH is so bad it hasto be placed on the list of rejected works in its entirety, what about the next-worst? And, the next worst? Every sub-discipline has a journal or person that they think is the worst. This proposal will never pass, with good, practical reasons.*

*Today, declaring an entire journal with a living editor to be placed on the list of rejected publications will do nothing. Next week a newly named journal will appear and revalidate all the names. Rejecting the names one by one would be a better solution, although I do not see*

*anything to keep them from being repeated next week as well. As forextending the ban into the future, to invalidate works not yet published is indeed censorship. We call it a gag rule. I am wondering if anywork by a living author has ever been placed on the rejected list*

*contrary to their wishes? Has it ever been done that names proposed by a certain person are placed on the rejected list for simply being named by that person, both those already published and those that may be*

*published in the future? When a work is placed on the rejected list, a reason is given, Geoffroy for not being consistently binomial, etc.*

*What reason will be given for AJH? "Unpopular Editor" would be pretty weak in a 100 years.*

*If coleopterists can survive 38,000 Pic names, herpetologists can survive a mere 600 Hoser names. And yes, the Macrochelys is valid. Live with it.*

*Mike (who swore he was not getting into this)*

### *CHELYDRA* SCHWEIGGER, 1812

The taxonomy and nomenclature of the Common Snapping Turtle genus has been fairly stable since the publication of Phillips *et al.* (1996), which resulted in there being three recognized species, being *Chelydra serpentina* (Linnaeus, 1758) from North America, *Chelydra acutirostris* (Peters, 1862) from south and southern central America as far north as Honduras and *Chelydra rossignonii* (Bocourt 1868), from Mexico to Honduras on the Pacific draining side.

Further inspection of specimens of *C. acutirostris* (type locality of Guayaquil, Equador) across the range of the putative taxon has shown the presence of two clearly allopatric, morphologically divergent forms worthy of species-level division. With no available name, the form from the Pacific drainages on the Panama Isthmus is herein formally named as a new species, *Chelydra haydnmcphiei sp. nov.*.

Physical evidence showing the Panama Isthmus closed around 2-3 MYA (O'Dea *et al.* 2016) would imply that the two relevant populations of *Chelydra* from northern South America would have been separated from one another for a similar time frame, which is more than enough to allow each form to allopatrically speciate.

Publications relevant to the genus *Chelydra* Schweigger, 1812, with specific reference to the species *C. acutirostris* (Peters, 1862) and the taxonomic acts within this paper, include Avise *et al.* (1992), Boulenger (1902a), Campbell and Howell (1965), Carr (1952), Carvajal-Cogollo *et al.* (2020), Castro-Herrera and Vargas-Salinas (2008), Cope (1872), Dunn (1945), Ernst and Barbour (1972, 1989), Feuer (1966, 1971), Gibbons *et al.* (1988), Jungnickel (1987), McCranie (2015, 2018), Medem (1977), Moll and Dodd Jnr (1985), O'Dea *et al.* (2016), Peters (1862), Phillips *et al.* (1996), Richmond (1958), Rhodin *et al.* (2017), Schmidt (1946), Smith and Smith (1980), Wermuth and Mertens (1977) and sources cited therein.

There is also an extensive bibliography of all things *Chelydra* online at:
http://www.repfocus.dk/Chelydra_bibliography.html

***CRYPTOCHELYS* IVERSON, LE AND INGRAM, 2013**

The Mud Turtle genus *Cryptochelys* Iverson, Le and Ingram 2013 (Type species: *Cinosternon leucostomum* Duméril, Bibron and Duméril, 1851) has been known to contain two sharply divergent lineages for some years (e.g. Iverson, Le, and Ingram 2013 and Loc-Barragan *et al.* 2020), with Iverson *et al.* 2013, giving an estimate of an 18 MYA divergence for the two clades.

With such a significant timeline of divergence, coupled with significant morphological differentiation, it is appropriate that the unnamed assemblage be given recognition as a new genus called *Martinekchelys gen. nov.*. The relevant species in this divergent clade are *Cryptochelys* (AKA *Kinosternon*) *acutum* (Gray, 1831), *C. creaseri* (Hartweg, 1934) and *C. herrerai* Stejneger, 1925.

Publications relevant to the genus *Kinosternon sensu lato*, including, *Rhinoclemmys* Fitzinger, 1835, *Sternotherus* Bell. 1825 and the recently named genus *Cryptochelys* Iverson, Le and Ingram, 2013 relevant to the taxonomic acts within this paper include Agassiz (1857), Akeret (2009), Allen (1932), Atkinson (2012, 2013), Barley *et al.* (2010), Bartlett and Bartlett (1999), Becker (1992, 1995), Becker and Müller (1997), Bell (1825a, 1825b, 1827), Bennett *et al.* (2015), Berry and Iverson (1980), Bidmon (2015), Bocourt (1876), Bonin *et al.* (2016), Boulenger (1889, 1913), Bour (2008b), Campbell (1998), Castañeda and Mora (2015), Conant and Berry (1978), Conant and Collins (1991), Cope (1870), Dixon (2000), Duméril and Bibron (1835, 1851), Duméril and Duméril (1935, 1851), Dundee and Rossman (1989), Ernst and Barbour (1989), Ernst and Lovich (2009), Fitzinger (1835), Gad (1987, 1989, 1993), Gray (1825, 1831a, 1831b, 1844, 1856a, 1860a), Günther (1885), Hallowell (1856), Hartweg (1934, 1938, 1939), Hennig (2003, 2004, 2015), Hibbitts and Hibbitts (2016), Iverson (1977a, 1977b, 1978, 1983, 1988, 1998), Iverson and Berry (1979), Iverson *et al.* (2013), Jensen *et al.* (2008), Joyce and Bourque (2016), Köhler (2000, 2008), Latrielle (1802), Lee (2000), Legler and Vogt (2013), Lemos-Espinal and Dixon (2013), Lemos-Espinal and Smith (2015), Lemos-Espinal *et al.* (2018), Lehmann (1984), Loc-Barragan *et al.* (2020), Lourenço *et al.* (2011), Mata-Silva *et al.* (2002), Moll and Williams (1963), Palmer and Braswell (1995), Pereira *et al.* (2017), Rau (2010), Reynolds and Seidel (1982, 1983), Seidel and Lucchino (1981), Rhoads (1895), Rhodin *et al.* (2017), Scott *et al.* (2017), Schilde (2001, 2003a, 2004a), Schmidt (1941, 1947), Scott *et al.* (2017), Seidel *et al.* (1981, 1986), Smith and Brandon (1968), Smith and Glass (1947), Smith and Taylor (1950), Spinks *et al.* (2014), Spix (1824), Stejneger (1902, 1923, 1925), Thomson *et al.* (2008), Tinkle (1958), Tinkle and Webb (1955), Walker *et al.* (1995, 1997), Wermouth and Mertens (1996), Wiens *et al.* (2010), Woolrich-Piña *et al.* (2017), Zug (1986) and sources cited therein

***STERNOTHERUS* BELL, 1825**

The genus *Sternotherus* Bell. 1825, type species Type species: *Sternotherus odoratus* (= *Testudo odorata* Latreille in Sonnini and Latreille 1802), by subsequent designation by Stejneger (1902:237), splits into two well-defined clades.

These are *Sternotherus odoratus* (Latrielle, 1802) and *S. carinatus* (Gray, 1856), which remains the type genus and subgenus.

The second grouping, which according to Iverson *et al.* (2013) diverged from the main group about 14 MYA include the species *Sternotherus minor* (Agassiz, 1857), *S. peltifer* (Smith and Glass, 1947), *S. depressus* Tinkle and Webb, 1955 and *S. intermedius* Scott, Glenn and Rissler, 2017.

They are herein placed into a new subgenus *Parasternotherus subgen. nov..*

For relevant references, see the preceding citations under the heading, *Cryptochelys* Iverson, Le and Ingram 2013.

***RHINOCLEMMYS* FITZINGER, 1835**

The genus *Rhinoclemmys* Fitzinger, 1835, type species: *Geoemyda* (*Rhinoclemmys*) *dorsata* (= *Testudo dorsata* Schoepff, 1801 = subjective synonym of *Testudo punctularia* Daudin, 1801), by subsequent designation as *Emys dorsata sensu* Schweigger 1812 by Lindholm (1929), is herein split four ways on the basis of deep divergences between four phyletic groups combined with obvious morphological divergences.

The species retained in *Rhinoclemmys* are *Rhinoclemmys punctularia* (Daudin, 1801) (type species), *R. areolata* (Duméril and Bibron, 1851), *R. diademata* (Mertens, 1954), *R. flammigera* (Paolillo, 1985), *R. funerea* (Cope, 1876), and *R. melanosterna* (Gray, 1861).

*Parageoemyda subgen. nov*. is created by splitting a divergent group from the genus *Geoemyda* Gray, 1834.

The newly named species *Geomyda daranini sp. nov*. from Vietnam has until now been treated as a southern population of *Geoemyda spengleri* (Gmelin, 1789), from southern China, but is clearly a species-level divergent form.

The name *Callopsis* Gray, 1863 is available for the group of species including the type species *Rhinoclemys* (*Callopsis*) *annulata* (= *Geoclemmys annulata* Gray, 1860), by original monotypy.

Hence the species in this genus are *Callopsis annulata* (Gray, 1860), *C. incisa* (Bocourt, 1868), *C. manni* (Dunn, 1930), *C. pulcherrima* (Gray, 1856) and *C. rogerbarbouri* (Ernst, 1978).

The remaining two genera are as follows:
1/ *Crottychelys gen. nov*., type species *Chelopus rubidus* Cope, 1870, better known as *Rhinoclemmys rubida* (Cope, 1870), is a new genus which also includes *Geoemyda rubida perixantha* Mosimann and Rabb 1953, more recently treated as being a subspecies of "*Rhinoclemmys rubida* (Cope, 1870)", but herein treated as a full species.
These two species have a divergence of about 20 MYA from nearest living relatives according to Pereira *et al.* (2017).

A subspecies of the taxon "*Rhinoclemmys rubida* (Cope, 1870)" is also formally named herein for the first time as *C. perixantha ipsumtenebris subsp. nov..*

2/ *Oxychelys gen. nov.*, type species *Oxychelys oxyi sp. nov.* from Colombia, is the genus which also includes the species *Nicoria nasuta* Boulenger, 1902 (Boulenger, 1902b), better known as *Rhinoclemmys nasuta* (Boulenger, 1902). Together they form a divergent clade which had a divergence of nearly 20 MYA from nearest living relatives according to Pereira *et al.* (2017).

For relevant references, see the preceding citations under the heading, *Cryptochelys* Iverson, Le and Ingram 2013.

***KINOSTERNUM BAURII* (GARMAN, 1891)**

The well-known south-east USA species *Kinosternon baurii* (Garman, 1891) is divided two ways with the northern populations with reduced or no markings on the carapace formally named for the first time as *Kinosternon baurii grantturneri subsp. nov.*.

Besides morphological divergence from the central and south Florida animals as found by Lamb and Lovich (1990), genetic divergence was also found by Wilson and Karl (2001).

For relevant references, see the preceding citations under the heading, *Cryptochelys* Iverson, Le and Ingram 2013.

***ACANTHOCHELYS* GRAY, 1873**

The genus *Acanthochelys* Gray, 1873 is split two ways. The species group associated with *Emys radiolata* Mikan, 1820 is sufficiently divergent from the other species in the genus to warrant being transferred to a new genus. As there is no pre-existing name for the group of species (at least two, with only one currently named), the genus *Sloppchelys gen. nov.* is formally erected to accommodate the species.

Publications relevant to the genus *Acanthochelys* Gray, 1873 *sensu lato* and the taxonomic decision made herein include Alderton (1998), Artner (2007), Ávila *et al.* (2006), Bonin *et al.* (2006), Boulenger (1886), Bour (2009), Brandao *et al.* (2002), Cabrera and Böhm (2015), Castro and Teixeira (2007), Duméril and Bibron (1935), Ernst (1983a, 1983b, 1983c, 1987), Ernst and Barbour (1989), Freiberg (1945, 1967), Freitas *et al.* (2018, 2019), Fritz and Pauler (1992a, 1992b, 1999), Garbin *et al.* (2016), Garcia-Passos *et al.* (2018), Gemel *et al.* (2019), Giraudo (1996), Gustafson (2006), Hoogmoed and Gruber (1983), Huebinger *et al.* (2013), Iverson (1986), Kacoliris *et al.* (2006), Mikan (1820), Oliveira *et al.* (2020), Pereira *et al.* (2017), Rhodin *et al.* (1984, 1984b, 1990, 2017), Rocha *et al.* (2004), Schnee (1900), Siebenrock (1902b), Silva-Soares (2011), Souza (2004, 2019), Souza *et al.* (2019), Spix (1824), Valenzuela (2009), Valverde (2009), Varela (1999), Vinke and Vinke (2001, 2006. 2010), Wied-Neuwied (1824), Winkler (2006), Zocca *et al.* (2019) and sources cited therein.

***MANOURIA* GRAY, 1854**

*Manouria* Gray, 1854 is split two ways, with a new genus being formally named.

A new species in the new genus *Freudchelys gen. nov.* is also formally named for the first time as *Freudchelys freudi sp. nov.*.

Publications relevant to the genus *Manouria* Gray, 1854 *sensu lato* and the taxonomic decisions made herein include Alderton (1988), Blyth (1854), Bonin *et al.* (2006), Boulenger (1903), Bour (1998), Choudhury (1996. 2001), Cox *et al.* (1998), Das and Das (2017), Ernst and Barbour (1989), Eggenschwiler (2003, 2005), Ernst and Barbour (1989), Fritz and Havaš (2014), Gray (1841, 1855, 1861c, 1871a, 1872c), Grossmann (1994), Günther (1882), Kundu *et al.* (2013, 2016, 2017), Le *et al.* (2006), Lourenço *et al.* (2011), Manthey and Grossmann (1997), Mell (1938), Mo (2020), Moll (1989), Murthy (2010), Nguyen *et al.* (2009), Nutaphand (1979), Pereira *et al.* (2017), Platt *et al.* (2002), Rhodin *et al.* (2017), Schaffer and Morgan (2002), Schlegel and Müller (1845), Stanford *et al.* (2015), Stoliczka (1871), Theobald (1868b), Valverde (2004), Velo-Antón *et al.* (2011), Zug and Mulcahy (2019) and sources cited therein.

***CLEMMYS GUTTATA* (SCHNEIDER, 1792)**

The North American Spotted Turtle *Clemmys guttata* (Schneider, 1792), is familiar to most American herpetologists in the north east of the USA and is a species I have had cause to inspect when visiting the USA. Hence I was astounded that distributionally disjunct, morphologically divergent populations had not been afforded taxonomic recognition.

As a species, putative *C. guttata* are not a particularly mobile species and so it would make sense that morphologically divergent, allopatric populations are not just divergent at the subspecies level, but also potentially to the species level.

The nominate forms of both *C. guttata* and *Geoclemmys sebae* Gray, 1869 are both from Philadelphia, Pennsylvania, USA according to Rhodin *et al.* (2017) and sources cited therein and therefore only apply to that form of the species at the subspecies level.
In the absence of molecular data for the various divergent populations and an abundance of caution, the physically larger (on average) Great Lakes form is formally named for the first time as is the southern, east cost population with smaller and less distinct spots on the carapace, both as new subspecies.

The form from the Great Lakes drainages is formally named *C. guttata maximus subsp. nov.*, while the South Carolina Population is formally named *C. guttata praetortus subsp. nov.*.

Publications relevant to the the putative species *Clemmys guttata* (Schneider, 1792) and the taxonomic concusions within this paper relevant to it include Allerstorfer (2017), Angielczyk and Feldman (2013), Anthonysamy *et al.* (2014), Barnwell *et al.* (1997), Beaudry *et al.* (2009), Belmore (2004), Bentley and Knight (1993), Bickham *et al.* (1996), Bour (2008), Buchanan *et al.* (2017), Burke *et al.* (1996), Bury and Ernst (1997), Camper (2019), Chandler *et al.* (2020), Conant (1938), Conant and Collins (1991), Cordero (2017), Cross and Becker (2017, 2018), Ernst (1967, 1968, 1970a, 1970b, 1972, 1976, 1982, 2001), Ernst and Barbour (1989), Ernst and Lovich (2009), Ernst and Zug (1994), Feldman and Parham (2002), Feng *et al.* (2019), Folkerts and Skorepa (1967), Froom (1976), Gray (1869), Graziano (2019), Green and Pauley

(1987), Haxton and Berrill (2001), Holman and Fritz (2001), Howell and Seigel (2018, 2019), Howell *et al.* (2016, 2019), Jensen *et al.* (2008), King *et al.* (1997), Krolak and Bidmon (2016), Krolak and Krolak (2015), Lambertz and Lambertz (2002), Litzgus (2006), Litzgus and Brooks (1998a, 1998b, 2000), Litgus and Mousseau (2003, 2004, 2006), Litgus *et al.* (2008), Lovich (1998), Lovich and Jaworski (1988), Lovich *et al.* (2014), Manns (1969), Mehrtens (1949), Milam and Merlvin (2001), Mitchell (1994), Mitchell and Reay (1999), Moski (1957), Netting (1940), Niederberger and Seidel (1997), Oxenrider *et al.* (2018, 2019), Palmer and Braswell (1995), Parker and Whiteman (1993), Pereira *et al.* (2017), Perry (2018), Phillips (2016), Rasmussen and Litzgus (2010), Ritgen (1828), Roe and Nacy (2017), Rowe *et al.* (2012), Ruther *et al.* (2017), Schaefer (1994), Schneider (1792), Schoepff (1792), Seburn (2012), Seidel and Ernst (2017), Sowerby and Lear (1872), Spinks and Bradley Shaffer (2009), Steen (2013), Steiner (1977), Stevenson *et al.* (2018), Ultsch and Carroll (2020), Ward *et al.* (1976), Wilson (2000), Wright (1918), Yagi and Litzgus (2012) and sources cited therein.

***ACTINEMYS* AGASSIZ, 1857**

Until recently, species within the genus *Actinemys* Agassiz, 1857 was subsumed within *Emys* Duméril, 1805, although molecular phylogenies, including that of Pereira *et al.* (2017) have confirmed that species within putative *Actinemys* are not closely related to the type form of *Emys* and so the genus *Actinemys* is recognized herein.

All tortoises within *Actinemys* were all treated as being of the single species *Emys marmorata* Baird and Girard, 1852 by original designation until recently.

Following the paper of Seeliger (1945) and later works, such as Spinks *et al.* (2014), that putative species has been treated as two, being *E. marmorata* (Baird and Girard, 1852) from generally north of San Francisco, California, USA along the coast and ranges to British Columbia, Canada, where it is either now rare or extinct and *E. pallida* (Seeliger, 1945) from south of this range, through southern California and into Baja Mexico.

Seeliger (1945), Spinks *et al.* (2014), and others have recognized the Baja, Mexico population as being both morphologically and genetically divergent from the others and it is on this basis that it is formally named herein as a new species.

Seeliger (1945) wrote of the southern form from Baja North Mexico the following:
"Since the few specimens from Lower California are not similar to either the southern or northern forms herein defined, no attempt will be made to assign them to either subspecies."
After a time gap of more than half a century, it is wholly appropriate that this unnamed form be formally named and it is herein identified and named as *Actinemys maxinehoserae sp. nov.*.

Papers relevant to this genus and in particular the newly named species, relevant to the taxonomic decisions herein, include Agassiz (1857), Baird and Girard (1852), Barela and Olson (2014), Bettelheim (2005a, 2005b), Bondi and Marks (2013), Boulenger (1889), Bour (2008), Bury (1970), Bury and Ernst (1977), Bury *et al.* (2010), Buskirk (2002), Crother (2012, 2017), Duméril (1805), Ernst (2001), Ernst and Barbour (1989), Ernst and Lovich (2009), Feldman and Parham (2002), Fitch (1936), Fritz (2001, 2001b), Germano (2000, 2015), Germano and Bury (1998, 2001, 2009), Germano and Rathbun (2008), Germano and Riedle (2015), Gray (1870, 1872b), Hallowell (1854), Haman *et al.* (2019), Holland (1992), Holman and Fritz (2001), Janzen *et al.* (1997), Kittleson *et al.* (2020), Lambert *et al.* (2013, 2019), Legler and Vogt (2013), Leidy *et al.* (2016), Lovich and Meyer (2002), Lovich *et al.* (2005, 2007), Lubcke and Wilson (2006), Obst (2003), Pereira *et al.* (2017), Reynolds *et al.* (2007), Rhodin *et al.* (2017), Rosenberg and Swift (2012), Ruso *et al.* (2017), Scott *et al.* (2008), Seeliger (1945), Seidel and Ernst (2007), Spinks and Shaffer (2005, 2009), Spinks *et al.* (2003, 2014, 2016), Stebbins (1985), Stejneger (1893), Storer (1930), Thomson *et al.* (2008), Valdez-Villavicencio *et. al.* (2016a, 2016b), Van Denburgh (1922), Welsh (1988), Werning (2012), Wilcox (2019), Zaragoza *et al.* (2015) and sources cited therein.

***HEOESEMYS* STEJNEGER, 1902**

The genus *Heosemys* Stejneger, 1902 has been shown by Pereira *et al.* (2017) and others to be divided into two main clades. One clade containing the type species only, namely *Emys spinosa* Gray, 1831, currently recognized in herpetology as being of a single species only, the other clade having all other species in the genus as currently recognized (e.g. Rhodin *et al.* 2017).

The name *Hieremys* Smith, 1916, type species being *Hieremys annandalii* (= *Cyclemys annandalii* Boulenger, 1903), by original monotypy is available for those species, which according to Pereira *et al.* (2017) diverged from *Emys spinosa* more than 20 MYA.

Therefore I resurrect from synonymy and recognize the name *Hieremys* Smith, 1916 as the appropriate genus name for *H. annandalii* (Boulenger, 1903) and the other two taxa recently placed in *Heosemys*, being *Geoemyda depressa* Anderson, 1875 and *Geoemyda grandis* Gray, 1860.

The putative species *Emys spinosa* Gray, 1831 is clearly composite, but a thorough inspection of specimens from across the known range of the species only showed two very distinct forms. These were the nominate form from Peninsula Malaysia and a very different form from Borneo and immediately offshore islands.

The specimens from Sumatra appeared most like those from Peninsula Malaysia (same eye colour and plastron scute configuration), as opposed to the Borneo animals and so has been assigned to that species.

There is no available name for the Borneo specimens and in light of the molecular results of Spinks *et al.* (2012), I have no hesitation in formally describing the Borneo form as a new species, *H. turneri sp. nov.*.

*Hieremys grandis* (Gray, 1860), originally described as *Geoemyda grandis* Gray, 1860 has a type locality of Cambodia and that form of the putative species occurs in zone generally near the coast running from Vietnam, Cambodia, Laos, Thailand and into Peninsula Malaysia.

The population from the west flowing watercourses on Peninsula Malaysia in the states of Perak and Kedah are morphologically divergent from the others further north, appear to be allopatric in distribution, with an apparent break on the Isthtumus of Kra and are therefore formally named as a new subspecies.

While taxonomy should not be used improperly as a means to draw attention to a taxon, I do note that putative *H. grandis* are under extreme existential threat across their range and with it being noted here that there are divergent populations, the relative threat to each is even greater.

A similar situation exists with respect of the species *Hieremys annandalii* (Boulenger, 1903), originally named as *Cyclemys annandalii* Boulenger, 1903 and most recently placed in the genus *Heosemys* Stejneger, 1902 (Rhodin *et al*. 2017).

The form from the Chao Phraya River basin in Thailand and including specimens on the east side of Peninsula Malaysia, being the type form (Type locality Yala Province, south Thailand), differ from specimens from the Mekong basin in Vietnam and Laos.

The unnamed form from the Mekong basin is formally identified as the new subspecies *Hieremys annandalii mekongensis subsp. nov..*

Literature relevant to the putative species *Heosemys spinosa* (Gray, 1831), *Hieremys grandis* (Gray, 1860) and *Hieremys annandalii* (Boulenger, 1903) including the taxonomic and nomenclatural conclusions herein include Ahmad *et al*. (2019), Auer (2011), Auliya (2006), Becker, (1994), Bell (1836), Beolens *et al.* (2011), Bong Heang (1987), Boulenger (1903), Chan-ard *et al.* (2011, 2015), Cox *et al*. (1998), Das (1996), Diesmos *et al*. (2005, 2008), Duméril and Bibron (1835), Duong *et al.* (2014), Ernst and Barbour (1989), Fritz (1997), Fritz and Freitag (2008), Gaulke and Fritz (1998), Goode and Ewert (2006), Gray (1830, 1831a, 1834a, 1834b, 1860c, 1873c), Grismer *et al.* (2008, 2010), Grossmann and Tillack (2001), Hartmann *et al*. (2013), Herman (1993), Iverson and McCord (2016), Joyce *et al.* (2013), Kasper *et al.* (2013), Kowalski *et al.* (2011), Lee *et al*. (2009), Lehr and Holloway (2003), Lorenz (1984), Malkmus *et al*. (2002), Manthey and Grossmann (1997), Mertens (1971), Molengraaff and Weber (1921), Nguyen *et al.* (2009), Nur-Amalina *et al*. (2017), Onn *et al*. (2009), Pauwels *et al*. (2000, 2003), Pereira *et al*. (2017), Platt *et al*. (2014), Rhodin *et al*. (2017), Rooijen *et al*. (2001), Rudolphi and Weser (2000), Schilde (2004b), Sowerby and Lear (1872), Spinks *et al*. (2012), Stejneger (1902), Sumarli *et al*. (2015), Teo and Rajathurai (1997), Teynié *et al*. (2010), Theobald (1868b), Voris (2000), Ziegler *et al*. (2006), Zug and Mulcahy (2019) and sources cited therein.

***VIJAYACHELYS SILVATICA* (HENDERSON, 1912)**

The species *Vijayachelys silvatica* (Henderson, 1912), monotypic for the genus *Vijayachelys* Praschag, Schmidt, Fritzsch, Müller, Gemel and Fritz, 2006 was for many years only known from the southern Western Ghats of south-west India, although for more than 30 years now, populations from north of the Paighat gap (AKA Palakkad gap) have been known.

The Paighat gap is a 30 km lowland divide between the otherwise uninterrupted hill ranges of the Western Ghats and a known biogeographical barrier in terms of local herpetofauna.

Inspection of numerous specimens of *V. silvatica* by myself from either side of the Paighat gap showed consistent morphological differences between specimens, I have deemed worthy of taxonomic recognition.

In the absence of molecular data and an abundance of caution, I have taken the conservative step and formally described the hitherto unnamed northern population as a new subspecies *V. silvatica whittoni subsp. nov..*

Publications relevant to the genus *Vijayachelys* Praschag, Schmidt, Fritzsch, Müller, Gemel and Fritz, 2006, *V. silvatica* and the taxonomic decision within this paper include Appukuttan (1991), Daniels (2001), Das (1995), Deepak and Vasudevan (2010, 2013), Deepak *et al*. (2019, 2014), Ernst and Barbour (1989), Groombridge *et al*. (1983), Henderson (1912), Jose *et al.* (2007), Kanagavel and Raghavan (2012), Moll *et al*. (1986), Murthy (2010), Praschag, Schmidt, Fritzsch, Müller, Gemel and Fritz, 2006, Rhodin *et al*. (2017), Schaefer (2005), Schilde (2004), Sharath (1990), Smart (2008), Smart *et al.* (2014), Smith (1931), Vasudevan and Deepak (2008, 2010), Vasudevan *et al*. (2010), Vija ya (1982, 1983), Whitaker and Vijaya (2009) and sources cited therein.

***CHITRA INDICA* (GRAY, 1830)**

The species *Chitra indica* (Gray, 1830) is formally divided into two subspecies. The nominate form is from the Ganges drainage, while the Indus form is formally named as *Chitra indica indusensis subsp. nov.*. Braulik *et al*. (2015, 2021) are some of a number of recently published papers which have found that riverine species from the Ganges and Indus systems last apparently mixed about 550K years ago.

Publications relevant to the genus *Chitra* Gray, 1844, the species *Chitra indica* (Gray, 1830) and the taxonomic decisions made herein include Adil *et al.* (2020), Ali *et al*. (2018), Bonin *et al.* (2006), Boulenger (1889), Bour (2008), Braulik *et al*. (2015, 2021), Cantor (1847), Cox *et al*. (1998), Das and Das (2017), Das and Singh (2009), Duméril and Bibron (1835), Engstrom *et al*. (2002), Ernst and Basrbour (1989), Gemel and Haring (2011), Gray (1830, 1831a, 1831c, 1844, 1864a), Ka¨stle *et al.* (2013), Khan (2006), Lenz (2012), Li *et al.* (2017), Manthey and Grossmann (1997), Martens (1876), McCord and Pritchard (2003), Murthy (2010), Rhodin *et al.* (2017), Smith (1931), Swan and Leviton (1962), Taylor (1970) and sources cited therein.

***CHELONOIDIS* FITZINGER, 1835**

Vargas-Ramírez and Fritz (2010) found that various regional forms of the widespread (putative) South American species *Chelonoidis carbonaria* (Spix, 1824) diverged from one another between 2 and 4 MYA.

The three available names all refer to specimens of the form from north-east or eastern Brazil, being, *Testudo carbonaria* Spix, 1824, *Testudo boiei* Wagler, 1830 and *Testudo hercules truncata* Gray, 1830. The three

morphologically distinctive and divergent forms from the south of the range of the putative species (mainly Paraguay) and the north east (2 forms from Colombia and Panama) are formally named within this paper as *Chelonoidis hoserae sp. nov.*, *C. woolfi sp. nov.* and *C. fiacummingae sp. nov.*.

The morphologically similar and sometimes sympatric species, *Chelonoidis denticulatus* (Linnaeus 1766) was found by Vargas-Ramírez and Fritz (2010) to have diverged from the *Chelonoidis carbonaria* (Spix, 1824) species group about 13 MYA and by more than 20 MYA by Pereira *et al.* (2017). Due to the morphological and biological divergence of this taxon, it is formally placed in a new subgenus *Parachelonoidis subgen. nov.*.

Publications relevant to the genus *Chelonoidis* Fitzinger, 1835, the putative species *Chelonoidis carbonaria* (Spix, 1824) and *Chelonoidis denticulatus* (Linnaeus 1766) as well as the taxonomic decisions made herein, include Andersson (1900), Bell (1836), Bonin *et al.* (2006), Castaño-Mora and Lugo Rugeles (1981), Catenazzi *et al.* (2013), Censky (1988), Duméril and Bibron (1835), Duméril *et al.* (1854), Ernst and Barbour (1989), Ferreira (2021), Ferronato *et al.* (2011), Gaffney (1979), Hoogmoed and Gruber (1983), Humair (2013a, 2013b), Le *et al.* (2006), Legler (1963), Lehr (2001, 2002), Linnaeus (1766), Loftin (1965), Merchán *et al.* (1988), Methner (1989), Olson and David (2014), O'Malley (2010), Pereira *et al.* (2017), Pritchard and Terebbau (1984), Rodriguez-Bayona and Rylander (1984), Rhodin *et al.* (2017), Schneider (1792), Valverde (2004, 2009), Vargas-Ramírez and Fritz (2010), Vinke *et al.* (2008), Vlachos and Rabi (2018), Williams (1960) and sources cited therein.

***KINIXYS* BELL, 1827**

Morphologically divergent Central African forms of the species *Kinixys homeana* Bell, 1827 and *Kinixys erosa* (Schweigger, 1812) are formally identified and named as subspecies for the first time.

The divergence of these forms was across the well-known and well defined biogeographical barrier of the Dahomey Gap (Togo and Benin) on the south coast of West Africa.

Publications relevant to the taxonomy and nomenclature of the two newly named subspecies and associated species include Barnett and Emms (2005), Bell (1827), Beolens *et al.* (2011), Bonin *et al.* (2006), Boulenger (1889), Broadley (1997), Carlino (2010), Chirio and Ineich (2006), Chirio and Lebreton (2007), Duméril and Bibron (1835), Duméril *et al.* (1854), Ernst and Barbour (1989), Gramentz (2001b), Gray (1864c, 1873c), Harvan (2007), Hoinsoude-Segniagbeto *et al.* (2014), Hoser (2013a), Jackson and Blackburn (2007), Kindler *et al.* (2012), Lawson (2006), Lenglet and Colyn (1989), Loveridge and Ernst (1957), Luiselli (2006), Mifsud (2014), Nowak-Kemp (2009), Pauwels and Vande Weghe (2008), Schmidt (1919), Schweigger (1812), Shah (1960), Siebenrock (1916), Spawls *et al.* (2002, 2018), Trape *et al.* (2012), Valverde (2005a, 2005b), Vlachos and Rabi (2018), Zessin (2004) and sources cited therein.

***CYCLEMYS* BELL, 1834**

A well-known undescribed species within the genus *Cyclemys* Bell, 1834 from north-west Cambodia is formally named for the first time.

Publications relevant to the taxonomy and nomenclature of the newly named taxon and associated species include Auliya (2006), Boelens (2011), Bour (2008), Chan-ard *et al.* (2015), Fritz *et al.* (1997, 2008), Geissler *et al.* (2019), Gray (1863c, 1864b), Guicking *et al.* (2002), Iverson and McCord (1997), Ka¨stle and Schleich (2013), Kim (2011), Lourenço *et al.* (2011), Nguyen *et al.* (1997), Nguyen *et al.* (2009), Rai (2004), Schilde (2003b, 2004b), Schilde *et al.* (2004), Smith (1931), Stuart and Fritz (2008), Teynié *et al.* (2010), Vamberger *et al.* (2017) and sources cited therein.

***GRAPTEMYS* AGASSIZ, 1857**

The species *Graptemys caglei* Haynes and McKown, 1974 has long been known to have a divergent population from the upper reaches of the Guadalupe River, Texas, upstream of Seguin, Texas, USA. See for example Ward *et al.* (2013). Reflecting this reality, this hitherto unnamed form is formally described as *Graptemys caglei flavooculus subsp. nov.*.

The nominate subspecies *G. caglei caglei* is found downstream from Seguin, Texas, USA and also in the nearby San Marcos River drainage also in Texas.

A distinctive dark-eyed subspecies of *Graptemys pseudogeographica* (Gray, 1831) from the Calcasieu River drainage of Louisiana, USA is formally named for the first time.

The wide-ranging species, *Graptemys geographica* (Lesueur, 1817) is herein split into two allopatric subspecies based on consistent differences in morphology and reproductive isolation.

*Graptemys geographica aurantiacooculus subsp. nov.* has until now been treated as a population of *Graptemys geographica* (Lesueur, 1817) with a type locality of "marsh, on the borders of Lake Erie", USA. The newly named *G. geographica aurantiacooculus subsp. nov.* occurs in the Susquehanna River drainage and other nearby Atlantic drainages.

*Emys megacephala* Holbrook, 1836, with a type locality of Cumberland River, near Nashville, Tennessee, is of the same form as type *Graptemys geographica geographica*.

Publications relevant to the taxonomy and nomenclature of putative *Graptemys caglei* Haynes and McKown, 1974, *Graptemys geographica* (Lesueur, 1817) and *Graptemys pseudogeographica* (Gray, 1831) and the taxonomic acts within this paper include Angley and Buhlmann (2017), Bartlett and Bartlett (1999), Bishop (1921), Cagle (1954), Baur (1890), Bour (2008), Bour and Dubois (1983), Braun and Phelps (2016), Cagle (1953, 1954), Carrière *et al.* (2009), Conant (1938), Conant and Collins (1991), Conant *et al.* (1964), Crother (2012), Dixon (2000), Duméril and Bibron (1835), Duméril *et al.* (1854), Dundee (1974), Ernst and Lovich (2009), Ernst and Barbour (2009), Garman (1890), Gray (1831a, 1831b), Green and Pauley (1987), Haynes and McKown (1974), Hibbits and Hibbits (2016), Holbrook

(1836), Jensen *et al*. (2008), Joyce *et al*. (2013), Kirkpatrick (1993), Lechowicz (2008), Lesueur (1817), Lindeman (2003, 2009, 2019), Lindeman *et al.* (2015), Mitchell (1994), Mitchell and Reay (1999), Ouellette and Cardille (2011), Patch (1925), Pluto and Bellis (1986, 1988), Praschag *et al*. (2017), Rhodin *et al*. (2017), Say (1924), Seidel and Ernst (2017), Selman and Lindeman (2020), Spinks and Bradley Schaffer (2009), Stephens and Wiens (2003), Thomson *et al.* (2008, 2018), Vogt (1993), Ward *et al*. (2013), Wilson (1966) and sources cited therein.

***EMYS ORBICULARIS* (LINNAEUS, 1758)**

A long known, yet undescribed subspecies of *Emys orbicularis* (Linnaeus, 1758) from Tunisia and nearby parts of north-east Algeria is formally named for the first time as *Emys orbicularis repens subsp. nov.*.

Publications relevant to the taxonomy and nomenclature of *Emys orbicularis* (Linnaeus, 1758) including the north African forms and the decision made to formally name the form from from Tunisia and nearby parts of north-east Algeria include Bons and Geniez (1996), Bour (2008), Fahd *et al*. (2009), Fritz (1989, 1993a, 1993b, 1994a, 1994b, 1995a, 1995b, 1995c, 1996, 1998, 2001a, 2003), Fritz and Havaš (2007), Fritz and Obst (1995), Fritz *et al*. (1995, 1996, 1998b, 2005a, 2005b, 2006, 2007, 2009), Gray (1870), Joger *et al.* (2007), Kwet (2010), Kwet and Trapp (2014a, 2014b), Lenk *et al*. (1999), Linnaeus (1758), Malkmus (1982, 1995), Pedall *et al.* (2009, 2011), Pereira *et al.* (2017), Rhodin *et al*. (2017), Schleich *et al*. (1996), Seidel and Ernst (2017), Sommer *et al*. (2007), Spadola and Insacco (2009), Spinks and Bradley Shaffer (2009), Stuckas *et al*. (2014), Velo-Antón *et al*. (2018) and sources cited therein.

***CUORA* GRAY, 1856**

Putative *Cuora mouhotii* (Gray, 1862), with a type locality of “Lao Mountains, in Siam” more recently restricted to “Luang Prabang, Laos, Latitude 19.54 N., Longitude 102.08 E., by lectotype designation of Fritz *et al*. (1998)” (see Fritz 1998a), has long been known to consist of two divergent populations, one being found in a region centred on Vietnam and adjacent China, including nearby Laos, and another population centred on the Assam region of eastern India, including immediately adjacent parts of adjoining countries..

The Indian population is herein formally named as *Cuora adelynhoserae sp. nov*..

As of 2021, putative *C. amboinensis* (Riche in Daudin, 1801), is a species broken up by most herpetologists into up to four subspecies, occupying the range from Ambon, across the East Indies to south-east Asia and across to Eastern India and adjoining countries.

The molecular data of Protiva *et al*. (2016) indicated at least five species in the complex (see Fig. 5 and their accounts of divergences between measured clades in the text of the paper).

The Indian form of the putative taxon *C. amboinensis* is the only unnamed one in their phylogeny and so is formally identified and named as *C. jackyhoserae sp. nov.* herein.

The four previously recognized subspecies, *Cuora amboinensis amboinensis* (Riche in Daudin, 1801), *Cuora amboinensis couro* (Lechenault in Schweigger 1812), type locality of Java, Indonesia, *Cuora amboinensis kamaroma* Rummler and Fritz, 1991, type locality about 50 km north of Bangkok, Thailand and *Cuora amboinensis lineata* McCord and Philippen, 1998, with a type locality of Myitkyina, Kachin Province, Myanmar (Burma), are all herein recognized as full species, each occupying ranges close to their type localities.

It is for example noted that Protiva *et al*. (2016), found species-level divergence between specimens of putative *C. amboinensis* from Borneo and Sumatra.

Unnamed forms of putative *C. amboinensis* formally named for the first time in this paper and not necessarily included in the phylogentic study of Protiva *et al.* (2016) are as follows:

*C. jackyhoserae sp. nov.* from eastern India and nearby parts of Bangladesh, Bhutan and Myanmar (Burma);

*C. oxyslopp sp. nov*. from the Philippines;

*C. boxboyi sp. nov.* from Sulawesi;

*C. elfakariorum sp. nov.* from Borneo;

*C. richardwellsi sp. nov.* from Enganno Island;

*C. rosswellingtoni sp. nov.* from Halmahera Island.

All are clearly divergent from one another and can be differentiated morphologically and this is why I had no hesitation in recognizing each as full species, rather than as subspecies.

I note this is also a position counter to that of Ernst *et al.* (2016), who cited the discredited blog rant of Kaiser *et al.* (2013) as a basis to ignore the earlier work of McCord and Philippen (1998).

Publications relevant to the putative species *Cuora mouhotii* (Gray, 1862) and putative *C. amboinensis* (Riche in Daudin, 1801) and the taxonomic acts within this paper, include Abdala *et al*. (2008), Auliya (2006), Becker (1999, 2012), Beolens *et al*. (2011), Bernhardt (1995), Blanck (2013), Basumatary and Sharma (2013), Beukema (2011), Bourret (1941), Brown *et al.* (1996, 2000, 2012, 2013), Chan-ard *et al*. (1999, 2015), Chao *et al.* (2011), Cox *et al*. (1998), Das *et al*. (2016), Das and Das (2017), Das and Gupta (2017), Das *et al*. (2009), Daudin (1801, 1802), Diesmos *et al.* (2008), Duméril and Bibron (1835), Duméril *et al.* (1854), Ernst (1988), Ernst *et al*. (2011, 2016), Ernst and Barbour (1989), Ferner *et al*. (2000), Filella (1997), Fong and Qiao (2010), Forth (2017), Fritz and Obst (1997, 1998), Fritz and Freitag (2008), Fritz and Mendau (2002), Fritz *et al*. (1998a, 2002), Galgon and Fritz (2002), Gaulke (1995, 2001, 2011, 2017), Gaulke and Fritz (1998), Gemel *et al*. (2009), Gojo-Cruz and Afuang (2018), Gray (1856a, 1856b, 1862, 1864b), Grychta (1988), Hennig (2004, 2012), Ives *et al*. (2008), Kaiser *et al*. (2013) (wholly discredited in numerous later publications, e.g. Cogger 2014, Hoser 2015a-f, as well as being over-ruled by ICZN 2021), Kocj (2012), Kunz (2013), ICZN (2021), Lourenço *et al*. (2011), Ly *et al*. (2013), Manthey and Grossmann (1997), McCord and Philippen (1998), McDowell (1964), McLaughlin and Tristan Stayton

(2016), Mertens (1930), Murthy (2010), Nguyen *et al.* (2009), Nguyen *et al.* (2020), Parham *et al.* (2001), Pauler (1990), Pauwels *et al.* (2003), Praedicow (1985), Protiva *et al.* (2016), Purkayastha *et al.* (2013), Rahman *et al.* (2015), Rummler and Fritz (1991), Sachsse (1973), Schilde (2004b), Schmidt (1927), Schweigger (1812), Singh and Singh (2012), Spinks and Bradley Shaffer (2007), Struijk and Blanck (2015, 2016), Struijk *et al.* (2016), Stuart and Parham (2004), Taylor (1970), Theobold (1868b), Tshewang and Letro (2018), Rhodin *et al.* (2017), Wagner (2018a, 2018b), Wang *et al.* (2020), Wanger *et al.* (2011), Wangyal *et al.* (2012), Wangyal *et al.* (2012), Xiao *et al.* (2017), Zhang *et al.* (2008), Ziegler (2002), Zug and Mulcahy (2019) and sources cited therein.

***CHERSINA* GRAY, 1830**

The African Angulate Tortoise, *Chersina angulata* (Duméril in Schweigger, 1812), long suspected of comprising up to four well-defined regional forms (*sensu* Archer, 1967) remains being treated by herpetologists as a single species until now.

However, Spitzweg *et al.* (2020) presented compelling evidence for the splitting of the putative species at least two ways, this being the southern population and that from Namaqualand, in far northwest South Africa and adjacent Namibia.

While there has been expressed doubt as to the exact provenance of the type specimen for the species *C. angulata* by Spitzweg *et al.* (2020), the drawing of the type material (with reference to the colouration of the lower head) shows it is not of the north-west form.

The type locality for "*Testudo bellii* Gray, 1828" is "Cape of Good Hope" (Latitude 34.3568 S., Longitude 18.4740 E.) and again not of the northern form.

"Cape of Good Hope" is located south of Cape Town, South Africa, where the species *C. angulata* is common and the holotype of is evidently of that form.

The specimen described as *Chersina angulata pallida* Gray, 1831 is again of colouration of the southern form and not that of the north-west of the range of the putative species *Chersina angulata.*

Hence the until now unnamed form from Namaqualand, stated by Spitzweg *et al.* (2020) as having diverged from the nominate form (in pure state) some 3.8 MYA is formally named in this paper as a new species, *C. swileorum sp. nov..*

Publications relevant to the genus *Chersina* Gray, 1830 and the taxonomic acts within this paper, include Archer (1967, 1968), Bour (2008a), Branch (1984, 1989), Daniels *et al.* (2007), Duméril and Bibron (1835), Duméril *et al.* (1854), Ernst and Barbour (1989), Fleck and Fleck (2001), Gray (1828, 1830, 1831a, 1866), Greig and Burdett (1976), Herrmann and Branch (2013), Hewitt (1931), Hofmeyr (2004, 2009), Hofmeyr *et al.* (2014, 2016), Joshua *et al.* (2010), Loveridge and Williams (1957), Pereira *et al.* (2017), Rhodin *et al.* (2017), Schweigger (1812), Sowerby and Lear (1872), Spitzweg *et al.* (2020), Van Den Berg and Baard (1994) Van Heezik *et al.* (1994) and sources cited therein.

***HOMOPUS* DUMÉRIL AND BIBRON, 1834**

For most of the past 50 years, most herpetologists have regarded southern African "padlopers" as being within the genus *Homopus* (Duméril and Bibron, 1834),

More recently and following from a number of molecular studies, the genus *Chersobius* Fitzinger, 1835 has been resurrected for the five-toed species (now *C. boulengeri* (Duerden, 1906), *C. signatus* (Gmelin, 1789), and *C. solus* (Branch, 2007)), which are in fact more closely related to *Chersina* Gray, 1830.

*Chersobius signatus* (Gmelin, 1789), long known to include at least one unnamed form from Pofadder, northern South Africa was audited and the relevant form is herein formally named as a new species, *C. mandela sp. nov*. based on morphological and genetic divergence as well as ongoing reproductive isolation created by a zone of nearly 150 km (straight line) of clearly unsuitable habitat.

*Homopus* (type species *Homopus areolatus* (*Tortue Aréolée*, Schoepff = *Testudo Areolata*, Thunberg 1787), by subsequent designation of Duméril and Bibron (1835), is however very divergent from the other single recognized four-toed species included in the genus, that being *Homopus femoralis* Boulenger, 1888, with an estimated divergence of the two taxa of over 20 MYA.

Both putative species *H. areolatus* and *H. femoralis* are also considered to be species complexes as demonstrated by Hofmeyr *et al.* (2020) and sources cited therein.

Both *H. areolatus* and *H. femoralis* are therefore placed in separate genera, with *H. femoralis* placed into the newly named genus *Funkichelys gen. nov.*, herein considered to include at least two species, one of which is formally named for the first time as *Funkichelys funki sp. nov.* as type species for the new genus. The new species was until now treated as a distinctive and divergent western population of *H. femoralis.*

*H. areolatus* is split two ways as well at the species level, in line with well-known divergent populations in the west and east of the range. All type material for *H. areolatus* clearly refers to material from the immediate vicinity of Cape Town and Cape of Good Hope, immediately south of there and therefore is referrable to the western form.

The image depicted with Thunberg's, 1787 description is clearly of a specimen with a provenance of Cape Town, South Africa, as evidenced by the colouration of the carapace (yellow outers of each scute and light reddish-range inner scutes), meaning the eastern form was until now the unnamed species.

The eastern form, herein formally named *Homopus trevorhawkeswoodi sp. nov.*, is also in turn subdivided into three regionally and morphologically divergent subspecies. It appears they are also allopatric.

Publications relevant to the genus *Homopus* Duméril and Bibron, 1834 *sensu lato*, excluding *Chersina* Gray, 1830 as cited above, but including *Chersobius* Fitzinger, 1835 and the taxonomic acts within this paper, include Baard (1996), Bates *et al.* (2014), Bauer and Branch (2003), Bayoff (1995), Bell (1836), Bonin *et al.* (2006),

Boulenger (1888), Bour (1980, 1988), Boycott (1987), Branch (1993), Branch and Rau (1991), Broschell (2000), Clark *et al.* (2011), Conradie *et al.* (2016), Cuvier (1831), Daudin (1901), Dobiey (2006), Duerden (1906), Duméril and Bibron (1835), Duméril *et al* (1854), Ernst and Barbour (1989), Fitzinger (1836), Fleck and Fleck (2001), Fritz and Bininda-Emonds (2007), Gmelin (1739), Gorseman (1980), Gray (1873b, 1873c), Greig and Burdett (1976), Hewitt (1931, 1935, 1937), Hofmeyr and Branch (2018), Hofmeyr *et al.* (2016), Hoogmoed (1980), Hughes (1986), Kooijman (2015), Kuperus and Loehr (2009), Loehr (2006, 2008, 2012a, 2012b, 2013a, 2013b, 2015, 2016, 2019), Loehr *et al.* (2004, 2006, 2011, 2015, 2019), Lacépède (1788), Loon (2018), Loveridge and Ernst (1957), Mashinini and Mahlangu (2014), Oudemans (1895), Rhodin *et al.* (2017), Schleicher (2005a, 2005b), Schoepff (1792), Stark (2013), Thunberg (1785, 1787), Valverde (2005a, 2005b) and sources cited therein.

***CYCLANORBIS* GRAY, 1854**

The two African species in the genus, *Cyclanorbis* Gray, 1854 with *Cryptopus senegalensis* Duméril and Bibron, 1835 as the type species constitutes two divergent lineages. The other species *Baikiea elegans* Gray, 1869 treated by most authors since as being within *Cyclanorbis* is herein formally transferred back to the genus *Baikiea.* Pereira *et al.* (2017) found a divergence between the two forms of more than 30 MYA.

Within each species, there are distinctive east and west African lineages. For *Baikiea elegans* Gray, 1869, type locality “West Africa”, the eastern form was named *Cyclanorbis oligotylus* Siebenrock, 1902 and is herein treated as a subspecies.

*Cryptopus senegalensis* Duméril and Bibron, 1835 with a type locality of Senegal is the only named form of this species. John Edward Gray coined no less than five other names for the West African form. Then there was a name coined by Rochebrune (1884), namely *Tetrathyra vaillantii* Rochebrune, 1884, also for the West African form.

However the morphologically divergent form from the Nile River system remains unnamed and due to increasing human population in the region as well as invasive species in the same ecosystems, are under a very real threat of extinction.

It is therefore formally named as a new subspecies *Cyclanorbis senegalensis nileensis subsp. nov..*

The divergent and apparently isolated population from Lake Chad is also formally named for the first time as *Cyclanorbis senegalensis occultatum subsp. nov..*

Publications relevant to the genera *Cyclanorbis* Gray, 1854 and *Baikiea* Gray, 1869 and the taxonomic actions within this paper include Baker *et al.* (2015), Batista *et al.* (2018), Boulenger (1889), Branch (2008), Duméril (1856, 1861), Duméril and Bibron, (1835), Engstrom *et al.* (2004), Gramentz (2008), Gray (1854, 1856a, 1865a, 1865b, 1869), Harrison (1991), Hughes (1979), Largen and Spawls (2010), Le *et al.* (2014), Loveridge and Williams (1967), Mazuch *et al.* (2016), Meylan (1987), Meylan *et al.* (1990), Pereira *et al.* (2017), Praschag *et al.* (2011), Rhodin *et al.* (2017), Rochebrune (1884), Segniagbeto *et al.* (2014), Siebenrock (1902a, 1909), Webb (1975), Werner (1908, 1924) and sources cited therein.

***CYCLODERMA* PETERS, 1854**

The genus *Cycloderma* Peters, 1854 has for decades been regarded as containing just two species, being the type species, *Cycloderma frenatum* Peters, 1854, by original monotypy as well as *Heptathyra aubryi* (= *Cryptopodus aubryi* Duméril, 1856), by original monotypy of Cope, 1960.

While *Heptathyra* has been treated as a synonym of *Cycloderma* by virtually all herpetologists since the name was coined, the molecular evidence of Pereira *et al.* (2017) found the two (putative) species diverged from one another in the Oligocene, at a time of some 30 MYA, making separate genus-level placement of each species the most sensible option.

Therefore I formally resurrect the available name *Heptathyra* Cope, 1960 for *Cryptopodus aubryi* Duméril, 1856, more recently known as *Cycloderma aubryi* (Duméril, 1856).

Putative *Cycloderma frenatum* Peters, 1854 of East Africa occurs in two major river systems, being the Zambezi and the Rovuma, bordering Mozambique and Tanzania.

Inspection of specimens in each system revealed consistent differences between specimens. With each river system being effectively separated from one another, including during times of ice-age maxima and sea level minimum, it is reasonable to conclude that each population is evolving separately and divergent. The name *Aspidochelys livingstonii* Gray, 1860, with a type locality of “Mozambique in tributaries of River Zambesi” is not available for the Rovuma River system animals.

Therefore the relevant soft-shelled turtles are herein formally named *Cycloderma tismorum sp. nov.*

In terms of the putative species *Heptathyra aubryi* (Dumeril, 1856) a similar situation exists.

The type locality is Gabon and the type form is from the Ogooue River, which drains virtually the whole country.

However most specimens of putative *H. aubryi* are divergent from the type form and are found in the far more extensive Congo River system to the south and east that drains a sizeable chunk of central Africa. There is no available name for this population and so it is formally named for the first time as *Heptathyra marcdorsei sp. nov..*

Literature relevant to the species within the genera *Cycloderma* Peters, 1854 (including the synonym name *Aspidochelys* Gray, 1860) and *Heptathyra* Cope, 1860 and the taxonomic conclusions herein include Beolens (2011), Bonin *et al.* (2006), Bour (2008b, 2008c), Branch (1993), Branch *et al.* (2005), Broadley (1962), Broadley and Howell (1991), Broadley and Sachsse (2011), Chirio and Ineich (2006), Cope (1860), Dumeril (1856), Ernst and Barbour (1989), Fritz *et al.* (1994), Gramentz (1998, 1999, 2001), Gray (1860b, 1860d), Günther (1896), Haagner and Morgan (1991), Marques *et al.* (2018),

Meylan (1987), Nieden (1910), Pauwels and Vande Weghe (2008), Pereira *et al.* (2017), Peters (1854), Rhodin *et al.* (2017), Siebenrock (1902a), Spawls *et al.* (2002, 2018), Sweeney (1960), Thomson *et al.* (2008), Tornier (1902), Valverde (2007), Wermuth and Mertens (1977) and sources cited therein.

***LISSEMYS* SMITH, 1931.**

Pereira *et al.* (2017) found that the genus *Lissemys* Smith, 1931, type species: *Emyda punctata* (= *Testudo punctata* Lacepède, 1788) (= *Testudo punctata* Bonnaterre, 1789), by original monotypy has significant divergence between component species as currently recognized.

Praschag *et al.* (2011) found likewise. It appears that the morphologically distinctive species *Lissemys scutata* (Peters, 1868), originally described as *Emyda scutata* Peters, 1868 diverged from the other species in the genus 30 MYA based on the results of Pereira *et al.* (2017).

Therefore it should be transferred to new genus and there is no available name.

Hence the erection of *Piersonchelys gen. nov.* to accommodate this taxon.

Publications relevant to the taxonomic conclusions with respect of the genus *Lissemys sensu lato*, including in particular all aspects of the species *Emyda scutata* Peters, 1868 include Bonin *et al.* (2006), Boulenger (1898), Bour (2008b), Cordero (2017), Gray (1873b), Kuchling (1995),

Lacépède (1788), Li *et al.* (2017), Peters (1868), Platt *et al.* (2018, 2019), Praschag *et al.* (2011), Prokop and Hojay (2007), Rhodin *et al.* (2017), Webb (1982), Zug and Mulcahy (2019), Zug *et al.* (1998) and sources cited therein.

***PELODISCUS* FITZINGER, 1835**

The oriental genus *Pelodiscus* Fitzinger, 1835, type species: *Aspidonectes* (*Pelodiscus*) *sinensis* (= *Trionyx* (*Aspidonectes*) *sinensis* Wiegmann 1834), by subsequent designation by Fitzinger (1843) as generally recognized in 2021, while monophyletic, (see for example Pereira *et al.* (2017), has one very divergent member, being *Trionyx axenaria* Zhou, Zhang, and Fang 1991, since transferred to *Pelodiscus* by Zhou and Li (2007) and most herpetologists since.

Pereira *et al.* (2017) indicated a divergence of *Pelodiscus axenaria* of about 20 MYA from the other members of the genus (as a group) and so it is appropriate for subgenus-level recognition of this putative taxon.

Hence the erection of *Parapelodiscus gen. nov.* to accommodate this species.

Publications relevant to this taxonomic conclusion and the relevant affected species include Bain and Hurley (2011), Boulenger (1898), Bour (2008b), Brandt (1857), Chkhikvadze (1987), Ernst and Barbour (1989), Farkas and McCormack (2010), Farkas *et al.* (2019), Fitzinger (1843), Fritz and Obst (1999), Fritz *et al.* (2010), Gong *et al.* (2018), Meylan (1987), Nguyen *et al.* (2009), Pereira *et al.* (2017), Pope (1935), Pritchard (1979), Rhodin *et al.* (2017), Wang *et al.* (2020), Yang *et al.* (2011), Zhao (1997), Zhao and Adler (1993), Zhou *et al.* (1991), Zhou and Li (2007), Ziegler (2002) and sources cited therein.

***AMYDA* SCHWEIGGER IN GEOFFROY SAINT-HILLAIRE, 1809**

Fritz *et al.* (2014) reviewed the *Amyda cartilaginea* (Boddaert, 1770) species complex, which at the time was beaing treated as the entirety of the monotypic genus *Amyda* Schweigger in Geoffroy Saint-Hilaire, 1809. Fritz *et al.* (2014) split the putative species into two, resurrecting the name *Amyda ornata* (Gray, 1861) for the mainland south-east Asian taxa. *Amyda cartilaginea* was therein confined to the Sunda shelf region.

They formally named a subspecies *Amyda cartilaginea maculosa* Fritz, Gemel, Kehlmaier, Vamberger and Praschag 2014 for a divergent form from south-west Borneo, Java and Sulawesi.

The taxon *Trionyx phayrei* Theobald, 1868 was resurrected as a subspecies of *A. ornata.*

However unnamed forms within the genus *Amyda* are well-known and have been awaiting formal description as their habitats and numbers decline.

Two of these are formally named in this paper, being the taxon from the north of Borneo, formally named *A. ashphillipsi sp. nov.* and the taxon from Bangladesh, formally named as a subspecies of *A. ornata*, being *A. ornata magnapapulae sp. nov..*

Fritz *et al.* (2014) have in effect confirmed that both forms need taxonomic recognition and any further delay in such recognition may imperil their long term survival.

Publications relevant to the genus *Amyda* Schweigger in Geoffroy Saint-Hilaire, 1809 and the taxonomic actions within this paper include Anderson (1871, 1872), Auliya *et al.* (2016), Baur (1893a, 1893b, 1893c), Blumenbach (1779), Boddaert (1770), Boulenger (1889), Bour (2007), Das *et al.* (2016), de Bruyn *et al.* (2013), de Rooij (1915), Duméril and Bibron (1834), Fitzinger (1843), Fritz *et al.* (2014), Gemel *et al.* (2019), Geoffroy Saint-Hilaire (1809a, 1809b), Gray (1856b, 1861a, 1861b, 1864a, 1869a, 1873), Hmar *et al.* (2020), Jaekel (1911), Kabir *et al.* (2015), Khan (2012), Li *et al.* (2017), Manthey and Grossmann (1997), McCord and pritchard (2003), Nath *et al.* (2018), Nutaphand (1979, 1990), Pawar and Choudhury (2000), Pereira *et al.* (2017), Rhodin *et al.* (2017), Schneider (1787), Suckow (1798), Theobald (1868a, 1868b, 1874, 1875), Van Dijk (1992), Voris (2000) and sources cited therein.

***PELOMEDUSA* WAGLER, 1830**

Species in the genus *Pelomedusa* Wagler, 1830 have been scrutinized in a number of recent studies, including Vargas-Ramírez *et al.* (2010), Wong *et al.* (2010), Petzold *et al.* (2014), Nagy *et al.* (2015) and Fritz *et al.* (2015a, 2015b), with the result that ten species are currently recognized, with five “unnamed” forms still ostensibly undescribed as of 2021.

One of these unnamed forms in fact matches the previously synonymised form *Pelomedusa nigra* Gray, 1863 from Natal, South Africa.

That is a so-called variant of *Pelomedusa galeata*

(Schoepff 1792), type locality "near Cape Town" (South Africa).

Based on the phylogenetic results published, *Pelomedusa nigra* is clearly a separate species to *P. galeata* and therefore recognized herein as a valid species. It is formally resurrected from synonymy in this paper.

The other four previously identified and unnamed species in the *Pelomedusa* complex are formally named for the first time in this paper.

These are one from Cameroon, herein named *P. darrenkeilleri sp. nov.*, another from Sudan formally named *P. alexstaszewskii sp. nov.*, a divergent taxon from Ethiopia and Somalia is formally named *P. dannygoodwini sp. nov.*, while yet one more divergent taxon from DR Congo is formally named *P. shannonmcgrathi sp. nov.*.

The two divergent clades in the genus are also split, with the northern clade being formally named as a divergent subgenus *Keillerchelys subgen. nov.*, based on likely divergence of more than 10 MYA, a timeline derived from the molecular results cited above.

Publications relevant to the genus *Pelomedusa* Wagler, 1830 and the taxonomic actions within this paper include Boulenger (1889), Boycott and Bourquin (2008), Bour (2008b), Branch (2008), Branch *et al.* (1990), Duméril and Bibron (1935), Fritz *et al.* (2015a, 2015b), Gasperetti et al. (1993), Gray (1863a, 1863b), Hewitt (1935), Lacépède (1788), Mazuch (2013), McCord *et al.* (2014a), Meek and Cory (1910), Mertens (1937), Nagy *et al.* (2015), Petzold *et al.* (2014), Rhodin *et al.* (2017), Vargas-Ramírez *et al.* (2010), Wong *et al.* (2010) and sources cited therein.

***PELUSIOS RHODESIANUS* HEWITT, 1927**

The species *Pelusios rhodesianus* Hewitt, 1927, is formally divided. The new species is formally named as *P. lynnrawi sp. nov.* being from Angola.

A subspecies in this genus, being a subspecies of *Pelusios rhodesianus* Hewitt, 1927 from Tanzania, Malawi, DR Congo and Zambia is also formally named for the first time.

Publications relevant to *Pelusios rhodesianus* Hewitt, 1927 as previously defined and the taxonomic actions within this paper include Alderton (1988), Auerbach (1987), Bour (1983), Broadley and Howell (1991), Broadley (1981), Ernst and Barbour (1989), Hewitt (1927, 1933), Kindler *et al.* (2015), Marques *et al.* (2018), McCord *et al.* (2014b), Raw (1978), Spawls *et al.* (2002, 2018), Wermuth and Mertens (1977), Witte and Laurent (1943) and sources cited therein.

***ORLITIA BORNEENSIS* GRAY, 1873**

The species *Orlitia borneensis* Gray, 1873, monotypic for the genus *Orlitia* Gray, 1873 was investigated by Palupcikova *et al.* (2012).

They analyzed mitochondrial (cyt b) and nuclear (R35) sequences, as well as shell and scute morphometrics among *Orlitia borneensis* specimens in European zoo collections.

Most specimens lacked precise locality data because they originated from a single confiscation in 2001, but three "known-locality" specimens from Borneo and "Sumatra" were added to the sample series. They had no known West Malaysian specimens.

Haplotype diversity in cyt b was found to be relatively high, with three main haplotype groups identified; nucleotide diversity was lowand phylogenetic structure was poorly supported. The three known-origin animals clustered within one of the main haplotype groups, suggesting that the confiscated animals covered much of the species' genetic diversity. Only minimal variation was found in R35 sequences. Geometric morphometrics demonstrated morphological similarity of all examined specimens. These results led the authors to conclude that all examined animals represented a single conservation unit.

However the authors also found a 1.5 percent cyt B divergence within these animals, indicating up to 6 MYA divergence between at least some specimens ancestors based on their calculations.

The specimens from the western Malay Peninsula examined by myself when compared with others examined from southern Sumatra and Borneo, appear to have consistently deeper shells, slightly enlarged anterior marginals on the carapace and slightly more concave anterior marginals and so are formally identified herein as the new subspecies *O. borneensis perakensis subsp. nov.*.

References relevant to the genus *Orlitia* and the taxonomic action within this paper include Auliya (2006), Boulenger (1897), Bour (2008), Chan-ard *et al.* (1999), Cox *et al.* (1998), Ernst and Barbour (1989), Gray (1873a), Jamniczky and Russell (2004), Lee *et al.* (2009), Ludwig *et al.* (2007), Manthey and Grossmann (1997), Mo (2020), Palupcíková *et al.* (2012), Peters (1874), Rhodin *et al.* 2017, Schilde (2004b), Setiyabudi (2016), Siebenrock (1902c, 1904), Werner (1900) and sources cited therein.

***EMYDURA (TROPICOCHELYMYS) VICTORIAE* (GRAY, 1842)**

While previous studies had extensively sampled river systems from across Australia, it emerged that the Kimberley district of Western Australia had been largely unstudied with respect of species within the genus *Emydura* Bonaparte, 1836.

In terms of the Short-necked species, all were until now simply lumped within the species *Emydura australis* (Gray, 1841) or *Emydura victoriae* (Gray, 1842), *sensu* Georges and Adams (1996), Cann and Sadlier (2017) and most other authors in-between.

Cann and Sadlier (2017) provided a detailed analysis of the type material for both species, including photos, which clearly showed both to be from the Victoria or Daly River systems of the Northern Territory, with the Daly River form also formally described as *E. tanybaraga* Cann, 1997.

While Cann and Sadlier (2017) have assigned the name "*australis*" to the West Kimberley *Emydura* species, the photo of the holotype for that species in Cann and Sadlier (2017) shows quite clearly that this cannot be the case.

The carapace is too shallow and wide at the rear to be

of that form and instead conforms to specimens from the Victoria River system or the morphologically similar specimens from the Daly River system.

The West Kimberley specimens are quite different in form and so were inspected with a view to ascertaining whether or not they were sufficiently divergent to warrant taxonomic recognition.

In doing so, specimens from the major Kimberley River systems were inspected and compared with one another in terms of consistent morphological differences.

In terms of establishing divergences in the absence of molecular data, ice-age drainages were assessed to see which river systems were in fact separated at times of glacial maxima as per Shelley *et al.* (2020), which in turn were matched up with the divergent forms.

In summary, three different forms of *Emydura* (herein treated as being within the subgenus *Tropicochelymys* Wells and Wellington, 1985, an original designation being as genus), were found to be divergent morphologically from congeners in the Victoria River system in the Northern Territory and east of there. The forms also broadly matched the drainage systems as they were at the ice-age maxima as outlined by Shelley *et al.* (2019), meaning that there were three hitherto unnamed forms of *Emydura* (subgenus *Tropicochelymys*) from the West Kimberley region of Western Australia.

All three newly named species were formerly treated as western populations of *Emydura* (*Tropicochelymys*) *victoriae* (Gray, 1842) and are formally named in this paper.

Key publications relevant to the taxonomic conclusions herein with respect of the north-west Australian *Emydura*, include the following: Beolens *et al.* (2011), Bonin *et al.* (2006), Bonaparte (1836), Boulenger (1889), Bour (2008), Cann (1997a-d, 1998), Cann and Sadlier (2017), Cogger (2000, 2014), Cogger *et al.* (1983), Ernst and Barbour (1989), Georges and Adams (1996), Georges and Thomson (2010), Goode (1967), Gray (1841, 1842, 1871c), Kehlmaier *et al.* (2019), McCord *et al.* (2003), Mertens (1969), Shelley *et al.* (2020), Wells and Wellington (1983, 1985), Wermuth and Mertens (1969, 1977), Wilson and Swan (2010), Worrell (1963) and sources cited therein.

***WOLLUMBINIA LATISTERNUM* (GRAY, 1867)**

Saw Shelled Terrapins within the *Wollumbinia latisternum* (Gray, 1867) species complex were also audited on the basis of ongoing uncertainty with respect of taxonomic status of the regional forms.

Synonymies for Australian *Emydura* and Australian *Wollumbinia* species (sometimes the latter under the generic names of *Elseya* or *Myuchelys*), have been published by Cogger *et al.* (1983) or more recently Georges and Thomson (2010) and therefore this exercise is not repeated within this paper.

In terms of the wide-ranging species complex currently treated by most authors as the single species *Wollumbinia latisternum* (Gray, 1867), the evidence of there being several species was unequivicol.

Molecular data cited by Cann and Sadlier (2017) supported the contention of there being several species in the complex and so I found it astounding that no one had gone further to investigate.

The three named forms, *W. latisternum* with a type locality believed to be northern Cape York, Queensland, *W. spinosa* (Gray, 1871), believed to be from the Burdekin River region in central Queensland and *W. dorsii* Wells, 2009 all resolve to divergent taxa and are herein recognized as separate species.

Thomson and Georges (2010) wrote:
"The south east Queensland populations of *Myuchelys* (sic) *latisternum* have been named by Wells (2009) as *Wollumbinia dorsii*, but the account appears in a privately prepared and circulated document that does not, in the opinion of the authors, meet the provisions of ICZN Articles 8 and 9 and Recommendation 8D and so is not considered a publication for the purposes of nomenclature. In any case there is no evidence to suggest that they warrant separate recognition at the level of species."

The claims of those authors are false in all regards and are therefore ignored herein for the purposes of use of ICZN nomenclature in this paper (Hawkeswood 2021). *Myuchelys* Thomson and Georges, 2009 is an invalid non-ICZN duplicate name for *Wollumbinia* Wells, 2007. It was coined in a non-peer reviewed or PRINO (peer reviewed in name only) online "journal" called *Zootaxa*, which is a notorious vehicle of publication for non-scientists and taxonomic vandals.

*Zootaxa* papers regularly coin names outside of the rules of *the International Code of Zoological Nomenclature* (Ride *et al.* 1999), with the name *Myuchelys* being one of many to have debuted in that poor excuse for a scientific journal.

Quite correctly, Cogger (2014) uses the correct name *Wollumbinia* for the said turtles, noting the invalidity of the name *Myuchelys*. Cogger's 2014 book represents the view of the majority of Australian herpetologists.

Two presently undescribed forms in the *W. latisternum* complex were identified in this audit and are formally named herein.

They are the distinctive form from the wet tropics area of north Queensland, quite separate from the type form of *W. latisternum* from further north, near the tip of Cape York, Queensland, as well as another distinctive form from the Eungella area of Queensland, west of Mackay and south of the Burdekin gap, which is also a well-defined biogeographical barrier.

Key publications relevant to the taxonomic conclusions herein with respect of the north-east Australian *Wollumbinia* species include the following: Bonin *et al.* (2006), Cann (1972), Cann and Sadlier (2017), Cogger (2000, 2014), Cogger *et al.* (1983), Dijk *et al.* (2011), Ernst and Barbour (1989), Gaffney (1977), Georges and Adams (1996), Georges and Thomson (2006), Georges *et al.* (1998), Gray (1867, 1871b-c, 1872a), Hamann *et al.* (2008), Pachmann (2009), Prokop (2010), Seddon *et al.* (1997), Swan *et al.* (2017), Thieme (1984), Thomson *et al.* (2021), Thomson and Georges (2009), Valverde

(2010), Wells (2002, 2007a-b, 2009), Wells and Wellington (1983, 1985), Wilson and Swan (2010) and sources cited therein.

***HYDROMEDUSA* WAGLER, 1830**

The South American genus *Hydromedusa* Wagler, 1830, type species *Emys maximiliani* Mikan, 1825 has until now been treated as a genus comprising just two living species, namely, *H. maximiliani* (Mikan, 1825) and *Hydromedusa tectifera* Cope, 1870.

A third species identified as *Hydromedusa casamayorensis* De la Fuente and Bona, 2002 a fossil from the middle Eocene of Patagonia (South America) has also been placed in the genus.

Pereira *et al.* (2017) wrote:

> "*Hydromedusa tectifera* and *H. maximiliani* failed to be recovered as a monophyletic group in our analysis."

They also found a divergence between the two putative taxa in the Cretaceous period, meaning it is not tenable for the two putative taxa to be placed in a single genus.

Therefore *H. tectifera* is herein placed in a newly named genus *Wittchelys gen. nov.*.

A new subspecies of *H. tectifera*, herein placed in *Wittchelys gen. nov.* is *Wittchelys tectifera wittorum subsp. nov.* also formally named for the first time. This is a morphologically divergent population from the Lagoa Dos Patos, being a drainage not known to have been connected with the greater Parana system in recent geological times, including at times of glacial maxima, implying no likely or significant gene-flow between each divergent group.

The divergent north-east population of putative *H. maximiliani* is also formally named as a new species, *H. meyeyouchelys sp. nov.*.

The fossil taxon, *H. casamayorensis* while clearly in the family Hydromedusidae, is sufficiently divergent from the extant species to also be assigned to a new genus, for which the name *Lovelinaychelys gen. nov.* is erected.

Publications relevant to the genus *Hydromedusa* Wagler, 1830 *sensu lato* as defined by previous authors, including the taxonomic decisions within this paper include Alderton (1988), Bager and Rosado (2010), Baur (1893a), Beolens *et al.* (2011), Bonin *et al.* (2006), Boulenger (1885, 1886), Bour (2008b), Cacciali *et al.* (2016), Campinhos *et al.* (2016), Carreira *et al.* (2012), Cope (1870), Costa *et al.* (2015), Cozer *et al.* (2020), De La Fuente (2003), De La Fuente and Bona (2002), de Souza and Martins (2009), di Pietro *et al.* (2012), Dos Reis Martins *et al.* (2011), Duméril and Bibron (1835), Entiauspe-Neto *et al.* (2016), Ernst and Barbour (1989), Fabius (2010, 2016), Famelli *et al.* (2012, 2014, 2016), Freitas *et al.* (2018, 2019), Gaffney (1997), Gemel *et al.* (2019), Giebel (1866), Gray (1855, 1873b), Günther (1884), Huckembeck and Quintela (2013), Lüling (1984), Maniel *et al.* (2018), Martins and Souza (2008, 2009), Mertens (1967), Mikan (1825), Morato *et al.* (2017), Noleto *et al.* (2016), Novelli *et al.* (2013), Oliveira *et. al.* (2020), Pereira *et al.* (2017), Peters (1839), Prigioni *et al.* (2011), Rhodin *et al.* (2017), Ribas *et al.* (2002), Rojas-Padilla *et al.* (2020), Semeñiuk *et al.* (2017, 2019), Souza (2004, 2005, 2007), Souza and Abe (1998), Souza and Martins (2006), Souza and Novelli (2009), Souza *et al.* (2002, 2003), Valverde (2009, 2010), Wetmore (1925), Winkler (2006), Wood and Moody (1976), Wolff (2002) and sources cited therein.

***CHELYDERA* THOMSON AND GEORGES, 2020 IS A SUBJECTIVE SYNONYM OF *SUPREMECHELYS* HOSER, 2014 AND SHOULD NOT BE GENERALLY USED.**

In year 2000 in an online publication, Glenn Shea, Scott Thomson and Arthur Georges published a long-winded ramble on their views obout the taxonomy of Australia's long-necked terrapins of the genus *Chelodina* Fitzinger, 1826.

At the conclusion of their so-called scientific paper, they erected a new subgenus that they called:

> "*Chelydera* Thomson and Georges, 2020", with a type species of "*Chelodina parkeri* Rhodin & Mittermeier 1976."

Their concept of the genus included the following:

> "Assigned Species: *C. parkeri* Rhodin & Mittermeier 1976; *C. burrungandjii* Thomson, Kennett & Georges 2000; *C. expansa* Gray 1857; *C. kuchlingi* Cann 1997; *C. rugosa* Ogilby 1890; † *C. insculpta* De Vis 1897; † *C. alanrixi* Lapparent de Broin & Molnar 2001."

Six years earlier, Hoser (2014), erected the subgenus *Supremechelys* Hoser, 2014, with a type species of *Chelodina expansa* Gray, 1857.

Because *Chelodina expansa* Gray, 1857 is included in the list of species assigned to the more recently erected subgenus *Chelydera* it is therefore a subjective synonym of the earlier name *Supremechelys.*

Hence if one accepts the taxonomy of Shea, Thomson and Georges, the correct name to be used is *Supremechelys* and not *Chelydera.*

**INFORMATION RELEVANT TO THE FORMAL DESCRIPTIONS THAT FOLLOW**

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

Several people including anonymous peer reviewers who revised the manuscript prior to publication are also thanked as are relevant staff at museums who made specimens and records available in line with international obligations.

In terms of the following formal descriptions, spellings should not be altered in any way for any purpose unless expressly and exclusively called for by the rules governing Zoological Nomenclature as administered by the International Commission of Zoological Nomenclature (ICZN).

In the unlikely event two or more newly named taxa are deemed to be the same by a first revisor, then the name to be used and retained is that which first appears in this paper by way of page priority and as listed in the abstract keywords.

Some material in descriptions for taxa may be repeated

for other taxa in this paper and this is necessary to ensure each fully complies with the provisions of the *International Code of Zoological Nomenclature* (Fourth edition) (Ride *et al*. 1999) as amended online since.

Material downloaded from the internet and cited anywhere in this paper was downloaded and checked most recently as of 4 July 2021 (including if also viewed prior), unless otherwise stated and was accurate in terms of the content cited herein as of that date.

Online citations within this paper, including copied emails and the like, are not as a rule cited in the references part of this paper.

Unless otherwise stated explicitly, colour and other descriptions apply to living adult specimens of generally good health and not under any form of stress by means such as excessive cool, heat, dehydration, excessive ageing, abnormal skin or reaction to chemical or other input.

While numerous texts and references were consulted prior to publication of this paper, the criteria used to separate the relevant genera, subgenera, species or subspecies has already been spelt out and/or is done so within each formal description and does not rely on material within publications not explicitly cited herein.

***CHELYDRA HAYDNMCPHIEI SP. NOV.***

**LSIDurn:lsid:zoobank.org:act:9221E07D-9F6F-4198-92B0-EAEE51BB21E3**

**Holotype:** A preserved female specimen at the Natural History Museum of Utah, Utah, USA, specimen number Amphibian and reptile specimens UMNH:Herp:3961, collected from Chagres River, Juan Mina, Panama. This facility allows access to its holdings.

**Paratypes:** 1/ A preserved female specimen at the Natural History Museum of Utah, Utah, USA, specimen number Amphibian and reptile specimens UMNH:Herp:3948 collected from 1.5 miles north west of Almirante, Bocas del Toro, Panama. 2/ A preserved specimen at the Natural History Museum of Utah, Utah, USA, specimen number Amphibian and reptile specimens UMNH:Herp: 3959 collected from Escudo de Veraguas Island, Bocas del Toro, Panama.

**Diagnosis:** *Chelydra haydnmcphiei sp. nov*. has until now been treated as a northern population of *Chelydra acutirostris* Peters, 1862, with a type locality of the Atlantic Drainages of Equador.

*Chelydra haydnmcphiei sp. nov*. occurs in the Pacific drainages of Colombia and north, through Panama to just inside Honduras.

This taxon is in turn separated from the morphologically divergent *Chelydra rossignonii* (Bocourt, 1868) by the mountainous zone occupying most of that country, with *C. rossignonii* in turn being found further north into Mexico.

*Chelydra haydnmcphiei sp. nov*. is readiy separated from *Chelydra acutirostris* Peters, 1862 by having a yellow iris with blurred or indistinct dark spots within, versus a light brown iris with distinct dark spots within.The upper jaw of adult *C haydnmcphiei sp. nov*. is mostly grey, versus mainly yellow in *Chelydra acutirostris* Peters, 1862.

Both *C. haydnmcphiei sp. nov*. and *Chelydra acutirostris* are separated from *C. rossignonii* by only having a few granular scales on the head of relatively small size (or otherwise smooth), and few if any papillae on the under parts of face and neck and if present these are small in size and rounded, versus large, pointed, flattened and more numerous in *C. rossignonii*, this being the best means to distinguish between the taxa (Medem 1977).

Both *C. haydnmcphiei sp. nov*. and *C. acutirostris* are separated from *C. serpentina* (Linnaeus, 1758) by having young specimens with a light brown carapace, versus dark brown to blackish in *C serpentina*.

Both *C. haydnmcphiei sp. nov*. and *Chelydra acutirostris* are separated from all other species and subspecies of *Chelydra* Schweigger, 1812 by having a more pointed snout than in seen in the other species.

The four species in the genus *Chelydra* Schweigger, 1812 are separated from the morphologically similar snapping turtle species in the genus *Macrochelys* Gray, 1856 by lacking supramarginal scutes, having eyes inclined toward the top of the head and no lure on the floor of the mouth.

Species in the genus *Chelydra* are also identified as follows: The carapace of this snapping turtle reaches about 41 cm, although most individuals probably have 20-30 cm carapaces (Medem, 1977). The slightly rounded carapace has sharp posterior serrations and three low keels (which may disappear with age). The anterior width of the third vertebral is less than 25 percent of the maximum carapace width. The carapace ranges in color from brown to olive, dark brown, olive gray or black and may change with age.

A few light radiations or small spots may be present on the carapace of younger individuals, old turtles are often unicolored. The plastron is yellow, tan or gray. Juveniles have a light-dark mottled plastron pattern. The bridge is 6-8 percent of the carapace length; the gular scute is subdivided into two and 3-4 inframarginals are present. The abdominal scute is usually twice as broad as long and the length of the plastral forelobe is normally longer than 40 percent of the carapace width. The large head has a narrow pointed snout and usually 4-6 chin barbels. The skin is gray to olive-black or dark brown. Males are larger than females, have longer preanal tail lengths and the vent is situated beyond the posterior carapace rim.

Physical evidence showing the Panama Isthmus closed around 2-3 MYA (O'Dea *et al.* 2016) would imply that the two relevant populations of *Chelydra* from northern South America would have been separated from one another for a similar time frame, which is more than enough time to allow each form to allopatrically speciate.

Images of *Chelydra haydnmcphiei sp. nov*. in life are online at:
https://www.inaturalist.org/observations/10328914
and
https://www.inaturalist.org/observations/71674937
and
https://www.inaturalist.org/observations/72745645

Images of the type form of *Chelydra acutirostris* in life are online at:
https://www.inaturalist.org/observations/85710030
and
https://www.inaturalist.org/observations/36509029
and
https://www.inaturalist.org/observations/46718269

**Distribution:** *Chelydra haydnmcphiei sp. nov*. occurs in the Pacific drainages of Colombia and north, through Panama to just inside Honduras.

**Etymology:** Named in honour of Haydn McPhie (note spelling of his name) from Mirboo North, Victoria, Australia, in recognition of many decades of important contributions to herpetology.

***MARTINEKCHELYS GEN. NOV.***

**LSIDurn:lsid:zoobank.org:act:EC9A387B-E3AF-4B62-81CB-0818B8CB8FB7**

**Type species:** *Kinosternon acutum* Gray, 1831.

**Diagnosis:** Species within the genus *Martinekchelys gen. nov*. are readily separated from species in the genus *Cryptochelys* Iverson, Le, and Ingram 2013 (Type species: *Cinosternon leucostomum* Duméril, Bibron and Duméril, 1851) by having gular scutes more than half the length of the anterior lobe of the plastron, versus much less than half in the genus *Cryptochelys.*

In turn the two preceding genera are separated from other Kinosternid (*sensu stricto*) turtles as follows: Lacking an entoplastron (present in *Baltemys* and *Xenochelys*), with reduced carination (basically unicarinate; usually tricarinate in *Baltemys*, *Xenochelys*, *Sternotherus*, and *Kinosternon*, though nearly acarinate in some in the latter genus), a reduced neural series (typically five bones, all posteriorly symmetric; six in *Martinekchelys creaseri*) not in contact with the nuchal bone (usually six with neural contact in other kinosternids); the presence of clasping organs on the posterior crus and thigh (except absent in *Martinekchelys acutum* and *M. creaseri*; also present in *Sternotherus*, but absent in many *Kinosternon*), the anterior end of the anterior musk duct groove reaching only to the anterior half of the third peripheral (unknown for *Cryptochelys dunni*; reaching to the second peripheral in *Sternotherus* and most *Kinosternon*) (adapted from Iverson *et al.* 2013).

**Distribution:** Mexico including Veracruz, Chiapas, Campeche, Quintana Roo, Yucatan, Tamaulipas , San Luis Potosi, Hidalgo, Puebla as well as north Guatemala and Belize.

**Etymology:** Named in honour of Maryann Martinek, of Bendigo, Victoria, Australia in recognition of her services to wildlife conservation, including in digging up “mud” on corrupt wildlife officials in Australia, being relevant when naming a genus of “Mud Turtles”.

Further details of the important works of Maryann Martinek can be found in Hoser (2010).

**Content:** *Martinekchelys acutum* (Gray, 1831) (type species); *M. creaseri* (Hartweg, 1934); *M. herrerai* (Stejneger, 1925).

***PARASTERNOTHERUS SUBGEN. NOV.***

**LSIDurn:lsid:zoobank.org:act:8EB94B87-B15D-4888-B0AC-5825BB58FEEB**

**Type species:** *Goniochelys minor* Agassiz, 1857.

Now generally known as *Sternotherus minor* (Agassiz, 1857).

**Diagnosis:** Musk Turtles in the nominate subgenus *Sternotherus* (Bell, 1825) are separated from species within the subgenus *Parasternotherus subgen. nov.* by having one or other of the following suites of characters:
A/ Barbels on chin and neck; side of head usually with two conspicuous light stripes, or:
B/ Barbels on chin only; side of head is variously marked but lacks two conspicuous stripes. Plastron lacking a gular scute; carapace is high-keeled, being about as tall as it is wide.

By contrast species in the subgenus *Parasternotherus subgen. nov*. are separated from the nominate subgenus by having a plastron with a gular scute and a carapace that is wider than it is tall.

Turtles within the genus *Sternotherus* (Bell, 1825) are readily separated from similar genera of Turtles in North America, including *Kinosternon* Spix, 1824 and allied genera, by the presence of a square or rectangular pectoral scute and an immobile plastron (versus triangular pectoral and mobile plastron in the other genera).

**Distribution:** Southern United States of America.

**Etymology:** *Parasternotherus* literally means “resembling *Sternotherus*”.

**Content:** *Sternotherus* (*Parasternotherus*) *minor* (Agassiz, 1857) (type species); *S.* (*Parasternotherus*) *peltifer* (Smith and Glass, 1947); *S.* (*Parasternotherus*) *depressus* Tinkle and Webb, 1955 and *S.* (*Parasternotherus*) *intermedius* Scott, Glenn and Rissler, 2017.

***CROTTYCHELYS GEN. NOV.***

**LSIDurn:lsid:zoobank.org:act:99F65583-2151-4590-B362-F3F9166A5D0B**

**Type species:** *Chelopus rubidus* Cope, 1870.

(better known as *Rhinoclemmys rubida* (Cope, 1870)).

**Diagnosis:** Species within *Crottychelys gen. nov*. are separated from other species within greater *Rhinoclemmys* Fitzinger, 1835 as previously recognized by the following unique suite of characters:

Little or no interdigital webbing; tip of the upper jaw is hooked and unnotched; dorsal head pattern consists of a pair of supratemporal stripes or no stripes present; carapace rather high, but flat on top.

Species within *Rhinoclemmys* Fitzinger, 1835 *sensu lato*, including *Callopsis* Gray, 1860, *Crottychelys gen. nov*. and *Oxychelys gen. nov*. as formally named in this paper are readily separated from all similar North, South and Central American species of turtle by the following suite of characters:

Aquatic and terrestrial Neotropical batagurine turtles with squamosals loosely attached and barely in contact with jugal, but touching postorbital; ethmoid fissures broadly triangular or oval; anterior edge of inferior

process of parietal not flexed outward, separated from jugal but touching palatine; ventral end of jugal broad; plastron large, hingeless and attached to carapace by well-ossified buttresses;

hexagonal neurals short-sided posteriorly; well-developed carapace with vertebral keel; cloacal bursae present; head and limb patterns vividly colored (derived from Ernst, 1978).

The two species within *Crottychelys gen. nov*. gen. nov. are separated from one another as follows:

A/ Carapacial scutes uniformly light brown; gular scute approximately twice as long as the humeral; marginal scutes a little flared; an elongated temporal spot (*C. rubidus*), and:

B/ Pleural scutes darker colored than vertebrals or marginals; gular scute only slightly longer than humeral; marginal scutes strongly outward projecting; an oval temporal spot (*C. perixantha*).

The subspecies *C. perixantha ipsumtenebris subsp. nov.* is separated from *C. perixantha perixantha* (Mosimann and Rabb, 1953) by their darker colouration as compared to the nominate subspecies.

The most anterior and posterior vertebral scutes are darker than in either *C. perixantha perixantha* or *C. rubidus.* The dark coloration of the posterior vertebral scutes also extends partly onto the marginal scutes. There is no variegated patterning on the marginal scutes.

The head patterns of specimens of this subspecies are variable but invariably bold and well defined with a distinctive white oval in the centre of the top of the head, this sometimes being divided.

**Distribution:** Mexico, including the lowlands of Jalisco, Colima, Michoacan, Oaxaca, Chiapas and West Guerrero.

**Etymology:** The genus is named in honour of a now deceased Great Dane cross Rottwieller dog (*Canis familiaris*), named "*Crotalus*", or Crotty for short, who guarded our research facility and collection for more than a decade from 1989 to the early 2000's. *Crotalus* Linnaeus, 1758 is a well-known Rattlesnake (Pit Viper) genus, with a type species from North America.

**Content:** *Crottychelys rubidus* (Cope, 1870) (type species); *C. perixantha perixantha* (Mosimann and Rabb, 1953) (including subspecies).

***CROTTYCHELYS PERIXANTHA IPSUMTENEBRIS SUBSP. NOV.***

**LSIDurn:lsid:zoobank.org:act:BAFE4225-B551-40AF-889E-292B06DCF8F8**

**Holotype:** A preserved specimen at the Field Museum of Natural History in Chicago, Illinois, USA, specimen number FMNH Amphibians and Reptiles 39136, collected from the vicinity of La Majada, near Apatzingin, Michoacin, Mexico.

**Paratype:** A preserved specimen at the Field Museum of Natural History in Chicago, Illinois, USA, specimen number FMNH Amphibians and Reptiles 39137, collected from the vicinity of La Majada, near Apatzingin, Michoacin, Mexico.

**Diagnosis:** The subspecies *C. perixantha ipsumtenebris subsp. nov.* is separated from *C. perixantha perixantha* (Mosimann and Rabb, 1953) by their darker colouration as compared to the nominate subspecies.

The most anterior and posterior vertebral scutes are darker than in either *C. perixantha perixantha* or *C. rubidus.* The dark coloration of the posterior vertebral scutes also extends partly onto the marginal scutes. There is no variegated patterning on the marginal scutes.

The head patterns of specimens of this subspecies are variable but invariably bold and well defined with a distinctive white oval in the centre of the top of the head, this sometimes being divided.

The two species within *Crottychelys gen. nov*. are separated from one another as follows:

A/ Carapacial scutes uniformly light brown; gular scute approximately twice as long as the humeral; marginal scutes little flared; an elongated temporal spot (*C. rubidus*), and:

B/ Pleural scutes darker colored than vertebrals or marginals; gular scute only slightly longer than humeral; marginal scutes strongly outward projecting; an oval temporal spot (*C. perixantha*).

Species within *Crottychelys gen. nov*. are separated from other species within greater *Rhinoclemmys* Fitzinger, 1835 *sensu lato* as previously recognized by the following unique suite of characters:

Little or no interdigital webbing; tip of the upper jaw is hooked and unnotched; dorsal head pattern consists of a pair of supratemporal stripes or no stripes present; carapace rather high, but flat on top.

Species within *Rhinoclemmys* Fitzinger, 1835 *sensu lato*, including *Callopsis* Gray, 1860, *Crottychelys gen. nov*. and *Oxychelys gen. nov*. as formally named in this paper are readily separated from all similar North, South and Central American species of turtle by the following suite of characters:

Aquatic and terrestrial Neotropical batagurine turtles with squamosals loosely attached and barely in contact with jugal, but touching postorbital; ethmoid fissures broadly triangular or oval; anterior edge of inferior process of parietal not flexed outward, separated from jugal but touching palatine; ventral end of jugal broad; plastron large, hingeless, and attached to carapace by well-ossified buttresses;

hexagonal neurals short-sided posteriorly; well-developed carapace with vertebral keel; cloacal bursae present; head and limb patterns vividly colored (derived from Ernst, 1978).

Photos of *C. perixantha ipsumtenebris subsp. nov.* in life can be found online at:

https://www.inaturalist.org/observations/13938590

and

https://www.inaturalist.org/observations/16424664

and

https://www.inaturalist.org/observations/47932835

and

https://www.inaturalist.org/observations/57398550

Photos of *C. perixantha perixantha* in life can be found online at:
https://www.inaturalist.org/observations/86774700
and
https://www.inaturalist.org/observations/34811645
and
https://www.inaturalist.org/observations/34101749
and
https://www.inaturalist.org/observations/9080324

**Distribution:** *C. perixantha ipsumtenebris subsp. nov.* is known only from near the type locality being the vicinity of La Majada, near Apatzingin, Michoacin, Mexico.

*C. perixantha perixantha* (Mosimann and Rabb, 1953) is apparently separated by distribution via an area of elevated hills, a distance of about 50 km in a straight line.

**Etymology:** *Ipsumtenebris* in Latin means "very dark", in reference to the darkening of the vertebral scutes in this taxon.

***OXYCHELYS GEN. NOV.***

**LSIDurn:lsid:zoobank.org:act:EED90BB2-3B59-4603-B4DD-793B4213B2F4**

**Type species:** *Oxychelys oxyi sp. nov.* (this paper).

**Diagnosis:** The two species within *Oxychelys gen. nov.* have until now been treated as a single species, namely *Nicoria nasuta* Boulenger, 1902, more recently better known as *Rhinoclemmys nasuta* (Boulenger, 1902).

Both species form a divergent clade which Lee and McCord (2007) showed had a divergence of nearly 20 MYA from nearest living relatives.

They are separated from other species within greater *Rhinoclemmys* Fitzinger, 1835 *sensu lato* as previously recognized by the following unique suite of characters:

Inter-digital webbing is heavy; dorsal head stripes extend from the nape to level of orbits or less; no light spots present at occipital region; snout strongly pointed; shell distinctly depressed; chin and lower jaw with dark bars.

They are species well adapted to swimming in fast flowing rivers.

Species within *Rhinoclemmys* Fitzinger, 1835 *sensu lato*, including *Callopsis* Gray, 1860, *Crottychelys gen. nov*. and *Oxychelys gen. nov*. as formally named in this paper are readily separated from all similar North, South and Central American species of turtle by the following suite of characters:

Aquatic and terrestrial Neotropical batagurine turtles with squamosals loosely attached and barely in contact with jugal, but touching postorbital; ethmoid fissures broadly triangular or oval; anterior edge of inferior process of parietal not flexed outward, separated from jugal but touching palatine; ventral end of jugal broad; plastron large, hingeless, and attached to carapace by well-ossified buttresses; hexagonal neurals short-sided posteriorly; well-developed carapace with vertebral keel; cloacal bursae present; head and limb patterns vividly coloured (derived from Ernst, 1978).

The newly named species *Oxychelys oxyi sp. nov.* type for this new genus (*Oxychelys gen. nov*.) is separated from *O. nasuta* (Boulenger, 1902) by the following suite of characters:

Dark sections at rear of lateral scutes on plastron are larger ventrally than dorsally (versus larger dorsally than ventrally in the type form); a brownish-grey iris (versus bluish-yellow iris); a generally much less flattened shell on general view than seen in *O. nasuta.*

Ernst (1978) who also examined both species, including the holotype for *Oxychelys oxyi sp. nov.* (describing the two species as the specimens from Colombia and the specimens from Equador), also noted significant differences between the two species.

*O. nasuta* had much wider marginals (mean = 24.7 mm, SD = 2.2, n = 6) than for *O. oxyi sp. nov.* (mean = 19.1 mm, SD = 2.7, n = 11). *O. nasuta* also had wider carapaces than *O. oxyi sp. nov.*

The mean CW/CL ratio for *O. nasuta* was 0.77 (SD = 0.05) and that for *O. oxyi sp. nov.* was 0.72 (SD = 0.02).

**Distribution:** Colombia, Ecuador. Confined to the Chocoan rainforest area in Pacific coastal

drainages of northwestern Ecuador and western Colombia, and the middle and upper portion of

the Caribbean-draining Río Atrato basin in northwestern Colombia (Carr and Giraldo, 2009).

**Etymology:** The genus is named in honour of a now deceased Great Dane, named "*Oxyuranus*", or "*Oxy*" for short, that protected our wildlife research facility for 8 years in recognition of his loyal services. *Oxyuranus* Kinghorn, 1923 is also a genus of venomous elapid snake from Australia.

**Content:** *Oxychelys oxyi sp. nov.* (type species); *O. nasuta* (Boulenger, 1902).

***OXYCHELYS OXYI SP. NOV.***

**LSIDurn:lsid:zoobank.org:act:80A2D973-D9BD-4869-96F0-5E2F28A772EA**

**Holotype:** A preserved specimen at the California Academy of Sciences, San Francisco, California, USA, specimen number CAS HERP 80969, collected at Trunado, Department of Choco, Colombia, Latitude 7.1502 N., Longitude -77.1999 W. This facility allows access to its holdings.

**Diagnosis:** The newly named species *Oxychelys oxyi sp. nov.* type for this new genus (*Oxychelys gen. nov*.) is separated from *O. nasuta* (Boulenger, 1902) by the following suite of characters:

Dark sections at rear of lateral scutes on plastron are larger ventrally than dorsally (versus larger dorsally than ventrally in the type form); a brownish-grey iris (versus bluish-yellow iris); a generally much less flattened shell on general view than seen in *O. nasuta.*

Ernst (1978) who also examined both species, including the holotype for *Oxychelys oxyi sp. nov.* (describing the two species as the specimens from Colombia and the specimens from Equador), also noted significant differences between the two species.

*O. nasuta* had much wider marginals (mean = 24.7 mm,

SD = 2.2, n = 6) than for *O. oxyi sp. nov.* (mean = 19.1 mm, SD = 2.7, n = 11). *O. nasuta* also had wider carapaces than *O. oxyi sp. nov.*

The mean CW/CL ratio for *O. nasuta* was 0.77 (SD = 0.05) and that for *O. oxyi sp. nov.* was 0.72 (SD = 0.02).

The two species within *Oxychelys gen. nov.* have until now been treated as a single species, namely *Nicoria nasuta* Boulenger, 1902, more recently better known as *Rhinoclemmys nasuta* (Boulenger, 1902).

Both species form a divergent clade which Lee and McCord (2007) showed had a divergence of nearly 20 MYA from nearest living relatives.

They are separated from other species within greater *Rhinoclemmys* Fitzinger, 1835 *sensu lato* as previously recognized by the following unique suite of characters:

Inter-digital webbing is heavy; dorsal head stripes extend from the nape to level of orbits or less; no light spots present at the occipital region; snout strongly pointed; shell distinctly depressed; chin and lower jaw with dark bars.

They are species well adapted to swimming in fast flowing rivers.

Species within *Rhinoclemmys* Fitzinger, 1835 *sensu lato*, including *Callopsis* Gray, 1860, *Crottychelys gen. nov*. and *Oxychelys gen. nov*. as formally named in this paper are readily separated from all similar North, South and Central American species of turtle by the following suite of characters:

Aquatic and terrestrial Neotropical batagurine turtles with squamosals loosely attached and barely in contact with jugal, but touching postorbital; ethmoid fissures broadly triangular or oval; anterior edge of inferior process of parietal not flexed outward, separated from jugal but touching palatine; ventral end of jugal broad; plastron large, hingeless and attached to carapace by well-ossified buttresses; hexagonal neurals short-sided posteriorly; well-developed carapace with vertebral keel; cloacal bursae present; head and limb patterns vividly coloured (derived from Ernst, 1978).

**Distribution:** This species appears to be restricted to the Caribbean-drained middle and upper Río Atrato basin of northwestern Colombia and immediately adjacent watercourses.

**Etymology:** The species is named in honour of a now deceased Great Dane, named "*Oxyuranus*", or "*Oxy*" for short, that protected our wildlife research facility for 8 years in recognition of his loyal services. *Oxyuranus* Kinghorn, 1923 is also a genus of venomous elapid snake from Australia.

***KINOSTERNON* (*PLATYTHYRA*) *BAURII GRANTTURNERI SUBSP. NOV.***

**LSIDurn:lsid:zoobank.org:act:8932007A-5D3A-40D6-9752-364F8BF54447**

**Holotype:** A preserved male specimen at the North Carolina Museum of Natural Sciences, Raleigh, North Carolina, USA, Herpetology Collection, specimen number NCSM-Herp 28633, collected from 1.7 air miles SSW Kill Devil Hills, Nags Head Woods, Dare County, North Carolina, USA, in a turtle trap in pond #28.4, Latitude 35.9776 N., Longitude -75.6643 W. This facility allows access to its holdings.

**Paratypes:** Two more specimens at the North Carolina Museum of Natural Sciences, Raleigh, North Carolina, USA, Herpetology Collection, specimen numbers NCSM-Herp 29280 and 29281 also collected from Dare County, North Carolina, USA.

**Diagnosis:** The subspecies *Kinosternon baurii grantturneri subsp. nov*. occurs in Georgia, South Carolina, North Carolina, Virginia and the far north of Florida, with the nominate subspecies *Kinosternon bauri baurii* (Garman, 1891) (including *Kinosternon bauri palmarum* (Stejneger, 1925), treated herein as synonymous with that subspecies) is herein confined to the Florida Panhandle and the keys south of there.

*K. baurii grantturneri subsp. nov*. is morphologically similar to *K. bauri baurii* but is separated from that taxon by a strong reduction in the head and carapace stripes typical of *K. bauri baurii.*

The three carapace stripes seen in typical specimens of *K. bauri baurii* (not including extremely old specimens) are faded or absent in *K. baurii grantturneri subsp. nov*..

The subspecies *K. baurii grantturneri subsp. nov*. is also easily confused with *K. subrubrum* (Bonnaterre 1789), also occurring on the Atlantic Coastal Plain, but is separated from that taxon by having light stripes from the eyes to the tips of their noses.

Lamb and Lovich (1990) provided a key diagnosis to separate *K. baurii grantturneri subsp. nov*. and *K. subrubrum*, which is provided below in modified form.

*K. baurii grantturneri subsp. nov*. is diagnosed by having carapace stripes greatly reduced, or absent. Side of head bearing a pair of stripes, usually faded, either continuous or broken. Canthal stripe typically extends anterior of eye to tip of snout. In males, ratio of PH/PL falls between 0.29-0.33 and ratio of FL/PL between 0.35-0.38. In females, PH/PL falls between 0.28-0.35 and FL/PL between 0.32-0.35

*K. subrubrum* is diagnosed by never having carapace stripes. Side of head variable in colour from no markings to extensive spotting or stripe-like patterning, but seldom involving a pair of stripes. If side of head is patterned, then canthal stripe, if present, does not extend anterior of eye. In males, ratio of PH/PL falls between 0.25-0.28 and ratio of PL falls between 0.24-0.28 and FL/PL between 0.36-0.39.

Besides morphological divergence from the central and south Florida animals as found by Lamb and Lovich (1990), genetic divergence was also found by Wilson and Karl (2001), confirming the sensibility of taxonomic recognition of this population unit.

The subgenus *Platythyra* Agassiz 1857 type species *Platythyra flavescens* Agassiz 1857, by original

Monotypy, is recognized herein for the divergent lineage within *Kinosternon* Spix, 1824, including this newly named subspecies. See the phylogeny of Iverson *et al.* (2013) for the relative positions of the species groups in their phylogeny.

Colour photos of *Kinosternon baurii grantturneri subsp. nov*. in life can be found online at: https://www.inaturalist.org/observations/75429676

and

https://www.inaturalist.org/observations/28649997

and

https://www.inaturalist.org/observations/25258178

Colour photos of *Kinosternon bauri baurii* (Garman, 1891) from Florida in life can be found online at:

https://www.inaturalist.org/observations/70942174

and

https://www.inaturalist.org/observations/36739252

and

https://www.inaturalist.org/observations/65712416

**Distribution:** The subspecies *Kinosternon baurii grantturneri subsp. nov*. occurs in Georgia, South Carolina, North Carolina, Virginia and the far north of Florida. The nominate subspecies *Kinosternon bauri baurii* (Garman, 1891) (including *Kinosternon bauri palmarum* (Stejneger 1925), treated herein as synonymous with that subspecies) is herein confined to the Florida Panhandle and the keys south of there.

**Etymology:** *Kinosternon baurii grantturneri subsp. nov*. is named in honour of Dr. Grant Turner of Innisfail, near Cairns, north Queensland, Australia, formerly of Bundoora, Victoria, Australia in recognition of a lifetime dedicated to herpetology, including numerous important peer reviewed scientific papers.

***SLOPPCHELYS GEN. NOV.***

**LSIDurn:lsid:zoobank.org:act:FA6BFD18-5A50-483A-9E73-BE4FE7487F22**

**Type species:** *Emys radiolata* Mikan, 1820.

Currently known as *Acanthochelys radiolata* (Mikan 1820).

**Diagnosis:** *Sloppchelys gen. nov*. are separated from all other South American turtles by the following unique suite of characters:

(1) Oval carapace, flat;
(2) Presence of a shallow longitudinal sulcus between 2nd and 4th vertebral scutes;

(3) Carapace and plastron scutes with radiating striations;
(4) Dorsal surface of the head covered with scales of irregular shape and size;
(5) Mesodorsal region of the head with no scales;
(6) Dorsal and lateral surfaces of the neck covered with small tubercles of irregular shape;
(7) Posterior region of the thigh with small series of tubercles,
(derived from Ernst and Barbour 1989; Rhodin *et al.* 1984b; Rhodin *et al*. 2009; Vinke *et al*. 2011; Garbin *et al.* 2016) who all separated *Sloppchelys radiolata* (Mikan, 1820).

Alternatively, *Sloppchelys* are separated from morphologically similar species by the following suite of characters:
Neural plates present, six in number; nuchal shield present, marginal. Plastron large, with a very strong axillary and moderately strong inguinal buttresses, the latter consolidated to the fifth costal plate; a parieto-squamosal arch; parietals more or less expanded superiorly. Jaws moderately strong, without alveolar ridges. Chin with a pair of dermal appendages, or barbels. Digits entirely webbed.

Carapace much depressed, smooth in the adult; vertebrals very broad in the young, broader than the costals, much narrower in the adult, in which the first is the broadest and the fourth the narrowest; nuchal rather large, at least twice as long as broad. Plastron large, deeply notched posteriorly, slightly concave in the male; width of the bridge contained three and a half to four times in the length of the plastron; axillary and inguinal shields very small or absent. Snout rather pointed, with the nasal region very slightly produced. Upper surface of neck with small warts. Limbs very broadly webbed, fringed on the outer side, covered anteriorly with unequal transverse scales; a prominent series of enlarged tubercular scales along the inner edge of the leg.

Carapace with a feeble vertebral keel; dorsal shields of adults with radiating striata.
Front lobe of plastron is broader than the hind lobe; intergular shield at least as long as its distance from the abdominals; suture between the pectorals shorter than that between the abdominals. Skin of upper surface of head divided into irregular shields; parietal bones above as wide as the diameter of the orbit; mental barbels shorter than the diameter of the eye. Dark brown above; lower surface of marginals yellow. Plastron yellow, with a large subrhomboidal dark brown spot in the middle; tympanum, chin and throat yellowish, with small brown spots.

The preceding was largely derived from Boulenger (1889) and remains accurate more than 100 years later.

While the genus is being treated monotypic here for the type species, there is at least one other species associated with the type species from north-eastern Brazil that is in fact distinct at the species level.

**Distribution:** Brazil including Bahia, Minas Gerais, Mato Grosso, Sao Paulo, Espìrito Santo.

**Etymology:** The genus is named in honour of a nine year old (as of 2021) Great Dane, named “Slop” or “Slopp” who has protected our wildlife research facility for 9 years in recognition of his loyal services.

**Content:** *Sloppchelys radiolata* (Mikan, 1820) (type species).

***CLEMMYS GUTTATA MAXIMUS SUBSP. NOV.***

**LSIDurn:lsid:zoobank.org:act:259E7689-7CC1-4D3F-9C2B-220648FDDD0A**

**Holotype:** A preserved specimen at the Cornell University Museum of Vertebrates. Cornell University, Ithaca, New York, USA, in the CUMV Amphibian and Reptile Collection, specimen number R-0008964 collected from North of Auburn, Cayuga County, New York, USA, Latitude 42.94386 N., Longitude -76.56591 W. This facility allows access to its holdings.

**Paratypes:** 1/ A preserved specimen at the California Academy of Sciences, San Francisco, California, USA, specimen number CAS SUR 9698 collected from Bergen Swamp, Genesee County, New York, USA, Latitude 43.09924 N., Longitude -77.99082 W. 2/ A preserved specimen at the Cornell University Museum

of Vertebrates. Cornell University, Ithaca, New York, USA, in the CUMV Amphibian and Reptile Collection, specimen number R-0007881 collected from Duck Lake and Spring Lake, Cayuga County, New York, USA.

**Diagnosis:** The three subspecies of *Clemmys guttata* Ritgen, 1828 are separated from one another by each of the following suites of characters:

1/ *C. guttata maximus subsp. nov.* from the Great Lakes region of the USA and nearby Canada is separated from the other two subspecies by having three or more large yellow spots on the surfaces of each of the vertebrals and costals on the carapace, (versus less and smaller in size in the other two subspecies); most of the plastron in young adults is melanistic, the remainder being orange (same in *C. guttata guttata*, but usually half or less melanistic in *C. guttata praetortus subsp. nov.*), the outer edge of the femoral and anal plates of the plastron has an obvious inwards inflection, this not being the case in the other two subspecies; the gulars are very triangular, with each edge roughly equidistant.

Type *C. guttata guttata* from the Philadelphia area in north-east USA, has one, or less often two or three small yellow spots on on the surfaces of each of the vertebrals and costals on the carapace, most of the plastron in young adults is melanistic, the remainder being orange; the outer edge of the femoral and anal plates of the plastron does not have an obvious inwards inflection; the gulars are triangular, but with the posterior edges slightly elongated.

*C. guttata praetortus subsp. nov.* from South Carolina and south of there in coastal regions to Florida is separated from the other two subspecies by having one, or less often two or three tiny to small yellow spots on on the surfaces of each of the vertebrals and costals on the carapace, half or less than half of the plastron is usually melanistic in young adults, these areas being widely separated by an orange midline region; the outer edge of the femoral and anal plates of the plastron does not have an obvious inwards inflection; the gulars are triangular, but with the posterior edges clearly elongated, almost touching the humeral.

Notwithstanding the preceding, it should be noted that aged specimens of each subspecies commonly have a wholly or nearly wholly black plastron.

Photos of *C. guttata maximus subsp. nov.* in life can be found online at:

https://www.inaturalist.org/observations/1669540

and

https://www.inaturalist.org/observations/9340155

and

https://www.inaturalist.org/observations/30864939

Photos of nominate *C. guttata guttata* in life can be found online at:

https://www.inaturalist.org/observations/73033037

and

https://www.inaturalist.org/observations/25074107

and

https://www.inaturalist.org/observations/58525222

Photos of *C. guttata praetortus subsp. nov.* in life can be found online at:

https://www.inaturalist.org/observations/73625293

and

https://www.inaturalist.org/observations/88188815

and

https://www.inaturalist.org/observations/72492609

*Clemmys guttata* (Schneider, 1792), monotypic for the genus *Clemmys* Ritgen, 1828 as currently recognized is diagnosed and defined as follows:

*Clemmys guttata* is small species and has a gray to black base color on the carapace. The carapace is smooth, does not have a central ridge or keel running down the middle and grows up to 12.5 cm in straight-line carapace length.

The dark carapace is typified by numerous yellow spots, which are a defining characteristic of this taxon.

Spots can always also be found on the head, neck and limbs, where at times they may coalesce to form a line on the angle of the limb.

The plastron is yellow, orange-yellow to reddish and a black spot with somewhat ill defined boundary is usually present on each scute, which tends to expand with age and more rapidly in the northern two subspecies.

The head is blackish; the upper jaw is notched. On each side of the head is a large orange blotch. Also present are several yellow bands of some form of varying size and intensity. Skin on the upper surfaces is dark grey to black with sparse yellow or orange spots while skin on the ventral side may be brighter, being orange, pink, or red.

**Distribution:** *C. guttata maximus subsp. nov.* is found in the Great Lakes region of the USA and nearby southern Canada.

**Etymology:** The name "*maximus*" reflects both the maximal northern distribution for the species as a whole and also that adults on average are larger than seen in the other subspecies.

***CLEMMYS GUTTATA PRAETORTUS SUBSP. NOV.***

**LSIDurn:lsid:zoobank.org:act:8658F74D-8E5B-4171-AB06-DC2A72E8F17C**

**Holotype:** A preserved specimen at the National Museum of Natural History, Smithsonian Institution, Washngton, DC, USA, specimen number USNM Amphibians and Reptiles 110490, collected from 8 miles south east of St. George, Dorchester, South Carolina, USA, Latitude 33.1521 N., Longitude -80.4461 W. This facility allows access to its holdings.

**Paratype:** A preserved male specimen (dry) at the National Museum of Natural History, Smithsonian Institution, Washngton, DC, USA, specimen number USNM Amphibians and Reptiles 91405, collected from five miles south east of Leesville, Lexington, South Carolina, USA, Latitude 33.8591 N., Longitude -81.4641 W.

**Diagnosis:** The three subspecies of *Clemmys guttata* Ritgen, 1828 are separated from one another by each of the following suites of characters:

1/ *C. guttata maximus subsp. nov.* from the Great Lakes

region of the USA and nearby Canada is separated from the other two subspecies by having three or more large yellow spots on the surfaces of each of the vertebrals and costals on the carapace, (versus less and smaller in size in the other two subspecies); most of the plastron in young adults is melanistic, the remainder being orange (same in *C. guttata guttata*, but usually half or less melanistic in *C. guttata praetortus subsp. nov.*), the outer edge of the femoral and anal plates of the plastron has an obvious inwards inflection, this not being the case in the other two subspecies; the gulars are very triangular, with each edge roughly equidistant.

Type *C. guttata guttata* from the Philadelphia area in north-east USA, has one, or less often two or three small yellow spots on on the surfaces of each of the vertebrals and costals on the carapace, most of the plastron in young adults is melanistic, the remainder being orange; the outer edge of the femoral and anal plates of the plastron does not have an obvious inwards inflection; the gulars are triangular, but with the posterior edges slightly elongated.

*C. guttata praetortus subsp. nov*. from South Carolina and south of there in coastal regions to Florida is separated from the other two subspecies by having one, or less often two or three tiny to small yellow spots on on the surfaces of each of the vertebrals and costals on the carapace, half or less than half of the plastron is usually melanistic in young adults, these areas being widely separated by an orange midline region; the outer edge of the femoral and anal plates of the plastron does not have an obvious inwards inflection; the gulars are triangular, but with the posterior edges clearly elongated, almost touching the humeral.

Notwithstanding the preceding, it should be noted that aged specimens of each subspecies commonly have a wholly or nearly wholly black plastron.

Photos of *C. guttata maximus subsp. nov*. in life can be found online at:

https://www.inaturalist.org/observations/1669540

and

https://www.inaturalist.org/observations/9340155

and

https://www.inaturalist.org/observations/30864939

Photos of nominate *C. guttata guttata* in life can be found online at:

https://www.inaturalist.org/observations/73033037

and

https://www.inaturalist.org/observations/25074107

and

https://www.inaturalist.org/observations/58525222

Photos of *C. guttata praetortus subsp. nov.* in life can be found online at:

https://www.inaturalist.org/observations/73625293

and

https://www.inaturalist.org/observations/88188815

and

https://www.inaturalist.org/observations/72492609

*Clemmys guttata* (Schneider, 1792), monotypic for the genus *Clemmys* Ritgen, 1828 as currently recognized is diagnosed and defined as follows:

*Clemmys guttata* is small species and has a gray to black base color on the carapace. The carapace is smooth, does not have a central ridge or keel running down the middle and grows up to 12.5 cm in straight-line carapace length.

The dark carapace is typified by numerous yellow spots, which are a defining characteristic of this taxon.

Spots can always also be found on the head, neck, and limbs, where at times they may coalesce to form a line on the angle of the limb.

The plastron is yellow, orange-yellow to reddish and a black spot with somewhat ill defined boundary is usually present on each scute, which tends to expand with age and more rapidly in the northern two subspecies.

The head is blackish; the upper jaw is notched. On each side of the head is a large orange blotch. Also present are several yellow bands of some form of varying size and intensity. Skin on the upper surfaces is dark grey to black with sparse yellow or orange spots while skin on the ventral side may be brighter, being orange, pink, or red.

**Distribution:** *C. guttata praetortus subsp. nov*. occurs from South Carolina and south of there in coastal regions to Florida, USA.

**Etymology:** The name "*praetortus*" is Latin for reduced and refers to the reduced size and frequency of spots on the carapace of this southern form.

***ACTINEMYS MAXINEHOSERAE SP. NOV.***

**LSIDurn:lsid:zoobank.org:act:F9E3FF28-E1CC-4F9E-BAD1-440745215BB8**

**Holotype:** A preserved specimen at the California Academy of Sciences, San Francisco, California, USA, specimen number CAS Herpetology (HERP) SUR 7759 collected from Rancho San Antonio, Baja California Norte, Mexico, Latitude 30.81534 N., Longitude -115.630453 W. This facility allows access to its holdings.

**Paratypes:** 1/ Two preserved specimen at the California Academy of Sciences, San Francisco, California, USA, specimen numbers CAS Herpetology (HERP) 56884 and 56885, collected from 2 miles South of La Joya, Valladares, San Pedro Martir Mountains, Baja California Norte, Mexico. 2/ A preserved specimen at the California Academy of Sciences, San Francisco, California, USA, specimen number CAS Herpetology (HERP) 138885, collected from Rancho San Juan de Dios, 30 miles East of El Rosario, Baja California Norte, Mexico, Latitude 32.133333 N., Longitude -16.166667 W. 3/ A preserved specimen at the National Museum of Natural History, Smithsonian Institution, Washington, DC, USA, specimen number USNM Amphibians and Reptiles 22052 collected from Tecate River, Baja California Norte, Mexico. 4/ A preserved specimen at the University of Arizona Museum of Natural History, Tucson, Arizona, USA, specimen number UAZ 22057, collected from a lagoon at the mouth of the Santo Tomas Canyon, Baja California Norte, Mexico.

**Diagnosis:** Until recently, species within the genus

*Actinemys* Agassiz, 1857 was subsumed within *Emys* Duméril, 1805, although molecular phylogenies, including that of Pereira *et al*. (2017) have confirmed that species within putative *Actinemys* are not closely related to the type form of *Emys* and so the genus *Actinemys* is recognized herein.

All tortoises within *Actinemys* were all treated as being of the single species *Emys marmorata* Baird and Girard, 1852 by original designation until recently.

Following the paper of Seeliger (1945) and later works, such as Spinks *et al*. (2014), that putative species has been treated as two, being *E. marmorata* (Baird and Girard, 1852) from generally north of San Francisco, California, USA along the coast and ranges to British Columbia, Canada, where it is either now rare or extinct and *E. pallida* (Seeliger, 1945) from south of this range, through southern California and into Baja Mexico.

Seeliger (1945), Spinks *et al.* (2014), and others have recognized the Baja, Mexico population as being both morphologically and genetically divergent from the others and it is on this basis that it is formally named herein as a new species.

The six specimens inspected by Seeliger (1945) form the type series herein for the new species *Actinemys maxinehoserae sp. nov.*.

Known only from the localities the holotype and paratypes come from in Baja North, Mexico and more recent finds in the same general area, *A. maxinehoserae sp. nov.* is readily separated from the other two species in the genus, namedly *A. marmorata and A. pallida* by having inguinal plates that are large and either rectangular or round in shape, versus none, small or large and triangular in populations of either other species.

In *C. marmorata*, the inguinal plates are generally large and triangular, save for the northernmost populations in which the inguinal plate is absent. In *C. pallida,* a species present in most parts of California, including the south, the inguinals are invariably absent or tiny only.

*A. maxinehoserae sp. nov*. also has a very slight upturn in the anterior carapace, not seen in either other species. *A. maxinehoserae sp. nov*. is characterised by marbling on the lower neck as opposed to distinct or semi-distinct spotting in the other two species.

The three species in the genus are all separated from morphologically similar species in other genera by the following unique suite of characters:
Straight carapace length in adults is 11-21 cm, being low, broad and usually widest just posterior to the middle. Carapace obtusely unicarinate in the young, the keel becoming almost or quite indistinct

in the adult; shields nearly smooth in the adult, with radiating striata in the young. Vertebrals 2 to 4 much broader than long, a little narrower than the second costal. Plastron large, concave in the male, openly emarginate posteriorly; the width of the bridge much less than the length of the hind lobe; pectoral and abdominal shields subequal in size; the longest median suture is that between the anals, the shortest that between the humerals; axillary and inguinal shields absent, small or large (depending on species). Head rather large, especially in some adults; upper jaw is not hooked, notched in the middle; the width of the mandible at the symphysis nearly equals the horizontal diameter of the orbit. Digits webbed to the claws, which are long and strong.

Tail about half as long as the shell in the males and similar in females. Carapace ranges from light brown to dark olive or blackish, sometimes with yellowish dots or radiating lines, and the markings may disappear in old specimens; plastron yellow, sutures black, with or without some large black blotches. Head olive or brown above, with small black or light markings, yellow interiorly, uniform, black-dotted or marbled; limbs brown, spotted with black and yellow. Adult males have a light or pale yellow throat.

Photos of *A. maxinehoserae sp. nov.* in life can be found in the papers of Valdez-Villavicencio *et. al.* (2016a, 2016b) or online at:

https://www.inaturalist.org/observations/73887726

and

https://www.inaturalist.org/observations/73312310

and

https://www.inaturalist.org/observations/3760434

Photos of *A pallida* in life can be found online at:

https://www.inaturalist.org/observations/78749530

and

https://www.inaturalist.org/observations/33221

and

https://www.inaturalist.org/observations/5063013

Photos of *A marmorata* in life can be found online at:

https://www.inaturalist.org/observations/32037268

and

https://www.inaturalist.org/observations/78917605

and

https://www.inaturalist.org/observations/85170250

**Distribution:** *A. maxinehoserae sp. nov.* is known only from Baja North, Mexico.

**Conservation:** Wild populations of this genus have been impacted by a shell disease (Haman *et al*. 2019) in addition to other human caused pressures. Leidy *et al*. (2016) also documented a summer die off of a species in this genus in a California watercourse.

**Etymology:** *A. maxinehoserae sp. nov.* is named in honour of Maxine Hoser or Margate, United Kingdom (including England, Scotland, Wales, Northern Ireland, Gibralta and other British colonies) in recognition of her services to herpetology in the 1960's.

***HEOSEMYS TURNERI SP. NOV.***

**LSIDurn:lsid:zoobank.org:act:8F8A833E-1108-4616-B482-6C2D2C11B993**

**Holotype:** A preserved specimen at the Field Museum of Natural History, Chicago, Illinois, USA, specimen number FMNH Amphibians and Reptiles 251487 collected from Sipitang District, Sabah, Borneo, Malaysia. This facility allows access to its holdings.

**Paratypes:** 1/ A preserved specimen at the Field

Museum of Natural History, Chicago, Illinois, USA, specimen number FMNH Amphibians and Reptiles 246378 collected from Lahad Datu District, Sabah, Borneo, Malaysia. 2/ A preserved female (dry) specimen at the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA, specimen number MCZ Herp R-182834 collected from Kuching, Sarawak, Borneo, Malaysia.

**Diagnosis:** The genus *Heosemys* Stejneger, 1902 is herein treated as including only the species

*H. spinosa* (Bell in Gray, 1830) and *H. turneri sp. nov.*, until now treated as the eastern (Borneo) population of the same species.

Molecular evidence of Spinks *et al.* (2012) confirmed that a population of putative *H. spinosa* from Tawi Tawi Island, Philippines and others from unknown locations are of a different species-level taxon to other putative *H. spinosa.* They failed however to identify where other specimens came from.

An inspection of live and preserved specimens from across the known range and distribution of the putative species, quickly identified two allopatric taxa.

The type form of *H. spinosa* with a type locality of Penang in Peninsula Malaysia, includes yellow-eyed tortoises from peninsula Malaysia and Sumatra, while the bluish-grey eyed form from Borneo and the Phillipines is of the previously unnamed taxon, herein formally named *H. turneri sp. nov.*.

*H. turneri sp. nov.* is readily separated from *H. spinosa* by having bluish-grey iris (rarely reddish), versus a yellow to yellow-white iris in *H. spinosa.*
*H. turneri sp. nov.* is further separated from *H. spinosa* by having expanded anals and correspondingly reduced femorals on the plastron, the result being the that the midline suture of the anals is as long or slightly longer than that of the femorals, versus much longer for the femorals in *H. spinosa.*

Adult *H. turneri sp. nov.* have a maximum carapace length of 220 mm, versus 250 mm in *H. spinosa*, making it a significantly smaller species.

Inspection of preserved specimens at the Philippines National Museum, specimen numbers PNM 2233 (adult male) and PNM 2232 (female), from Mindanao as well as the specimen at the Zoological Museum, Natural History Museum of Denmark, specimen number ZMUC-R25236 from Tawi Tawi Island, off the north-east coast of Borneo in the Philippines appear to conform to *H. turneri sp. nov.* on the basis of size of sexually mature adults and plastron configuration and so are tentatively also referred to this species. Das (1996) provides photos and detailed measurements of the Philippines specimens.

The two (above-mentioned) species in the genus *Heosemys* are separated from the morphologically similar species in the genus *Hieremys* Smith, 1916 (previously synonymised with *Heosemys*) by having the anterior margin of the shell serrated; second vertebral shield is at least as broad as the second costal and much broader than long, versus anterior margin of the shell not serrated; second vertebral shield narrower than the second costal and not much broader than long in the genus *Hieremys*.

The name *Hieremys* Smith, 1916, type species being *Hieremys annandalii* (= *Cyclemys annandalii* Boulenger, 1903), by original monotypy is available for those species, which according to Pereira *et al.* (2017) diverged from *Emys spinosa* more than 20 MYA.

*Hieremys* Smith, 1916 includes *H. annandalii* (Boulenger, 1903) and the other two taxa recently placed in *Heosemys*, being *Geoemyda depressa* Anderson, 1875 and *Geoemyda grandis* Gray, 1860.

Both genera *Heosemys* and *Hieremys* are separated from all other morphologically similar species and genera by the following suite of characters: Neural plates mostly hexagonal, short-sided behind. Plastron extensively united to the carapace by suture, with axillary and inguinal peduncles just reaching the first and fifth costals; entoplastron intersected by the humero-pectoral suture. Skull without bony temporal arch: alveolar surfaces narrow, without median ridge. Upper surface of head covered with undivided skin. Digits with a short web. Tail very short, not longer in the young than in the adult.

*H. spinosa* and *H. turneri sp. nov.* are both separated from other similar species by the following suite of characters: Carapace of adult much depressed, with broad flat vertebral region and an uninterrupted obtuse keel; anterior and posterior margin serrated; of young more regularly arched, with a short keel or spinose tubercle on each costal shield and the border strougly serrated all round, each marginal being produced in a spine, with or without smaller denticulation on each side; the vertebral keel stronger than in the adult. Vertebral shields (2-4) much broader than long, at least as broad as the costals; nuchal shield longer than broad. Plastron large; the width of the bridge about equal to the length of the posterior lobe, which is angularly emarginate; in respect of size, the plastral shields take the following order, commencing with the largest: abdominals, pectorals, femorals, humerals, anals, gulars; the suture between the abdominals not longer than or only slightly longer than that between the pectorals; axillary and inguinal shields present. Upper jaw bicuspid. Carapace brown above, reddish in the young and young adults, the vertebral keel lighter, sometimes yellow, white, or light orange and often well defined; each plastral shield often with yellow and dark brown radiating streaks; soft parts greyish, dark brown, or blackish. There is often a yellowish, yellowish or reddish spot on each side of the neck, near the ear. Other markings on the head are usually faded or indistinct, but generally more prominent and larger in *H. spinosa* than in *H. turneri sp. nov.* (adapted and modified from Boulenger 1889).

Photos of *H. turneri sp. nov.* in life are depicted online at:
https://www.inaturalist.org/observations/35481391
and
https://www.inaturalist.org/observations/59450068
and
https://www.inaturalist.org/observations/38528997
and

https://www.inaturalist.org/observations/65691620

Photos of the type form of *H. spinosa* in life from Peninsula Malaysia are depicted online at:

https://www.inaturalist.org/observations/17986033

and

https://www.inaturalist.org/observations/35161014

and

https://www.inaturalist.org/observations/64931736

Photos of specimens herein assigned to *H. spinosa* in life from Sumatra are depicted online at:

https://www.inaturalist.org/observations/349133

and

https://www.inaturalist.org/observations/65400091

and

https://www.inaturalist.org/observations/4956092

**Distribution:** *H. turneri sp. nov.* is restricted to Borneo (both north and south parts) as well as nearby offshore islands including Tawi Tawi (Philippines), with records from Mindanao, Philippines also attributed to this taxon. *H. spinosa* appears to be confined to Peninsula Malaysia, (including Singapore), far south Burma and Thailand as well as Sumatra.

**Etymology:** *H. turneri sp. nov.* is named in honour of Dr. Grant Turner of Innisfail, near Cairns, north Queensland, Australia, formerly of Bundoora, Victoria, Australia in recognition of a lifetime dedicated to herpetology including a number of significant peer reviewed scientific papers on Australian snakes.

***HIEREMYS GRANDIS MALAYENSIS SUBSP. NOV.***

**LSIDurn:lsid:zoobank.org:act:CCABC1C3-A626-4690-8144-F8B68C75E285**

**Holotype:** A preserved male specimen (in alcohol) at the Field Museum of Natural History, Chicago, Illinois, USA, specimen number FMNH Amphibians and Reptiles 224043 collected from Perak, (Peninsula) Malaysia. This facility allows access to its holdings.

**Paratypes:** Six preserved specimens at the Field Museum of Natural History, Chicago, Illinois, USA, all collected from Perak, (Peninsula) Malaysia, specimen numbers FMNH Amphibians and Reptiles 224041 and 224042, both females in alcohol, 224037, 224038, 224039, 224040, all dried or skeletal parts.

**Diagnosis:** *Hieremys grandis* (Gray, 1860), originally described as *Geoemyda grandis* Gray, 1860 has a type locality of Cambodia and that form of the putative species occurs in zone generally near the coast running from Vietnam, Cambodia, Laos, Thailand and into Peninsula Malaysia. The population from the west flowing watercourses on Peninsula Malaysia in the states of Perak and Kedah are morphologically divergent from the others further north, appear to be allopatric in distribution, with an apparent break on the Isthtumus of Kra and are therefore formally named as a new subspecies, *H. grandis malayensis subsp. nov.*.

*H. grandis malayensis subsp. nov.* is separated from *H. grandis grandis* by having an orange-brown to dark brown coloured iris, versus yellow, bluish-yellow or yellowish with an orange tinge in *H. grandis grandis.*

Adult *H. grandis malayensis subsp. nov.* have weak and indistinct salmon coloured markings on the top of the head, less so on the sides of the head, all overlain with a whitish-grey sheen, with similarly subdued markings on the lower jaw and neck.

By contrast *H. grandis grandis* have strong contrasting orange markings in the form of reticulations or areas of orange interspersed with brown and likewise on the lower jaw and neck.

*H. grandis* (both subspecies) is separated from other species in the genus *Hieremys* Smith, 1916 by having the carapace arched or raised in the centre in a transverse section, versus the carapace being much depressed and flattened in the vertebral region.

*H. grandis* is further defined as follows:
Carapace has a strong but obtuse vertebral keel; only the posterior margin serrated. Vertebral shields (1-3) not or but slightly broader than long and narrower than the costals; nuchal longer than broad. On the plastron, the length of the suture between the pectoral shields is at least two thirds that of the abdominals. Carapace is dark brown, dark grey or blackish above; plastron and lower surface of marginals with black and yellow rays, either the black or the yellow predominating.

Species in the genus *Hieremys* Smith, 1916 (previously synonymised with *Heosemys* Stejneger, 1902) are separated from the morphologically similar species in the genus *Heosemys* by having the anterior margin of the shell not serrated; second vertebral shield narrower than the second costal and not much broader than long versus having the anterior margin of the shell serrated; second vertebral shield is at least as broad as the second costal and much broader than long in *Heosemys.*

The name *Hieremys* Smith, 1916, type species being *Hieremys annandalii* (= *Cyclemys annandalii* Boulenger, 1903), by original monotypy is available for those species, which according to Pereira *et al.* (2017) diverged from *Emys spinosa* (type species for *Heosemys* Stejneger, 1902) more than 20 MYA.

*Hieremys* Smith, 1916 includes *H. annandalii* (Boulenger, 1903), and the other two taxa recently placed in *Heosemys* as additional species, being *Geoemyda depressa* Anderson, 1875 and *Geoemyda grandis* Gray, 1860.

Both genera *Heosemys* and *Hieremys* are separated from all other morphologically similar species and genera by the following suite of characters: Neural plates mostly hexagonal, short-sided behind. Plastron extensively united to the carapace by suture, with axillary and inguinal peduncles just reaching the first and fifth costals; entoplastron intersected by the humero-pectoral suture. Skull without bony temporal arch; alveolar surfaces narrow, without median ridge. Upper surface of the head covered with undivided skin. Digits with a short web. Tail very short, not longer in the young than in the adult.

Photos of *H. grandis malayensis subsp. nov.* in life can be found online at:

https://www.inaturalist.org/observations/49854455

and

https://www.flickr.com/photos/zulbaning/7984269247/

Photos of the nominate subspecies of *H. grandis grandis* in life can be found online at:

https://www.inaturalist.org/observations/32330180

and

https://www.flickr.com/photos/lagart0/6129891097

**Distribution:** *H. grandis malayensis subsp. nov.* is known from Peninsula Malaysia and presumably also occurs in nearby parts of southern Burma and possibly also southern Thailand. *H. grandis* with a type locality of Cambodia, occurs in Cambodia, Vietnam, Laos, Thailand and Myanmar as far south as the Isthmus of Kra.

**Etymology:** Named in reflection of where the taxon originates, being the Malay Peninsula.

***HIEREMYS ANNANDALII MEKONGENSIS SUBSP. NOV.***

**LSIDurn:lsid:zoobank.org:act:1785131B-559F-46B5-9BBE-666A6C763B3D**

**Holotype:** A preserved specimen at the Field Museum of Natural History, Chicago, Illinois, USA, specimen number FMNH Amphibians and Reptiles 259074 collected from the An Minh district, Kien Giang District, Vietnam. This facility allows access to its holdings.

**Paratypes:** Two preserved specimens (Carapaces) at the Field Museum of Natural History, Chicago, Illinois, USA, specimen numbers FMNH Amphibians and Reptiles 263052 and 259398 collected from Siem Reap Province, Cambodia.

**Diagnosis:** *Hieremys annandalii* (Boulenger, 1903), was originally named as *Cyclemys annandalii* Boulenger, 1903 and most recently placed in the genus *Heosemys* Stejneger, 1902 (Rhodin *et al.* 2017).

The form from the Chao Phraya River basin in Thailand and including specimens on the east side of Peninsula Malaysia, being the type form (Type locality Yala Province, south Thailand), differ from specimens from the Mekong basin in Vietnam and Laos.

The unnamed form from the Mekong basin is formally identified as the new subspecies *Hieremys annandalii mekongensis subsp. nov..*

*Hieremys annandalii mekongensis subsp. nov.* is most readily separated from the nominate form by

the posession of a well defined, well demarcated, sometimes broken, yellow stripe (often with an orange tinge) running from the tip of the snout, on each side of the head, through the upper eye and onto the front of the neck, coupled with a mainly dark grey top of the head, versus mainly yellow, yellowish brown or light grey on the top of the head, especially towards the front (anteriorly) and with yellow markings behind the eye usually being ill defined or even absent in *Hieremys annandalii annandalii*, or usually only present in younger specimens.

*Hieremys annandalii* of both subspecies are separated from other species in the genera *Hieremys* Smith, 1916 and *Heosemys* Stejneger, 1902 by the following suite of characters: Some form of yellow markings on the top of the head and to the rear of the eye; the plastron is mostly black in adults and lacks obvious radiating lines; the vertebral keel is flattened; there are no bright orange speckles on the head.

The name *Hieremys* Smith, 1916, type species being *Hieremys annandalii* (= *Cyclemys annandalii* Boulenger, 1903), by original monotypy is available for those species, which according to Pereira *et al.* (2017) diverged from *Emys spinosa* (type species for *Heosemys* Stejneger, 1902) more than 20 MYA.

*Hieremys* Smith, 1916 includes *H. annandalii* (Boulenger, 1903), and the other two taxa recently placed in *Heosemys* as additional species, being *Geoemyda depressa* Anderson, 1875 and *Geoemyda grandis* Gray, 1860.

Both genera *Heosemys* and *Hieremys* are separated from all other morphologically similar species and genera by the following suite of characters: Neural plates mostly hexagonal, short-sided behind. Plastron extensively united to the carapace by suture, with axillary and inguinal peduncles just reaching the first and fifth costals; entoplastron intersected by the humero-pectoral suture. Skull without bony temporal arch; alveolar surfaces narrow, without median ridge. Upper surface of the head covered with undivided skin. Digits with a short web. Tail very short, not longer in the young than in the adult.

*Hieremys annandalii mekongensis subsp. nov.* in life is depicted in Rhodin *et al.* (2017) on page 98 at top left, or online at:

https://www.inaturalist.org/observations/63151153

*Hieremys annandalii annandalii* in life is depicted in life online at:

https://www.inaturalist.org/observations/66606947

and

https://www.inaturalist.org/observations/34113147

and

https://www.inaturalist.org/observations/74007853

**Distribution:** *Hieremys annandalii mekongensis subsp. nov.* is apparently confined to the Mekong basin of Vietnam and Laos, including the delta region. It may also occur in east flowing drainages to the north.

The nominate subspecies *H. annandalii annandalii* is found generally in the rest of Thailand, possibly nearby parts of Burma and northern Peninsula Malaysia.

**Etymology:** *Hieremys annandalii mekongensis subsp. nov.* is named in reflection of its centre of distribution.

***VIJAYACHELYS SILVATICA WHITTONI SP. NOV.***

**LSIDurn:lsid:zoobank.org:act:842E9E13-2793-4BFD-80AD-2E6A090EDE93**

**Holotype:** A preserved specimen at the Florida Museum of Natural History, University of Florida, Gainesville, Florida, USA, specimen number herpetology, UF Herp 52515, collected from Calicut Hills, Kerala, India. This facility allows access to their holdings.

**Diagnosis:** *Vijayachelys silvatica whittoni subsp. nov.* from north of the Paighat gap, Western Ghats, India is separated from *Vijayachelys silvatica silvatica*

(Henderson, 1912) from south of the Paighat gap, Western Ghats, India as follows:

Adult female *V. silvatica whittoni subsp. nov*. are separated from adult female *V. silvatica silvatica* by having whitish skin on the upper and lower surfaces of the neck, with prominent thickened blunt brown tubercles, versus fine and indistinct such tuberculation in *V. silvatica silvatica*; the beak (external upper jaw) is squarish in profile when viewed side on, versus more daggar-shaped (tending triangular) in *V. silvatica silvatica*. The iris of female *V. silvatica whittoni subsp. nov*. is brownish in colour, versus orangeish in female *V. silvatica silvatica*. There is only a little orange on the head and neck of female *Vijayachelys silvatica whittoni subsp. nov*. versus a lot in *V. silvatica silvatica*.

Adult male *V. silvatica whittoni subsp. nov*. are separated from adult male *V. silvatica silvatica* by having prominent thickened blunt tubercles, versus fine and indistinct or medium such tuberculation in *V. silvatica silvatica*.

Comparative photos of *V. silvatica whittoni subsp. nov*. and *V. silvatica silvatica* (adult females) can be seen in Deepak *et al.* (2014) in Fig. 4.

*V. silvatica whittoni subsp. nov*. in life (female) is depicted online at:

https://www.inaturalist.org/observations/54824715

*V. silvatica silvatica* in life (female) is depicted online at:

https://www.inaturalist.org/observations/27113118

Adult *V. silvatica* are separated from other morphologically similar tortosies as follows:

It is the smallest turtle species in India, with carapace length in females up to 139 mm and males up to 126 mm. They have a low carapace with three prominent keels. The keels on the carapace are prominent in all but the oldest individuals but the central one is widest and most pronounced. The carapace color in females varies from cinnamon to tawny or raw umber with a dark brown stripe along the central keel; males have a much darker carapace than females, varying from burnt umber to dusky brown. The plastron color varies from buff to buff yellow in females and straw to sulfur yellow in males (Moll *et al.* 1986). The maxillae form a distinct median upper jaw hook, the labial ridge is slightly serrated irregularly. The nuchal scute is well developed. The forelimbs are heavily armored anteriorly, with enlarged, imbricate and squarish to pentagonal-shaped scales extending on to the toes and soles of the feet. On the hind limbs enlarged scales are confined to the posterior medial surface except for the feet where they cover the entire surface. A large pointed scale is present on each heel (Henderson 1912; Smith 1931; Moll *et al.* 1986; Praschag *et al.* 2006; Deepak *et al.* 2014).

**Distribution:** *V. silvatica whittoni subsp. nov*. occurs in the Western Ghats of India, north of the Paighat gap (Kerala) as far north as the state of Karnataka. *V. silvatica silvatica* is found south of the Paighat gap in the states of Kerala and adjacent Tamil Nadu.

**Etymology:** *V. silvatica whittoni subsp. nov*. is named in honour of Evan Whitton of Sydney, New South Wales, Australia. Born on 5 March 1928 at Muswellbrook, New South Wales, Australia and died on 16 July 2018. He is recognized for his significant contributions to the exposure of organised crime in Australia, with particular reference to the legal system and a corrupt judiciary including through his many definitive best-selling books.

***CHITRA INDICA INDUSENSIS SUBSP. NOV.***

**LSIDurn:lsid:zoobank.org:act:AC82794C-CB0D-426B-B755-8E521A11C0E9**

**Holotype:** A preserved specimen at the California Academy of Sciences, San Francisco, California, USA, specimen number CAS HERP 120754, collected from the Indus River, 5 miles north of Sukkur, Sindh Province, Pakistan, Latitude 27.7777 N., Longitude 68.8573 E. This facility allows access to their holdings.

**Paratypes:** 1/ A preserved specimen at the California Academy of Sciences, San Francisco, California, USA, specimen number CAS HERP 120755, collected from the Indus River, 5 miles north of Sukkur, Sindh Province, Pakistan, Latitude 27.7777 N., Longitude 68.8573 E. 2/ A preserved juvenile specimen at the California Academy of Sciences, San Francisco, California, USA, specimen number CAS HERP 120753, collected from the Indus River, at Tappu (Alauifkacha), Pakistan.

**Diagnosis:** *Chitra indica indusensis subsp. nov.* of the Indus river system is similar in most respects to *C. indica indica* (Gray, 1830) of the Ganges river system, which is why until now, no one has thought to separate the taxa. However studies on Cetaceans in the two river systems indicate a most recent mix of riverine species between the two systems to have been about 550K years ago, warranting subspecies level distinction between the populations.

Braulik *et al.* (2021), is one of a number of recently published papers which have found that riverine species from the Ganges and Indus systems last apparently mixed about 550K years ago.

*C. indica indusensis subsp. nov.* like *C. indica indica* has significant changes in morphology and colour with age, making differentiation between the two subspecies problematic.

However *C. indica indusensis subsp. nov.* is best separated from *C. indica indica* by a generally brownish hue to the colour in larger specimens, versus more yellowish in *C. indica indica*, as well as significantly less prominent head and face markings in specimens of similar age.

The neck markings of *C. indica indusensis subsp. nov.* are also more curved than those of *C. indica indica.*

**Distribution:** *Chitra indica indusensis subsp. nov.* appears to be restricted to the Indus river system, within Pakistan and India, where it inhabits muddy and sand bottomed areas.

**Etymology:** The taxon is named in reflection of the river system it is known to occur.

***PARAGEOEMYDA SUBGEN. NOV.***

**LSIDURN:LSID:ZOOBANK.ORG:ACT:D2A5208C-B984-4080-9AA9-917964D77738**

**Type species:** *Geoemyda japonica* Fan, 1931.

**Diagnosis:** *Parageoemyda subgen. nov*. are separated from other species within the genus *Geoemyda* Gray,

1834 by the following unique suite of characters: Neurals reaching the first suprapygal; posterior neurals with short sides posterolaterally; carapace tricarinate, with median keel stronger and wider than lateral keels; forelobe of plastron emarginate anteriorly; strong serrations in anterolateral and posterolateral margins of carapace; entoplastron intersected by gulohumeral; small concavity at the anterior corner of posterior vertebrals and laterally rounded forelobe of the plastron.

Specimens in the nominate subgenus *Geoemyda* Gray, 1834 are further separated by having a yellow iris, with slight bluish tinge and also a darkening on the lateral edges (especially posterior) to the pupil, which is either absent or indistinct in *Parageoemyda subgen. nov.*.

*Geoemyda* Gray, 1834 species (both subgenera), are separated from morphologically similar genera and species by the following unique character combination: Serration in the anterolateral margin of the carapace and the presence of a distinct and a wide medial keel on the carapace.

**Distribution:** Ryukyu Archipelago, Japan (see Takahashi *et al.* (2007) for details).

**Etymology:** Formally named *Parageoemyda subgen. nov.* as these animals are not quite *Geoemyda* Gray, 1834.

**Content:** *G.* (*Parageoemyda*) *japonica* (Fan, 1931) (type species); *G.* (*Parageoemyda*) *amamiensis* (Takahashi, Kata and Ota, 2007) (believed to be extinct).

***GEOEMYDA DARANINI SP. NOV.***

**LSIDurn:lsid:zoobank.org:act:25BBBB4D-FEAC-4B78-94B8-DDD5DBF16C0E**

**Holotype:** A preserved female specimen at the Museum of Vertebrate Zoology, University of California, Berkeley, California, USA, specimen number MVZ:Herp:208234, collected from Vietnam, probably North Vietnam. This facility allows access to their holdings.

**Diagnosis:** *Geoemyda daranini sp. nov.* from Vietnam has until now been treated as a southern population of *Geoemyda spengleri* (Gmelin, 1879), a species in fact from southern China. Adult *G. daranini sp. nov.* are separated from *G. spengleri* by having a generally dark brownish grey carapace, versus one that is generally light yellowish-brown in *G. spengleri.* The spines on the forelimbs of *G. daranini sp. nov.* are large and entirely yellow, sometimes tipped with red or orange, versus smaller and not entirely yellow in *G. spengleri.*

The original descriptions of *G. spengleri* clearly refer to Chinese specimens, however the problem is that there are two similar forms in China, one being from Guangdong, Hong Kong and Macau and another from Guangxi and Hainan Island and it is unclear as to which form the type description fits.

The form from Guangdong, Hong Kong and Macau has a slightly reddish iris, which the other form does not. They are sufficiently divergent to warrant taxonomic separation at either subspecies or species level.

*Geoemyda daranini sp. nov.* and *G. spengleri* (both Chinese forms) are separated from all other similar species by the following suite of characters: Carapace much depressed, strongly tricarinate; anterior border serrated, posterior border expanded and very strongly serrated, each marginal being acutely pointed. Vertebral shields broader than long, about as broad as the costals; nuchal moderate, trapezoid, broadest and emarginate posteriorly. Plastron large; the width of the bridge about equals the length of the posterior lobe, which is broadly notched; front lobe openly emarginate anteriorly. As regards size, the plastral shields take the following order, commencing with the largest: abdominals, femorals, pectorals, humerals, anals, gulars; no axillary or inguinal shields. Beak is strongly hooked in males, not notched; the width of the mandible at the symphysis is less than the diameter of the orbit. Tail in males is a little longer than the head. Dorsally the general colour is yellowish brown (Chinese species) to darker brown and greyish black (the Vietnamese species), often speckled with brown and with invariably with traces of black lines following the dorsal keels; plastron blackish brown, with a yellowish band on each side, which separates the blackish colour of the bridge from that of the rest of the plastron.

**Distribution:** Known only from the northern half of Vietnam and nearby Laos. The species is most common in hilly forested areas and appears to be confined to such areas.

**Etymology:** Named in honour of Dara Nin, of Ringwood, Victoria, Australia, who spent many years working as a part of the team at Snakebusters, Australia's best Reptiles, wildlife education and displays, in Melbourne, Victoria, Australia.

***FREUDCHELYS GEN. NOV.***

**LSIDurn:lsid:zoobank.org:act:FE78F33A-29D4-415B-A5FA-5A86418F83D5**

**Type species:** *Freudchelys freudi sp. nov.* (this paper).

**Diagnosis:** Until now, the species within *Freudchelys gen. nov.* have been treated as being within the genus *Manouria* Gray 1854, with the type species: *Manouria fusca* Gray, 1854 being a subjective synonym of *Testudo emys* Schlegel and Müller, 1840 by original monotypy.

*Freudchelys gen. nov.* are separated from *Manouria* Gray 1854 by the following suite of characters: A smaller adult size with a carapace not exceeding 31 cm in maximum length; the carapace is evidently somewhat flattened in shape, not seen in *Manouria* and also with characteristically very concave carapace scutes; there are strongly serrated marginal scutes and contiguous pectoral plates which always meet at the midline. There is also a single, large conical spur on each thigh, in contrast to the cluster of such spurs in *Manouria*.

In contrast to most contemporary authors, I regard *Manouria emys* (Schlegel and Müller 1840) as a complex of two species, meaning that the genus *Manouria* as recognized herein is not monotypic.

The two genera, *Freudchelys gen. nov.* and *Manouria* Gray 1854 are believed to have diverged more than 20 MYA, which along with their morphological divergence is good reason to divide the relevant taxa into two separate genera.

Both genera are characterised by having paired

supracaudal scutes, a posteriorly expanded nuchal scute and utilization of mesic, rather than xeric, habitats.

**Distribution:** Cambodia, China (Yunnan), Laos, Malaysia (Peninsular), Myanmar, Thailand and Vietnam.

**Etymology:** Named in honour of a Dachshund cross Dobermann named Freud, that was a family pet when I was aged 7-16 years of age, who became an expert at locating snakes and lizards as detailed in Hoser (1989), for services to herpetology. He travelled with me across Australia many times and located numerous valuable specimens.

**Content:** *Freudchelys freudi sp. nov*. (type species); *F. impressa* (Günther, 1882); *F. latinuchalis* (Vaillant, 1894); *F. pseudemys* (Boulenger, 1903).

***FREUDCHELYS FREUDI SP. NOV.***

**LSIDurn:lsid:zoobank.org:act:6B3D6F46-4D0D-48A4-8328-E7F275916648**

**Holotype:** A preserved specimen (carapace and plastron (dry) only) at the Museum of Comparative Zoology at Harvard University, Cambridge, Massachusetts, USA, specimen number MCZ Herp R-43051, collected from Mount Angka (now called Doi Inthanon), Thailand, Latitude 18.3515 N., Longitude 98.2912 E. This facility allows access to its holdings.

**Diagnosis:** *Freudchelys freudi sp. nov*. is readily separated from all other species in the genus *Freudchelys gen. nov.* by the following suite of characters: An absence of pink on the snout and other parts of the head (this being most prominent in *F. pseudemys*); yellow iris (versus with a blue tinge in *F. impressa* and *F. latinuchalis*); lumpy scales on the upper forelimbs are of moderate size, versus large on the other species in the genus.

Until now, the species within *Freudchelys gen. nov.* have been treated as being within the genus *Manouria* Gray 1854, with the type species: *Manouria fusca* Gray, 1854 being a subjective synonym of *Testudo emys* Schlegel and Müller, 1840 by original monotypy.

*Freudchelys gen. nov.* are separated from *Manouria* Gray 1854 by the following suite of characters: A smaller adult size with a carapace not exceeding 31 cm in maximum length; the carapace is evidently somewhat flattened in shape, not seen in *Manouria* and also with characteristically very concave carapace scutes; there are strongly serrated marginal scutes and contiguous pectoral plates which always meet at the midline. There is also a single, large conical spur on each thigh, in contrast to the cluster of such spurs in *Manouria*.

In contrast to most contemporary authors, I regard *Manouria emys* (Schlegel and Müller 1840) as a complex of two species, meaning that the genus *Manouria* as recognized herein is not monotypic.

The two genera, *Freudchelys gen. nov.* and *Manouria* Gray 1854 are believed to have diverged more than 20 MYA, which along with their morphological divergence is good reason to divide the relevant taxa into two separate genera.

Both genera are characterised by having paired supracaudal scutes, a posteriorly expanded nuchal scute and utilization of mesic, rather than xeric, habitats.

**Distribution:** *Freudchelys freudi sp. nov*. appears to be confined to the Shan Hills region of northern Thailand and adjacent eastern Myanmar.

**Etymology:** As for the genus. Named in honour of a Dachshund cross Dobermann named Freud, that was a family pet when I was aged 7-16 years of age (1960's-1970's), who became an expert at locating snakes and lizards as detailed in Hoser (1989), for services to herpetology. He travelled with me across Australia many times and located numerous valuable specimens.

***CHELONOIDIS HOSERAE SP. NOV.***

**LSIDurn:lsid:zoobank.org:act:CB7B4C43-8EDB-4431-9931-4E532A2E038B**

**Holotype:** A preserved specimen at The Field Museum of Natural History, Chicago, Illinois, USA, specimen number FMNH Amphibians and Reptiles 9499, collected from Paraguay. This facility allows access to its holdings.

**Paratypes:** 1/ A preserved specimen at The Field Museum of Natural History, Chicago, Illinois, USA, specimen number FMNH Amphibians and Reptiles 9500, collected from Paraguay.

2/ A preserved specimen (shell only), at the Museum of Zoology, Dresden, Germany specimen number MTD D 43485, collected from Filadelfia, Chaco, Paraguay.

**Diagnosis:** Until now, *Chelonoidis hoserae sp. nov.* has been treated as a southern population of *Chelonoidis carbonaria* (Spix, 1824), from Paraguay, eastern Bolivia and the immediately adjoining parts of south-west Brazil. Adults of this species are readily separated from *C. carbonaria*, including the newly described species C. *woolfi sp. nov.* and C. *fiacummingae sp. nov.*(previously regarded as north-western south American populations of *C. carbonaria*) by having a carapace that is blackish in colour, versus greyish brown or yellowish-brown and with distinctive large light yellow spots in the centre of each dorsal scute (excluding those on the lower margins), as well as a well-defined narrowing or waist in the middle of the carapace, not seen to the same extent in the other species.

There are no obvious yellow spots or large squares on the lower margins of each scute on the carapace as seen in *C. woolfi sp. nov.*.

*Chelonoidis hoserae sp. nov.* also has a very different plastral pattern as compared with all other species in the complex, in *C. hoserae sp. nov.* being mostly dark in a symmetrical mottled pattern.

*C. hoserae sp. nov.* is also unique in that it has an enlarged scale or 'spur' on the inside of the fore limb elbow.

Carapace size of *C. hoserae sp. nov.* is 35-40 cm, versus the usual 30-35 cm in *C. carbonaria.*

The species *Chelonoidis carbonaria*, type from Pará, Brazil, herein confined to the northern half of Brazil and most of the Atlantic Coast of South America (being the form that matches the holotype), is distinguished by having a greyish to yellowish-brown carapace, which has semi-distinct lightening at the centre of each scute, with blackening at the edges, but not the distinctive blackish coloured carapace seen in *C. hoserae sp. nov.*.

While mature specimens may have narrowing of the waist of the carapace, this is not heavily pronounced as seen in *C. hoserae sp. nov.*.

For *C. carbonaria*, head and limb colours are generally light orangeish to red, while plastrons are mostly pale yellow.

The species *C. woolfi sp. nov.* from the eastern and southern parts of Colombia as well as Ecuador and Peru, is a blackish-shelled species, with large squarish yellow shapes in the centre of each of the dorsal scutes and yellow spots or large squares also prominent on the lower margins of each scute on the carapace. Most specimens of *C. woolfi sp. nov.* are further characterised by having extremely exaggerated scute rings on each of the dorsal scutes, which while obvious in specimens of *C. carbonaria* and *C. hoserae sp. nov*. are generally less pronounced in specimens of those species.

In this species limb colors generally are a pale yellow with a pink, orange or red tinge, with their heads and limbs are often slightly different colours.

The average size of *C. woolfi sp. nov.* is slightly smaller than the usual 30-35 cm seen in *C. carbonaria*.

The crown of *C. hoserae sp. nov*. is mainly black, versus mainly yellow in *C. woolfi sp. nov.* and *C. fiacummingae sp. nov.*.

The species *C. fiacummingae sp. nov*. from Panama and immediately adjacent parts of far north Colombia is separated from *C. carbonaria*, *C. hoserae sp. nov*. and *C. woolfi sp. nov.* by the following unique suite of characters: A carapace base colour that is grey, dark brown, or coffee rather than black. Their pale plastrons have central dark areas resembling an exclamation point. Their heads and limbs are generally pale yellow to orange. The average size is slightly smaller than usual 30-35 cm seen in *C. carbonaria*. Furthermore their head is mainly yellow both above and on the sides of the face; usually having expanded areas of yellow or whitish-yellow in the centre of the dorsal scutes (excluding those on the lower margins), making the light areas occupy at least half of each scute (versus less than this in the other species); no obvious areas of yellow at the outer edges of the lower margin scutes of the carapace, which is generally grey, dark brown, or coffee in colour and a dark orangeish iris.

Like *C. woolfi sp. nov.*, the species *C. fiacummingae sp. nov*. is further characterised by having extremely exaggerated scute rings in adults.

The four species *C. carbonaria*, *C. hoserae sp. nov.*, *C. fiacummingae sp. nov.* and *C. woolfi sp. nov.* all until now treated as *C. carbonaria*, are separated from their nearest relative *C. denticulatus*, herein placed in a new subgenus *Parachelonoidis subgen. nov.* by the following unique suite of characters: General colour of the skin is dark olive, approaching black in parts, (versus light olive in *C. denticulatus*); main part of scales on legs a deep orangeish red in colour (versus yellow in *C. denticulatus*); tail of both sexes is moderately long (versus relatively short in *C. denticulatus*); posterior sternal notch is lunate, very broad and shallow, the depth being less than one fifth of the breadth (versus posterior sternal notch being triangular, nearly half as deep as it is broad in *C. denticulatus*).

The subgenera *Pampatestudo* Lindholm, 1929 with the type species: *Testudo* (*Pampatestudo*) *chilensis* (= *Testudo* (Gopher) *chilensis* Gray, 1870), by original monotypy and *Darwintestudo* Antenbrink-Vetter and Vetter, 1998 with the type species *Darwintestudo hoodensis* (= *Testudo hoodensis* Van Denburgh, 1907), by original designation, are recognized for the relevant species groups, due to divergences in the range of about 13 MYA for the relevant species groups from the *Chelonoidis carbonaria* clade, being type species for the genus *Chelonoidis* Fitzinger, 1835.

Remaining in the subgenus *Chelonoidis* Fitzinger, 1835 is the species complex associated with *C. carbonaria*, including *C. carbonaria*, *C. hoserae sp. nov.*, *C. fiacummingae sp. nov.* and *C. woolfi sp. nov.*.

*Chelonoidis denticulatus* is regarded herein as a single species, being the entirety of the subgenus *Parachelonoidis subgen. nov.*, but it can be split into subspecies, for which names are available (Rhodin *et al.* 2017).

Both subgenera *Chelonoidis* and *Parachelonoidis subgen. nov.* are separated from the other subgenera within *Chelonoidis* by the following suite of characters: Carapace elongate, margin not at all reverted, dark brown or black in colour, each dorsal shield yellowish in the centre to at least some extent; nuchal shield absent; gular shields distinct.

An image of *C. hoserae sp. nov*. in life can be found online at:
https://www.inaturalist.org/observations/72283198

An image of *C. woolfi sp. nov*. in life can be found online at:

https://www.inaturalist.org/observations/70965042

An image of *C. fiacummingae sp. nov*. in life can be found online at:

https://www.inaturalist.org/observations/72103470

**Distribution:** *C. hoserae sp. nov*. is found in Paraguay, immediately adjacent Argentina, eastern Bolivia and the immediately adjoining parts of south-west Brazil.

**Etymology:** Named in honour of my long suffering wife, Shireen Hoser, of Park Orchards, Victoria, Australia in recognition for her services to herpetology and wildlife conservation over more than a quarter of a century.

***CHELONOIDIS WOOLFI SP. NOV.***

**LSIDurn:lsid:zoobank.org:act:7176B4E9-960F-4483-9E4A-D9D96EC36A40**

**Holotype:** A preserved specimen at The Field Museum of Natural History, Chicago, Illinois, USA, specimen number FMNH Amphibians and Reptiles 61672, collected from Putumayo, Colombia. This facility allows access to its holdings.

**Diagnosis:** Until now, *C. woolfi sp. nov.* has been treated as a population of the well-known South American species *Chelonoidis carbonaria* (Spix, 1824). *C. woolfi sp. nov.* occurs in the eastern and southern parts of Colombia as well as Ecuador and Peru.

The species *C. hoserae sp. nov.* has been treated as a

southern population of *C. carbonaria* from Paraguay, eastern Bolivia and the immediately adjoining parts of south-west Brazil. Adults of this species are readily separated from *C. carbonaria*, including the newly described species C. *woolfi sp. nov.* and C. *fiacummingae sp. nov.*(previously regarded as north-western south American populations of *C. carbonaria*) by having a carapace that is blackish in colour, versus greyish brown or yellowish-brown and with distinctive large light yellow spots in the centre of each dorsal scute (excluding those on the lower margins), as well as a well-defined narrowing or waist in the middle of the carapace, not seen to the same extent in the other species.

There are no obvious yellow spots or large squares on the lower margins of each scute on the carapace as seen in *C. woolfi sp. nov.*.

*Chelonoidis hoserae sp. nov.* also has a very different plastral pattern as compared with all other species in the complex, in *C. hoserae sp. nov.* being mostly dark in a symmetrical mottled pattern.

*C. hoserae sp. nov.* is also unique in that it has an enlarged scale or 'spur' on the inside of the fore limb elbow.

Carapace size of *C. hoserae sp. nov.* is 35-40 cm, versus the usual 30-35 cm in *C. carbonaria.*

The species *Chelonoidis carbonaria*, herein confined to the northern half of Brazil and most of the Atlantic Coast of South America (being the form that matches the holotype), is distinguished by having a greyish to yellowish-brown carapace, which has semi-distinct lightening at the centre of each scute, with blackening at the edges, but not the distinctive blackish coloured carapace seen in *C. hoserae sp. nov.*.

While mature specimens may have narrowing of the waist of the carapace, this is not heavily pronounced as seen in *C. hoserae sp. nov.*.

For *C. carbonaria*, head and limb colours are generally light orangeish to red, while plastrons are mostly pale yellow.

The species *C. woolfi sp. nov.* from the eastern and southern parts of Colombia as well as Ecuador and Peru, is a blackish-shelled species, with large squarish yellow shapes in the centre of each of the dorsal scutes and yellow spots or large squares also prominent on the lower margins of each scute on the carapace. Most specimens of *C. woolfi sp. nov.* are further characterised by having extremely exaggerated scute rings on each of the dorsal scutes, which while obvious in specimens of *C. carbonaria* and *C. hoserae sp. nov.* are generally less pronounced in specimens of those species.

In this species limb colors generally are a pale yellow with a pink, orange or red tinge, and their heads and limbs are often slightly different colours.

The average size of *C. woolfi sp. nov.* is slightly smaller than the usual 30-35 cm seen in *C. carbonaria*.

The crown of *C. hoserae sp. nov.* is mainly black, versus mainly yellow in *C. woolfi sp. nov.* and *C. fiacummingae sp. nov.*.

The species *C. fiacummingae sp. nov.* from Panama and immediately adjacent parts of far north Colombia is separated from *C. carbonaria*, *C. hoserae sp. nov.* and *C. woolfi sp. nov.* by the following unique suite of characters: A carapace base colour that is grey, dark brown, or coffee rather than black. Their pale plastrons have central dark areas resembling an exclamation point. Their heads and limbs are generally pale yellow to orange. The average size is slightly smaller than usual 30-35 cm seen in *C. carbonaria*. Furthermore their head is mainly yellow both above and on the sides of the face; usually having expanded areas of yellow or whitish-yellow in the centre of the dorsal scutes (excluding those on the lower margins), making the light areas occupy at least half of each scute (versus less than this in the other species); no obvious areas of yellow at the outer edges of the lower margin scutes of the carapace, which is generally grey, dark brown, or coffee in colour and with a dark orangeish iris.

Like *C. woolfi sp. nov.*, the species *C. fiacummingae sp. nov.* is further characterised by having extremely exaggerated scute rings in adults.

The four species *C. carbonaria*, *C. hoserae sp. nov.*, *C. fiacummingae sp. nov.* and *C. woolfi sp. nov.* all until now treated as *C. carbonaria*, are separated from their nearest relative *C. denticulatus*, herein placed in a new subgenus *Parachelonoidis subgen. nov.* by the following unique suite of characters: General colour of the skin is dark olive, approaching black in parts, (versus light olive in *C. denticulatus*); main part of scales on legs a deep orangeish red in colour (versus yellow in *C. denticulatus*); tail of both sexes is moderately long (versus relatively short in *C. denticulatus*); posterior sternal notch is lunate, very broad and shallow, the depth being less than one fifth of the breadth (versus posterior sternal notch being triangular, nearly half as deep as it is broad in *C. denticulatus*).

The subgenera *Pampatestudo* Lindholm, 1929 with the type species: *Testudo* (*Pampatestudo*) *chilensis* (= *Testudo* (Gopher) *chilensis* Gray, 1870), by original monotypy and *Darwintestudo* Antenbrink-Vetter and Vetter, 1998 with the type species *Darwintestudo hoodensis* (= *Testudo hoodensis* Van Denburgh, 1907), by original designation, are recognized for the relevant species groups, due to divergences in the range of about 13 MYA for the relevant species groups from the *Chelonoidis carbonaria* clade, being type species for the genus *Chelonoidis* Fitzinger, 1835.

Remaining in the subgenus *Chelonoidis* Fitzinger, 1835 is the species complex associated with *C. carbonaria*, including *C. carbonaria*, *C. hoserae sp. nov.*, *C. fiacummingae sp. nov.* and *C. woolfi sp. nov.*.

*Chelonoidis denticulatus* is regarded herein as a single species, being the entirety of the subgenus *Parachelonoidis subgen. nov.*, but it can be split into subspecies, for which names are available (Rhodin *et al.* 2017).

Both subgenera *Chelonoidis* and *Parachelonoidis subgen. nov.* are separated from the other subgenera within *Chelonoidis* by the following suite of characters: Carapace elongate, margin not at all reverted, dark brown or black in colour, each dorsal shield yellowish in

the centre to at least some extent; nuchal shield absent; gular shields distinct.

An image of *C. hoserae sp. nov*. in life can be found online at:
https://www.inaturalist.org/observations/72283198

An image of *C. woolfi sp. nov*. in life can be found online at:

https://www.inaturalist.org/observations/70965042

An image of *C. fiacummingae sp. nov*. in life can be found online at:

https://www.inaturalist.org/observations/72103470

**Distribution:** *C. woolfi sp. nov.* occurs in the eastern and southern parts of Colombia as well as Ecuador and Peru.

**Etymology:** Named in honour of Paul Woolf of Walloon, Brisbane, Queensland, Australia, foundation president of the Herpetological Society of Queensland Incorporated, in recognition of his many valuable contributions to herpetology in Australia over more than 3 decades.

***CHELONOIDIS FIACUMMINGAE SP. NOV.***

**LSIDurn:lsid:zoobank.org:act:D2E2D0A4-93F5-41B7-BBFF-A4433826169C**

**Holotype:** A preserved specimen at the Natural History Museum of Utah (UMNH), Salt Lake City, Utah, USA, specimen number UMNH:Herp:3865 collected at Yape, Darien, Panama. This facility allows access to its holdings.

**Paratypes:** 1/ A preserved specimen (Carapace only) at the Natural History Museum of Utah (UMNH), Salt Lake City, Utah, USA, specimen number UMNH:Herp: 9974 collected at Darien, Panama. 2/ A preserved specimen (Carapace only) at the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA, specimen number MCZ:Herp:R-67120 collected at Darien, Panama.

**Diagnosis:** Until now, *C. fiacummingae sp. nov.* has been treated as a population of the well-known South American species *Chelonoidis carbonaria* (Spix, 1824). *C. fiacummingae sp. nov.* occurs in Panama and immediately adjacent parts of far north Colombia.

The species *C. hoserae sp. nov.* has been treated as a southern population of *C. carbonaria* from Paraguay, eastern Bolivia and the immediately adjoining parts of south-west Brazil. Adults of this species are readily separated from *C. carbonaria*, including the newly described species C. *woolfi sp. nov.* and C. *fiacummingae sp. nov.*(previously regarded as north-western south American populations of *C. carbonaria*) by having a carapace that is blackish in colour, versus greyish brown or yellowish-brown and with distinctive large light yellow spots in the centre of each dorsal scute (excluding those on the lower margins), as well as a well-defined narrowing or waist in the middle of the carapace, not seen to the same extent in the other species.

There are no obvious yellow spots or large squares on the lower margins of each scute on the carapace as seen in *C. woolfi sp. nov.*.

*Chelonoidis hoserae sp. nov.* also has a very different plastral pattern as compared with all other species in the complex, in *C. hoserae sp. nov.* being mostly dark in a symmetrical mottled pattern.

*C. hoserae sp. nov.* is also unique in that it has an enlarged scale or 'spur' on the inside of the fore limb elbow.

Carapace size of *C. hoserae sp. nov.* is 35-40 cm, versus the usual 30-35 cm in *C. carbonaria*.

The species *Chelonoidis carbonaria*, herein confined to the northern half of Brazil and most of the Atlantic Coast of South America (being the form that matches the holotype), is distinguished by having a greyish to yellowish-brown carapace, which has semi-distinct lightening at the centre of each scute, with blackening at the edges, but not the distinctive blackish coloured carapace seen in *C. hoserae sp. nov.*.

While mature specimens may have narrowing of the waist of the carapace, this is not heavily pronounced as seen in *C. hoserae sp. nov.*.

For *C. carbonaria*, head and limb colours are generally light orangeish to red, while plastrons are mostly pale yellow.

The species *C. woolfi sp. nov.* from the eastern and southern parts of Colombia as well as Ecuador and Peru, is a blackish-shelled species, with large squarish yellow shapes in the centre of each of the dorsal scutes and yellow spots or large squares also prominent on the lower margins of each scute on the carapace. Most specimens of *C. woolfi sp. nov.* are further characterised by having extremely exaggerated scute rings on each of the dorsal scutes, which while obvious in specimens of *C. carbonaria*, *C. hoserae sp. nov*. are generally less pronounced in specimens of those species.

In this species limb colors generally are a pale yellow with a pink, orange or red tinge, and their heads and limbs are often slightly different colours.

The average size of *C. woolfi sp. nov.* is slightly smaller than the usual 30-35 cm seen in *C. carbonaria*.

The crown of *C. hoserae sp. nov*. is mainly black, versus mainly yellow in *C. woolfi sp. nov.* and *C. fiacummingae sp. nov.*.

The species *C. fiacummingae sp. nov*. from Panama and immediately adjacent parts of far north Colombia is separated from *C. carbonaria*, *C. hoserae sp. nov*. and *C. woolfi sp. nov.* by the following unique suite of characters: A carapace base colour that is grey, dark brown, or coffee rather than black. Their pale plastrons have central dark areas resembling an exclamation point. Their heads and limbs are generally pale yellow to orange. The average size is slightly smaller than usual 30-35 cm seen in *C. carbonaria*. Furthermore their head is mainly yellow both above and on the sides of the face; usually having expanded areas of yellow or whitish-yellow in the centre of the dorsal scutes (excluding those on the lower margins), making the light areas occupy at least half of each scute (versus less than this in the other species); no obvious areas of yellow at the outer edges of the lower margin scutes of the carapace, which is generally grey, dark brown, or coffee in colour

and a dark orangeish iris.

Like *C. woolfi sp. nov.*, the species *C. fiacummingae sp. nov*. is further characterised by having extremely exaggerated scute rings in adults.

The four species *C. carbonaria*, *C. hoserae sp. nov.*, *C. fiacummingae sp. nov.* and *C. woolfi sp. nov.* all until now treated as *C. carbonaria*, are separated from their nearest relative *C. denticulatus*, herein placed in a new subgenus *Parachelonoidis subgen. nov.* by the following unique suite of characters: General colour of the skin is dark olive, approaching black in parts, (versus light olive in *C. denticulatus*); main part of scales on legs a deep orangeish red in colour (versus yellow in *C. denticulatus*); tail of both sexes is moderately long (versus relatively short in *C. denticulatus*); posterior sternal notch is lunate, very broad and shallow, the depth being less than one fifth of the breadth (versus posterior sternal notch being triangular, nearly half as deep as it is broad in *C. denticulatus*).

The subgenera *Pampatestudo* Lindholm, 1929 with the type species: *Testudo* (*Pampatestudo*) *chilensis* (= *Testudo* (Gopher) *chilensis* Gray, 1870), by original monotypy and *Darwintestudo* Antenbrink-Vetter and Vetter, 1998 with the type species *Darwintestudo hoodensis* (= *Testudo hoodensis* Van Denburgh, 1907), by original designation, are recognized for the relevant species groups, due to divergences in the range of about 13 MYA for the relevant species groups from the *Chelonoidis carbonaria* clade, being type species for the genus *Chelonoidis* Fitzinger, 1835.

Remaining in the subgenus *Chelonoidis* Fitzinger, 1835 is the species complex associated with *C. carbonaria*, including *C. carbonaria*, *C. hoserae sp. nov.*, *C. fiacummingae sp. nov.* and *C. woolfi sp. nov.*.

*Chelonoidis denticulatus* is regarded herein as a single species, being the entirety of the subgenus *Parachelonoidis subgen. nov.*, but it can be split into subspecies, for which names are available (Rhodin *et al.* 2017).

Both subgenera *Chelonoidis* and *Parachelonoidis subgen. nov.* are separated from the other subgenera within *Chelonoidis* by the following suite of characters: Carapace elongate, margin not at all reverted, dark brown or black in colour, each dorsal shield yellowish in the centre to at least some extent; nuchal shield absent; gular shields distinct.

An image of *C. hoserae sp. nov*. in life can be found online at:
https://www.inaturalist.org/observations/72283198

An image of *C. woolfi sp. nov*. in life can be found online at:

https://www.inaturalist.org/observations/70965042

An image of *C. fiacummingae sp. nov*. in life can be found online at:

https://www.inaturalist.org/observations/72103470

**Distribution:** *C. fiacummingae sp. nov*. occurs in Panama and immediately adjacent parts of far north Colombia.

**Etymology:** Named in honour of Fia Cumming of Lyons, ACT, Australia in recognition of her services to wildlife conservation in Australia, including through her important work as one of the best investigative journalists in Australian history.

Reports by her of endemic government wildlife department corruption in Australia forced a rewrite of wildlife conservation laws in all states of Australia and Federally, giving important positive, long-term wildlife conservation outcomes.

***PARACHELONOIDES SUBGEN. NOV.***

**LSIDurn:lsid:zoobank.org:act:CFAAD14E-A12C-4A99-BEEC-0A1FAD734A2B**

**Type species:** *Testudo denticulata* Linnaeus, 1766.

Currently known as *Chelonoidis denticulatus* (Linnaeus, 1766).

**Diagnosis:**

The four species *C. carbonaria*, *C. hoserae sp. nov.*, *C. fiacummingae sp. nov.* and *C. woolfi sp. nov.* all until now treated as *C. carbonaria*, are separated from their nearest relative *C. denticulatus* (Linnaeus 1766), herein placed in a new subgenus *Parachelonoidis subgen. nov.* by the following unique suite of characters: General colour of the skin is dark olive, approaching black in parts, (versus light olive in *C. denticulatus*); main part of scales on legs a deep orangeish red in colour (versus yellow in *C. denticulatus*); tail of both sexes is moderately long (versus relatively short in *C. denticulatus*); posterior sternal notch is lunate, very broad and shallow, the depth being less than one fifth of the breadth (versus posterior sternal notch being triangular, nearly half as deep as it is broad in *C. denticulatus*).

The subgenera *Pampatestudo* Lindholm, 1929 with the type species: *Testudo* (*Pampatestudo*) *chilensis* (= *Testudo* (*Gopher*) *chilensis* Gray, 1870), by original monotypy and *Darwintestudo* Antenbrink-Vetter and Vetter, 1998 with the type species *Darwintestudo hoodensis* (= *Testudo hoodensis* Van Denburgh, 1907), by original designation, are recognized for the relevant species groups, due to divergences in the range of about 13 MYA for the relevant species groups from the *Chelonoidis carbonaria* clade, being type species for the genus *Chelonoidis* Fitzinger, 1835.

Remaining in the subgenus *Chelonoidis* Fitzinger, 1835 is the species complex associated with *C. carbonaria*, including *C. carbonaria*, *C. hoserae sp. nov.*, *C. fiacummingae sp. nov.* and *C. woolfi sp. nov.*.

*Chelonoidis denticulatus* is regarded herein as a single species, being the entirety of the subgenus *Parachelonoidis subgen. nov.*, but it can be split into subspecies, for which names are available (Rhodin *et al.* 2017).

Both subgenera *Chelonoidis* and *Parachelonoidis subgen. nov.* are separated from the other subgenera within *Chelonoidis* by the following suite of characters: Carapace elongate, margin not at all reverted, dark brown or black in colour, each dorsal shield yellowish in the centre to at least some extent; nuchal shield absent; gular shields distinct.

**Distribution:** Generally the forested parts of the northern half of South America.

**Etymology:** *Parachelonoidis subgen. nov.* reflects the fact that the relevant species is not quite "*Chelonoidis*".

**Content:** *Chelonoidis* (*Parachelonoidis*) *denticulatus* (Linnaeus 1766).

***KINIXYS HOMEANA VARIANS SUBSP. NOV.***

**LSIDurn:lsid:zoobank.org:act:040337C6-9FFC-4AFD-BAA8-9A9672692B1D**

**Holotype:** A preserved specimen at the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA, specimen number MCZ:Herp: R-34309 collected at Sakbayeme, Littoral, Cameroon, Africa, Latitude 4.033 N., Longitude 10.567 E. This facility allows access to their holdings.

**Paratype:** A preserved specimen at the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA, specimen number MCZ:Herp: R-34311 collected at Sakbayeme, Littoral, Cameroon, Africa, Latitude 4.033 N., Longitude 10.567 E.

**Diagnosis:** The type form of *Kinixys homeana* Bell, 1827 is that from West Africa (Sierra Leone). The subspecies *Kinixys homeana varians subsp. nov.* is the form of the species found east of the Dahomey Gap (generally including most of Benin and Togo).

The two subspecies are separated morphologically as follows:

They type form of *K. homeana homeana* are separated from *K. homeana varians subsp. nov*. by having noticeable greying around the nostril in younger specimens and not in the eastern subspecies.

*K. homeana homeana* have a strong yellowish hue to the carapace. This is not so in *K. homeana varians subsp. nov*., which are generally more reddish in colour.

The species *Kinixys homeana* Bell 1827 (both subspecies) are separated from other species in the genus by the following suite of characters: Anterior and posterior margins of carapace reverted and dentate; nuchal shield present; anterior extremity of plastron not projecting beyond the carapace; carapace descending vertically at rear.

Species in the genus *Kinixys* Bell, 1827 are separated from other similar species of tortoise by the following suite of characters: Posterior portion of carapace movable in the adult, hinged between the seventh and eighth marginals and the fourth and fifth costal plates. Neural plates hexagonal, short-sided behind. Supracaudal shield undivided. Plastron extensively united to the carapace by suture, with short axillary and inguinal buttresses, which do not reach the costal plates; entoplastron anterior to the humero-pectoral suture. Skull with a bony temporal arch; alveolar surface without median ridge; beak hooked; choanae between the eyes. Head shielded above. Limbs club-shaped, with blunt claws and large scales. Tail short, not longer in the young than in the adult (derived from Boulenger 1889).

Images of *Kinixys homeana varians subsp. nov.* in life can be found online at:

https://www.inaturalist.org/observations/20577766

and

https://www.inaturalist.org/observations/24507224

Images of *Kinixys homeana homeana* Bell, 1827 in life can be found online at:

https://www.inaturalist.org/observations/42155589

and

https://www.inaturalist.org/observations/37756020

and

https://www.inaturalist.org/observations/9624630

and

https://www.flickr.com/photos/93882360@N07/34871508725/

**Distribution:** Wetter areas of Central Africa east of the Dahomey Gap.

**Etymology:** The name "*varians*" reflects that it is a variant of the nominate subspecies.

***KINIXYS EROSA DIVERGENTENS SUBSP. NOV.***

**LSIDurn:lsid:zoobank.org:act:19E29740-342C-4BF7-B803-06F1E9ACF39A**

**Holotype:** A preserved specimen at the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA, specimen number MCZ:Herp R-8364, collected from South Cameroon, Africa, Latitude 2.95 N., Longitude 9.917 E. This facility allows access to their holdings.

**Paratype:** A preserved specimen at the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA, specimen number MCZ:Herp R-8367, collected from South Cameroon, Africa, Latitude 2.95 N., Longitude 9.917 E.

**Diagnosis:** The type form of *Kinixys erosa* (Schweigger, 1812) is that from West Africa. The subspecies *Kinixys erosa divergentens subsp. nov.* is the form of the species found east of the Dahomey Gap (generally including most of Benin and Togo).

The forms described as *Kinixys castanea* Bell, 1827 and *Kinixis denticulata* Hallowell, 1839 also apply to West African forms and hence neither name is available for the central African or eastern form.

The two subspecies are separated morphologically as follows: *K. erosa divergentens subsp. nov.* have greyish to whitish upper surfaces of forelimbs, whereas western *K. erosa erosa* have dark grey to blackish upper surfaces. *K. erosa erosa* has a strong reddish hue in younger specimens and juveniles, versus a reddish-brown hue in *K. erosa divergentens subsp. nov.*. Young *K. erosa divergentens subsp. nov.* have a noticeable lightening in the mid dorsal line, versus none or indistinct in the western *K. erosa erosa.*

The species *Kinixys erosa* (Schweigger, 1812) (both subspecies) are separated from other species in the genus by the following suite of characters: Anterior and posterior margins of carapace reverted and dentate; no nuchal shield; anterior extremity of plastron projects beyond the carapace; posterior part of carapace is sloping.

Species in the genus *Kinixys* Bell, 1827 are separated from other similar species of tortoise by the following suite of characters: Posterior portion of carapace movable in the adult, hinged between the seventh and eighth marginals and the fourth and fifth costal plates.

Neural plates hexagonal, short-sided behind. Supracaudal shield undivided. Plastron extensively united to the carapace by suture, with short axillary and inguinal buttresses, which do not reach the costal plates; entoplastron anterior to the humero-pectoral suture. Skull with a bony temporal arch; alveolar surface without median ridge; beak hooked; choanae between the eyes. Head shielded above. Limbs club-shaped, with blunt claws and large scales. Tail short, not longer in the young than in the adult (derived from Boulenger 1889).

Images of *Kinixys erosa divergentens subsp. nov.* in life can be found online at:

https://www.inaturalist.org/observations/24879529

and

https://www.inaturalist.org/observations/57023

and

https://www.inaturalist.org/observations/52981487

Images of West African *Kinixys erosa erosa* (Schweigger, 1812) in life can be found online at:

https://www.inaturalist.org/observations/36891354

and

https://www.inaturalist.org/observations/48950590

**Distribution:** Wetter areas of Central Africa east of the Dahomey Gap.

**Etymology:** The name "*divergentens*" reflects that it is a divergent form of the nominate subspecies.

***CYCLEMYS MCDERMOTTORUM SP. NOV.***

**LSIDurn:lsid:zoobank.org:act:B717114F-AD69-4E96-BAF5-9EC57C63A5A2**

**Holotype:** A preserved specimen at the Zoologisches Forschungsmuseum Alexander Koenig (ZFMK), Bonn, Germany, specimen number: ZFMK 92567 collected from Phnom Kbal Spean, Banteay Srei District, Cambodia, Latitude 13.6863 N., Longitude 104.0156 E., in the Phnom Kulen National Park, in the watershed of the Stung Kbal Spean River. This facility allows access to its holdings.

**Diagnosis:** *Cyclemys mcdermottorum sp. nov*. currently only known from the Phnom Kulen National Park, Cambodia, has been treated by previous authors (e.g. Kim 2011) as an aberrant population of *C. oldhamii* Gray, 1863. However genetically it appears to be in many ways intermediate between both *C. oldhamii* and the recently described *C. atripons* Iverson and McCord, 1997.

Biologically it is clearly an allopatric species separate from each of the others and so is formally named herein.

*C. mcdermottorum sp. nov*. are readily separated from all other members of the genus *Cyclemys* Bell, 1834 by the following unique suite of characters: Plastron entirely dark (brown or black) or prevalent plastral colour dark (brown or black), being spotted, blotched or striated in pattern in younger specimens and generally striated dark in older specimens (all brown in aged specimens); femoral mid-seam approximately equal to or longer than anal mid-seam; anal notch wide, obtuse-angled; crown of the head speckled or with small dark blotches; shell rectangular when viewed from above; all juveniles and adults have moderately defined head markings and stripes on the top and sides of the head and well defined stripes underneath as in the neck is dark with salmon striping; throat salmon in colour and also showing a mottled dark pattern (versus unstriped on upper surfaces of the head of adults in the morphologically similar *C. oldhamii*).

The similar species, *Cyclemys atripons* Iverson and McCord, 1997 is readily separated from *C. mcdermottorum sp. nov*. by having a generally light coloured plastron, as seen in the comparative images depicted in Fig 2, of Vamberger *et al.* (2017).

*C. mcdermottorum sp. nov*. in life are depicted in Geissler *et al.* (2019).

**Distribution:** Known only from the type locality, being the western side of the Phnom Kulen National Park, in the watershed of the Stung Kbal Spean River, Cambodia.

**Etymology:** Named in honour of Rory and Catherine McDermott dedicated workers at the Mount Hotham Ski Resort, Victoria, Australia, including as managers of the Wongungarra Ski Lodge, Hotham Heights, for services to snow sports and eco-tourism in Australia.

***GRAPTEMYS CAGLEI FLAVOCULUS SUBSP. NOV.***

**LSIDurn:lsid:zoobank.org:act:37E3DD96-34C8-494C-9891-95B533991B6E**

**Holotype:** A preserved specimen at the Texas A and M University, College Station, Texas, USA, Biodiversity Research and Teaching Collections. Biodiversity Research and Teaching Collections,

Specimen number TCWC Herpetology 98284 collected from the Guadalupe River, 2 miles Southwest of Comfort at Highway 27, Kerr County, Texas, USA, Latitude 29.949278 N., Longitude -98.926006 W. This facility allows access to its holdings.

**Paratypes:** Five preserved specimens, all at the University of Texas at Austin, Texas, USA, Texas Natural History Collections, TNHC Herpetology Collection, specimen numbers 34022, 34023, 36106, 41223 and 50013 all collected from Kerr County, Texas, USA.

**Diagnosis:** *Graptemys caglei flavooculus subsp. nov*. is the divergent population of *Graptemys caglei* Haynes and McKown, 1974 from the Guadalupe River, Texas, upstream of Seguin, Texas, USA. The nominate subspecies is found downstream from Seguin, Texas, USA and also in the nearby San Marcos River drainage also in Texas.

*Graptemys caglei flavooculus subsp. nov*. is separated from the nominate subspecies by having a deep yellow iris, (versus light yellow in the nominate subspecies), which also has an ill-defined blackish line running horizontally through the iris (midline to the pupil), versus well-defined in the nominate subspecies. In large specimens of *Graptemys caglei flavooculus subsp. nov*. the yellow spot under the eye is bounded by black, versus grey in *G. caglei caglei.* Anterior narrowing of the carapace is somewhat pronounced in *Graptemys caglei flavooculus subsp. nov*., versus not so in *G. caglei caglei.*

*G. caglei* of both subspecies are separated from

morphologically similar species as follows: The carapace is typically green, occasionally toward brown with many reticulating, contour-like yellow markings. It is low-domed, moderately keeled and the posterior edge of the carapace is serrated. The plastron is cream in colour with varying amounts of dark patterning along the seams. The underside of each marginal is also marked with lines of dark pigment. The skin of *G. caglei* is dark green with white or cream markings. On the top of the head, there is a V-shaped marking which then heads toward the eye and forms a crescent around the eye (this crescent is frequently broken). Furthermore, there is a bold medial stripe from the nose back to the V-shaped marking. The chin and throat are marked with a number of latitudinal stripes, including a transverse bar or so-called "chin-strap".

Photos of live *Graptemys caglei flavooculus subsp. nov.* can be found online at:
https://www.inaturalist.org/observations/67047449
and
https://www.inaturalist.org/observations/83716276
and
https://www.inaturalist.org/observations/84905612
Photos of the type form of live *Graptemys caglei caglei* Haynes and McKown, 1974 can be found online at:
https://www.inaturalist.org/observations/69328434
and
https://www.inaturalist.org/observations/32896331

**Distribution:** *Graptemys caglei flavooculus subsp. nov.* is the divergent population of *Graptemys caglei* Haynes and McKown, 1974 from the Guadalupe River, Texas, upstream of Seguin, Texas, USA with most specimens known from Kerr County, Texas. The nominate subspecies is found downstream from Seguin, Texas, USA and also in the nearby San Marcos River drainage also in Texas.

**Etymology:** The subspecies name for *Graptemys caglei flavooculus subsp. nov.* derives from the Latin words "*Flavo*" meaning yellow and "*Oculus*" meaning eye, with the combined word being written "*flavooculus*", recognising the deep yellow iris in this subspecies.

***GRAPTEMYS PSEUDOGEOGRAPHICA BRUNNEISOCULUS SUBSP. NOV.***

**LSIDurn:lsid:zoobank.org:act:9A526946-89C2-4009-9BAE-2D4DB40F3B92**

**Holotype:** A preserved specimen at the Museum of Vertebrate Zoology, University of California, Berkeley, California, USA, specimen number MVZ Amphibian and reptile specimens MVZ:Herp:250644, collected from Ouiska Chitto Creek (also known as the Whiskey Chitto) (a tributary of the Calcasieu River) at the end of Hanchey Rd. Allen Parish, Louisiana, USA, Latitude 30.7261 N., Longitude -92.9043 W. This facility allows access to its holdings.

**Diagnosis:** *Graptemys pseudogeographica brunneisoculus subsp. nov.* restricted to the Calcasieu River basin is readily separated from both other subspecies of *G. pseudogeographica* (Gray, 1831), being *G. pseudogeographica pseudogeographica* and *G. pseudogeographica kohnii* (Baur, 1890) by the following unique suite of characters: A dark-brown iris that is bisected by black lines at the median line through the pupil, versus light coloured iris (or predominantly so, with at times a few darker flecks) in the other two species, the iris colour being whitish or yellow; a unique chin pattern being one or other of A/ A curved or angular (matching contours of chin), but transverse chin bar, or; B/ A three-spot pattern with elongated side spots (versus always spotted in the other two subspecies).

*Graptemys pseudogeographica* are separated from morphologically similar species as follows: They possess a dark olive or brown carapace. Young specimens have a row of saw-toothed knobs down the center of the back. As they age the knobs blunten. Adult males usually keep pronounced knobs, but they are hard to detect in large females. The plastron is light coloured, and usually has no markings. The head is dark coloured with light lines extending up the neck to the back of the eye. There is a light coloured line behind each eye that extends to the top of the head and then turns backwards down the neck. Some specimens have a line that behind the eye that wraps around to the bottom of the eye.

*G. geographica* (Lesueur, 1817) don't have a light coloured line behind each eye. *G. ouachitaensis* Cagle, 1953 are distinguished by having a large spot behind the eye, under the eye and on the lower jaw.

Quality colour photos of *Graptemys pseudogeographica brunneisoculus subsp. nov.* in life are published in Lindeman *et al.* (2015), page 180 at Fig. 2. and Fig. 3, with comparative photos of yellow-iris *G. pseudogeographica* (Gray, 1831) from the nearby Sabine River Drainage (Louisiana/Texas border area) in Fig. 4.

**Distribution:** *Graptemys pseudogeographica brunneisoculus subsp. nov.* is restricted to the Calcasieu River basin in Louisiana, USA.

**Etymology:** The subspecies name "*brunneisoculus*" refers in Latin to the brown (=*brunneis*) eye (=*oculus*) unique to this taxon.

***GRAPTEMYS GEOGRAPHICA AURANTIACOOCULUS SUBSP. NOV.***

**LSIDurn:lsid:zoobank.org:act:7B43789D-9C90-4917-81A7-0F6EA36B22A3**

**Holotype:** A preserved juvenile specimen at the Carnegie Museum of Natural History, Pittsburgh, Pennsylvania, USA, CM Herps Collection, specimen number 32483, collected from Dauphin, Pennsylvania, USA, Latitude 40.37 N., Longitude -76.93 S. This facility allows access to its holdings.

**Paratypes:** Two preserved specimens at the Carnegie Museum of Natural History, Pittsburgh, Pennsylvania, USA, CM Herps Collection, specimen number 31842 (adult female, head only), collected from 2 miles north of Duncannon, Perry, Pennsylvania, USA, Latitude 40.42 N., Latitude -77.02 W, and specimen number 29538 (head only) collected from the Susquehanna River, Fort Hunter, Dauphin, Pennsylvania, USA, Latitude 40.34 N., Longitude -76.91 W.

**Diagnosis:** *Graptemys geographica aurantiacooculus*

*subsp. nov*. has until now been treated as a population of *Graptemys geographica* (Lesueur, 1817) with a type locality of "marsh, on the borders of Lake Erie", USA. *G. geographica aurantiacooculus subsp. nov*. occurs in the Susquehanna River drainage and nearby systems.

*G. geographica aurantiacooculus subsp. nov*. is readily separated from nominate *G. geographica geographica* by the following unique suite of characters: An orange iris, as opposed to yellow or occasionally yellow with an orangeish tinge in *G. geographica geographica*; a carapace pattern that has an irregular pattern of dark flecks, as opposed to one or other of the following: no such markings, slight lightening in the centre of each scute or dark occeli on the scutes as seen in various populations of *G. geographica geographica.*
Adult female *G. geographica aurantiacooculus subsp. nov*. have a carapace that is noticeably narrower and deeper than seen in nominate *G. geographica geographica.*

*G. geographica aurantiacooculus subsp. nov*. also has somewhat thicker yellow lines on the top and sides of the head as compared to *G. geographica geographica* of the same age.

*Emys megacephala* Holbrook, 1836, with a type locality of Cumberland River, near Nashville, Tennessee, is of the same form as type *Graptemys geographica geographica*.

*Graptemys geographica* (both subspecies), can be separated from the morphologically similar species *G. pseudogeographica* and *G. ouachitensis* by its lower carapace keel, immaculate plastron, unique postorbital spot and more pugnacious behaviour. Also, the male *G. geographica* lack elongated foreclaws.

Photos of *G. geographica aurantiacooculus subsp. nov*. in life can be found online at:

https://www.inaturalist.org/observations/83279587

and

https://www.inaturalist.org/observations/52582887

and

https://www.inaturalist.org/observations/28561000

and

https://www.inaturalist.org/observations/49560707

and

https://www.inaturalist.org/observations/44969730

Photos of the type form of *Graptemys geographica geographica* (Lesueur, 1817) in life can be found online at:

https://www.inaturalist.org/observations/85851937

and

https://www.inaturalist.org/observations/85703623

and

https://www.inaturalist.org/observations/47344305

**Distribution:** *G. geographica aurantiacooculus subsp. nov*. occurs in the Susquehanna River drainage and other nearby Atlantic drainages.

**Etymology:** The subspecies *Graptemys geographica aurantiacooculus subsp. nov*. is named in reflection of the Latin words for orange eyes.

***EMYS ORBICULARIS REPENS SUBSP. NOV.***

**LSIDurn:lsid:zoobank.org:act:2863EB19-234D-4BD6-BB3A-76D2B37C3733**

**Holotype:** A preserved specimen in the University of Colorado, Museum of Natural History, Boulder, Colorado, USA, specimen number Herp:36643 collected 1 km west of Sedjenane, Bizerte Governorate, Tunisia. This facility allows access to its holdings.

**Paratypes:** Five preserved specimens from Algeria, being two at the University of Michigan, Museum of Zoology. Ann Arbor, Michigan, USA, UMMZ Herpetology Collection, specimen numbers 65798 and 65799, one from the National Museum of Natural History, Smithsonian Institution, Washington, DC, USA, specimen number USNM Amphibians and Reptiles 10986 and two from the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA, specimen numbers MCZ Herp R-5187 and MCZ Herp R-5189.

**Diagnosis:** *Emys orbicularis repens subsp. nov.* is similar in most respects to *E. orbicularis occidentalis* Fritz, 1993 as identified by Fritz (1993) in his paper, which it would otherwise be identified as, but it is readily separated from that taxon by the posession of prominent yellow markings on the limbs and when viewed from a distance, a yellowish-brown carapace, as opposed to a generally dark-brown carapace and yellow as opposed to whitish yellow iris.

The skin on the limbs of *Emys orbicularis repens subsp. nov.* are about 50 percent yellow markings, being spots or joined spots, versus less than 50 percent in *E. orbicularis occidentalis.*

The carapace of *E. orbicularis repens subsp. nov.* is heavily infused with closely spaced light wavy lines on a darker brown background, versus a darker brown background only lightly infused with such markings in *E. orbicularis occidentalis.*

Stuckas *et al.* (2014) identified this taxon (which they identified *E. orbicularis occidentalis*) as a distinct genetic unit, separate from *E. orbicularis occidentalis sensu stricto* and noted the conservation benefit of it being formally named.

**Distribution:** North-Eastern Algeria and nearby parts of north-west Tunisia, generally near the Mediterranean coast.

**Etymology:** "repens" in Latin, refers to the subspecies being relatively new and unexpected to science.

***CUORA ADELYNHOSERAE SP. NOV.***

**LSIDurn:lsid:zoobank.org:act:BBEFE472-E741-4803-8A80-F01E8E9F69BB**

**Holotype:** A preserved juvenile specimen at the (British) Museum of Natural History, London, UK, specimen number 98.12.20.1, collected from "Eastern Assam Hills", India. This facility allows access to its holdings.

**Paratype:** A preserved specimen at the Zoological Survey of India, Calcutta , West Bengal, India, specimen number 23923 collected from Deban, 27 km east of Miao, in the Tirap District, Arunachal Pradesh, India, Latitude 26.5939 N., Longitude 95.3226 E.

**Diagnosis:** Until now, *Cuora adelynhoserae sp. nov*. has been treated as a western population of

*Cuora mouhotii* (Gray, 1862), which is astounding considering the obvious differences between the two morphologically different forms.

*C. adelynhoserae sp. nov*. is readily separated from *C. mouhotii* and all other similar species by the following unique suite of characters: A distinctive flat-topped, tricarinate shell, markedly serrated posterior marginals, a long and narrow nuchal shield, short but distinct bridge, strongly hooked upperjaw, large shields on the posterior part of the forehead and on the forelimbs; half-webbed digits and extremely large and obvious tubercles at the base of the tail and on the thighs.

The carapace is chocolate-brown, the vertebral keel brownish-yellow edged with dark brown. The plastron is chrome yellow with a single large chocolate-brown patch in the middle and inframarginals of the same colour, (as opposed to the plastral pattern of dark brown spots on a yellow-brown background seen in *C. mouhotii*); the head is brown with a yellow spot and streak behind each eye.

The Iris is orange, versus dark in colour in *Cuora mouhotii mouhotii* (Gray, 1862) or bright red in *Cuora mouhotii obsti* (Fritz, Andreas and Lehr, 1998).

The tail (at least in young males), exceeds the length of the plastron.

In adults, the limbs are dark grey. The carapace develops large melanistic patches with age.
High quality photos of *C. adelynhoserae sp. nov*. can be found on the internet at:
https://www.conservationleadershipprogramme.org/media/2014/11/100206_India_FR_Tortoisesturtles.pdf at page 35 (identified as *C. mouhotii*).

**Distribution:** Bangladesh, Bhutan, India (Arunachal Pradesh, Assam, Manipur, Meghalaya,

Mizoram, Nagaland), western Myanmar.

**Etymology:** *Cuora adelynhoserae sp. nov*. is named in honour of my eldest daughter Adelyn Hoser, of Park Orchards, Victoria, Australia, in recognition of over 20 years of services to wildlife conservation globally.

***CUORA JACKYHOSERAE SP. NOV.***

**LSIDurn:lsid:zoobank.org:act:EF8DC13B-4E61-49C7-A9E9-EAFC3DBBAC4C**

**Holotype:** A preserved specimen at the Museum National D'Histoire Naturelle, Paris, France, specimen number MNHN-RA-0.7932, collected from India. This facility allows access to its holdings.

**Diagnosis:** Until now, *C. jackyhoserae sp. nov.* has been treated as the western (Indian) population of the widely distributed putative species *Cuora amboinensis* (Riche in Daudin, 1801), with a type locality of Ambon, Moluccas, Indonesia.

As of 2021, putative *C. amboinensis* is a species broken up by most herpetologists into up to four subspecies, occupying the range from Ambon, across the East Indies to south-east Asia and across to Eastern India and adjoining countries.

The molecular data of Protiva *et al*. (2016) indicated at least five species in the complex (see Fig. 5 and their accounts of divergences between measured clades in the text of the paper).

The Indian form of the putative taxon *C. amboinensis* is the only obviously unnamed one in their phylogeny and so is formally identified and named as *C. jackyhoserae sp. nov.* herein.

Protiva *et al*. (2016) showed species-level divergence between the Borneo population and all others and hence its formal description also in this paper.

The four previously recognized subspecies, *Cuora amboinensis amboinensis* (Riche in Daudin, 1801), *Cuora amboinensis couro* (Lechenault in Schweigger 1812), type locality of Java, Indonesia and also occurring on nearby Sumatra, lower Peninsula Malaysia and Singapore, *Cuora amboinensis kamaroma* Rummler and Fritz, 1991, type locality about 50 km north of Bangkok, Thailand and *Cuora amboinensis lineata* McCord and Philippen, 1998, with a type locality of Myitkyina, Kachin Province, Myanmar (Burma), are all herein recognized as full species, each occupying ranges close to their type localities.

Unnamed forms of putative *C. amboinensis* formally named for the first time in this paper and not necessarily included in the phylogentic study of Protiva *et al*. (2016) are as follows:

*C. jackyhoserae sp. nov.* from eastern India and nearby parts of Bangladesh, Bhutan and Myanmar (Burma);

*C. oxyslopp sp. nov*. from the Philippines;

*C. boxboyi sp. nov.* from Sulawesi;

*C. elfakariorum sp. nov.* from Borneo;

*C. richardwellsi sp. nov.* from Enganno Island;

*C. rosswellingtoni sp. nov.* from Halmahera Island.

*C. jackyhoserae sp. nov.* in life is readily separated from all other species in *C. amboinensis* complex by colouration. It is similar in most respects to *C. lineata* (McCord and Philippen, 1998), but separated from that and all other species in the *C. amboinensis* by having in life a strong orange-coloured line running from the snout, above the eye and on the neck.

All but very old specimens of *C. jackyhoserae sp. nov.* are also characterised by having an orange line running down the middle of the dorsum of the carapace. In *C. lineata* (McCord and Philippen, 1998) a similar white or yellow stripe is seen.

*C. lineata* has an extremely strongly domed shell in adults and maximum carapace length of 230 mm, versus somewhat less so in *C. jackyhoserae sp. nov.* and a similar maximum carapace length.

The type form of *C. amboinensis* is separated from the other species in the complex by having a flat broad carapace, with a distinctive margin.

*C. kamaroma* is separated from the other species by having a highly domed carapace, without a well-developed margin and carapace length up to 250 mm.

*C. couro* is intermediate in characters between the two preceding species, but noticeably smaller, with a maximum carapace length of 220 mm and is readily identified and separated from the other two species by having a distinctive charcoal grey to black coloured skin

on the head and face, giving it more vivid head markings than seen in the two preceding species. *C. amboinensis*, *C. oxyslopp sp. nov.* and *C. rosswellingtoni sp. nov.* have a maximum carapace length of just 200 mm, making them the smallest species in the complex.

*C. oxyslopp sp. nov.* are notable for their particularly domed carapace, which is not rounded in shape.

Furthermore, coloration in *C. oxyslopp sp. nov.* is quite different from that of adjacent species, showing significantly finer and whitish (usually not yellow) head stripes compared to broad yellow stripes in all other species except for the orange coloured ones in *C. jackyhoserae sp. nov.*.

The pupil in *C. oxyslopp sp. nov.* has a completely different pattern to the other species, forming a broad black pattern versus being finely shaped in the others.

*C. oxyslopp sp. nov.* also has a narrower head than seen in other species in the complex.

The plastral pattern in typical *C. amboinensis* is highly variable, ranging from nearly entirely black to yellow with or without black spots.

*C. oxyslopp sp. nov.* has a plastral pattern of clear separated spots arranged in a regular pattern.

Soft parts of *C. oxyslopp sp. nov.* are a plain grey to cream in colour and lack reticulations seen in other species in the complex.

*C. rosswellingtoni sp. nov*. is similar in most respects to *C. amboinensis* but is separated from that species by more prominent markings on the limbs, an even more flattened carapace than is seen for the relatively flattened carapace of *C. amboinensis*, and a larger maximum adult carapace length of 220 mm.

*C. rosswellingtoni sp. nov*. also lacks a slight inward inflection of the mid-carapace as seen in *C. amboinensis*, with significantly less upturn of the outer edges.

*C. boxboyi sp. nov.* is separated from the other species in the complex by having a shell that is relatively flattened (in common with *C. rosswellingtoni sp. nov*. and *C. amboinensis*), a noticeably light brown to light grey carapace, except in extremely aged specimens, light grey, rather than dark grey or black on the top of the head and a massive preponderance of yellow on the face (sides of anterior head) not seen in any of the other species as well as a larger maximum adult carapace length of 220 mm.

*C. elfakariorum sp. nov.* is a high-domed, dark-shelled form, with adults generally with a dark brown or black carapace. The top of the head is also brownish-grey in colour, as opposed to the grey-black or light grey seen in other species in the complex. Plastron is usually all or mainly light in colour, except in aged specimens and the carapace has little, if any upturn on the outer edges. Other than the stripe at the top of the head and neck, soft parts are generally unmarked.

*C. richardwellsi sp. nov.* is similar in most respects to *C. elfakariorum sp. nov.* or *C. couro* but is separated from those species by the combination of having faded light grey on the sides of the head, being yellowish grey between the whitish yellow lines on the head, a domed carapace, especially at the rear, a slightly expanded rear carapace and little if any upward inflection of the outer edge.

The carapace is dark brown except in aged specimens.

All species in the *C. amboinensis* species complex are diagnosed and separated from similar species, including others in the genus *Cuora* Gray, 1856 by the following suite of characters: Carapace depressed and tricarinate in the young, usually very convex and without or with a single keel in adult females and often heavily domed in adaults; vertebral shields as long as broad or a little longer than broad in the adult, broader in the young, much narrower than the costals. Plastron as large as the opening of the shell in the adult, without distinct bridge; no anal notch: the line of junction between the hyoplastron and the carapace shorter than that between the hypoplastron and the carapace; pectoral shields as long as or shorter than the abdominals, as long as or slightly longer than the humerals; axillary and inguinal small or absent. Head relatively small; upper jaw scarcely hooked, without any emargination. Front part of arm with large transverse scales.

Digits moderately webbed, with sharp claws. Carapace brown or blackish; plastron yellow with large black spots, or dark brown with the suture between the shields yellow; in the very young the black spots of the plastron are confluent into a broad longitudinal zone, the borders of the plastron being yellowish; head and neck grey, brown or blackish above, yellow or whitish interiorly; a (usually) yellow band borders the head and neck superiorly, meeting its fellow above the nostrils; a second yellow band passes through the eye and is separated from the upper jaw by a darker band; ear yellow (modified from Boulenger, 1889).

Photos of *C. jackyhoserae sp. nov.* in life can be found at:

https://www.inaturalist.org/observations/34050984

and

https://www.threatenedtaxa.org/index.php/JoTT/article/view/1915/4108

and https://www.conservationleadershipprogramme.org/media/2014/11/100206_India_FR_Tortoisesturtles.pdf at page 33 (identified as *C. amboinensis*).

*C. oxyslopp sp. nov*. from the Philippines in life can be found on the internet at:

https://www.flickr.com/photos/song-devan/5289168079/

and

https://www.inaturalist.org/observations/4054297

and

https://www.inaturalist.org/observations/64644428

and

https://www.inaturalist.org/observations/9759256

Photos of *C. boxboyi sp. nov.* from Sulawesi can be found in Rhodin *et al.* (2017) at page 86 (bottom right), Schoppe and Das (2011) at fig. 2., or on the internet at: https://www.flickr.com/photos/135552775@N06/49529193916/

and
https://www.flickr.com/photos/ianbool/29651577068/
and
https://www.flickr.com/photos/135552775@N06/49528687833/
and
https://www.inaturalist.org/observations/19879644
and
https://www.inaturalist.org/observations/36054539
Photos of *C. elfakariorum sp. nov.* from Borneo is depicted on page 87 (bottom left) of Rhodin *et al.* (2017) or can be found on the internet at:
https://www.flickr.com/photos/25872797@N02/43283837055/
and
https://www.flickr.com/photos/elliotbudd/26287786968/
and
https://www.flickr.com/photos/scincella1986/9429454304/
*C. couro* is depicted on page 87 (top left) of Rhodin *et al.* (2017).

Photos of *C. kamaroma* can be found on the internet at:
https://www.flickr.com/photos/30142279@N07/49675777532/
and
https://www.flickr.com/photos/berniedup/6963402976/

Photos of *C. lineata* in life can be seen in McCord and Philippen (1998) or Schoppe and Das (2011) at figs 8 and 9.

*C. richardwellsi sp. nov.* from Enganno Island can be seen in life online at:
https://www.inaturalist.org/observations/72871387

*C. amboinensis* of the type form from Ceram (immediately adjacent to Ambon) can be seen online at:
https://www.inaturalist.org/observations/32940848

**Distribution:** *C. jackyhoserae sp. nov.* is apparently confined to the Brahmaputra basin in Eastern India, Bangladesh, Bhutan and potentially adjacent parts of Myanmar (Burma) and southern China.

**Etymology:** *C. jackyhoserae sp. nov.* is named in honour of my youngest daughter Jacky Hoser, of Park Orchards, Victoria, Australia, in recognition of over 20 years of services to wildlife conservation globally.

***CUORA OXYSLOPP SP. NOV.***

**LSIDurn:lsid:zoobank.org:act:6C90D101-67B9-42E3-9232-12BE87AB83AD**

**Holotype:** A preserved specimen at the California Academy of Sciences, San Francisco, California, USA, specimen number CAS HERP 133090 from Zamboanguita Municipality, Negros Island, Philippines. This facility allows access to its holdings.

**Paratypes:** Two preserved specimen at the California Academy of Sciences, San Francisco, California, USA, specimen numbers CAS HERP 133091 and 133092 from Zamboanguita Municipality, Negros Island, Philippines.

**Diagnosis:** Until now, *Cuora oxyslopp sp. nov.* has been treated as a Philippines population of the widely distributed putative species *Cuora amboinensis* (Riche in Daudin, 1801), with a type locality of Ambon, Moluccas, Indonesia and found west of there to eastern India.

As of 2021, putative *C. amboinensis* is a species broken up by most herpetologists into up to four subspecies, occupying the range from Ambon, across the East Indies to south-east Asia and across to Eastern India and adjoining countries.

The molecular data of Protiva *et al.* (2016) indicated at least five species in the complex (see Fig. 5 and their accounts of divergences between measured clades in the text of the paper).

They did not include DNA from the widely divergent Philippines form.

The Indian form of the putative taxon *C. amboinensis* was the only obviously unnamed one in their phylogeny and so was formally identified and named as *C. jackyhoserae sp. nov.*in this paper.

Protiva *et al.* (2016) showed species-level divergence between the Borneo population and all others and hence its formal description also in this paper.

The four previously recognized subspecies, *Cuora amboinensis amboinensis* (Riche in Daudin, 1801), *Cuora amboinensis couro* (Lechenault in Schweigger 1812), type locality of Java, Indonesia and also occurring on nearby Sumatra, lower Peninsula Malaysia and Singapore, *Cuora amboinensis kamaroma* Rummler and Fritz, 1991, type locality about 50 km north of Bangkok, Thailand and *Cuora amboinensis lineata* McCord and Philippen, 1998, with a type locality of Myitkyina, Kachin Province, Myanmar (Burma), are all herein recognized as full species, each occupying ranges close to their type localities.

Unnamed forms of putative *C. amboinensis* formally named for the first time in this paper and not necessarily included in the phylogentic study of Protiva *et al.* (2016) are as follows:

*C. jackyhoserae sp. nov.* from eastern India and nearby parts of Bangladesh, Bhutan and Myanmar (Burma);

*C. oxyslopp sp. nov.* from the Philippines;

*C. boxboyi sp. nov.* from Sulawesi;

*C. elfakariorum sp. nov.* from Borneo;

*C. richardwellsi sp. nov.* from Enganno Island;

*C. rosswellingtoni sp. nov.* from Halmahera Island.

*C. jackyhoserae sp. nov.* in life is readily separated from all other species in *C. amboinensis* complex by colouration. It is similar in most respects to *C. lineata* (McCord and Philippen, 1998), but separated from that and all other species in the *C. amboinensis* by having in life a strong orange-coloured line running from the snout, above the eye and on the neck.

All but very old specimens of *C. jackyhoserae sp. nov.* are also characterised by having an orange line running down the middle of the dorsum of the carapace. In *C. lineata* (McCord and Philippen, 1998) a similar white or yellow stripe is seen.

*C. lineata* has an extremely strongly domed shell in adults and maximum carapace length of 230 mm,

versus somewhat less so in *C. jackyhoserae sp. nov.* and a similar maximum carapace length.

The type form of *C. amboinensis* is separated from the other species in the complex by having a flat broad carapace, with a distinctive margin.

*C. kamaroma* is separated from the other species by having a highly domed carapace, without a well-developed margin and carapace length up to 250 mm.

*C. couro* is intermediate in characters between the two preceding species, but noticeably smaller, with a maximum carapace length of 220 mm and is readily identified and separated from the other two species by having a distinctive charcoal grey to black coloured skin on the head and face, giving it more vivid head markings than seen in the two preceding species. *C. amboinensis*, *C. oxyslopp sp. nov.* and *C. rosswellingtoni sp. nov.* have a maximum carapace length of just 200 mm, making them the smallest species in the complex.

*C. oxyslopp sp. nov.* are notable for their particularly domed carapace, which is not rounded in shape.

Furthermore, coloration in *C. oxyslopp sp. nov.* is quite different from that of adjacent species, showing significantly finer and whitish (usually not yellow) head stripes compared to broad yellow stripes in all other species except for the orange coloured ones in *C. jackyhoserae sp. nov.*.

The pupil in *C. oxyslopp sp. nov.* has a completely different pattern to the other species, forming a broad black pattern versus being finely shaped in the others.

*C. oxyslopp sp. nov.* also has a narrower head than seen in other species in the complex.

The plastral pattern in typical *C. amboinensis* is highly variable, ranging from nearly entirely black to yellow with or without black spots.

*C. oxyslopp sp. nov.* has a plastral pattern of clear separated spots arranged in a regular pattern.

Soft parts of *C. oxyslopp sp. nov.* are a plain grey to cream in colour and lack reticulations seen in other species in the complex.

*C. rosswellingtoni sp. nov*. is similar in most respects to *C. amboinensis* but is separated from that species by more prominent markings on the limbs, an even more flattened carapace than is seen for the relatively flattened carapace of *C. amboinensis*, and a larger maximum adult carapace length of 220 mm.

*C. rosswellingtoni sp. nov*. also lacks a slight inward inflection of the mid-carapace as seen in *C. amboinensis*, with significantly less upturn of the outer edges.

*C. boxboyi sp. nov.* is separated from the other species in the complex by having a shell that is relatively flattened (in common with *C. rosswellingtoni sp. nov*. and *C. amboinensis*), a noticeably light brown to light grey carapace, except in extremely aged specimens, light grey, rather than dark grey or black on the top of the head and a massive preponderance of yellow on the face (sides of anterior head) not seen in any of the other species as well as a larger maximum adult carapace length of 220 mm.

*C. elfakariorum sp. nov.* is a high-domed, dark-shelled form, with adults generally with a dark brown or black carapace. The top of the head is also brownish-grey in colour, as opposed to the grey-black or light grey seen in other species in the complex. Plastron is usually all or mainly light in colour, except in aged specimens and the carapace has little, if any upturn on the outer edges. Other than the stripe at the top of the head and neck, soft parts are generally unmarked.

*C. richardwellsi sp. nov.* is similar in most respects to *C. elfakariorum sp. nov.* or *C. couro* but is separated from those species by the combination of having faded light grey on the sides of the head, being yellowish grey between the whitish yellow lines on the head, a domed carapace, especially at the rear, a slightly expanded rear carapace and little if any upward inflection of the outer edge.

The carapace is dark brown except in aged specimens.

All species in the *C. amboinensis* species complex are diagnosed and separated from similar species, including others in the genus *Cuora* Gray, 1856 by the following suite of characters: Carapace depressed and tricarinate in the young, usually very convex and without or with a single keel in adult females and often heavily domed in adaults; vertebral shields as long as broad or a little longer than broad in the adult, broader in the young, much narrower than the costals. Plastron as large as the opening of the shell in the adult, without distinct bridge; no anal notch: the line of junction between the hyoplastron and the carapace shorter than that between the hypoplastron and the carapace; pectoral shields as long as or shorter than the abdominals, as long as or slightly longer than the humerals; axillary and inguinal small or absent. Head relatively small; upper jaw scarcely hooked, without any emargination. Front part of arm with large transverse scales. Digits moderately webbed, with sharp claws. Carapace brown or blackish; plastron yellow with large black spots, or dark brown with the suture between the shields yellow; in the very young the black spots of the plastron are confluent into a broad longitudinal zone, the borders of the plastron being yellowish; head and neck grey, brown or blackish above, yellow or whitish interiorly; a (usually) yellow band borders the head and neck superiorly, meeting its fellow above the nostrils; a second yellow band passes through the eye and is separated from the upper jaw by a darker band; ear yellow (modified from Boulenger, 1889).

Photos of *C. jackyhoserae sp. nov.* in life can be found at:

https://www.inaturalist.org/observations/34050984

and

https://www.threatenedtaxa.org/index.php/JoTT/article/view/1915/4108

and https://www.conservationleadershipprogramme.org/media/2014/11/100206_India_FR_Tortoisesturtles.pdf at page 33 (identified as *C. amboinensis*).

*C. oxyslopp sp. nov*. from the Philippines in life can be found on the internet at:

https://www.flickr.com/photos/song-devan/5289168079/
and
https://www.inaturalist.org/observations/4054297
and
https://www.inaturalist.org/observations/64644428
and
https://www.inaturalist.org/observations/9759256
Photos of *C. boxboyi sp. nov.* from Sulawesi can be found in Rhodin *et al*. (2017) at page 86 (bottom right), Schoppe and Das (2011) at fig. 2., or on the internet at:
https://www.flickr.com/photos/135552775@N06/49529193916/
and
https://www.flickr.com/photos/ianbool/29651577068/
and
https://www.flickr.com/photos/135552775@N06/49528687833/
and
https://www.inaturalist.org/observations/19879644
and
https://www.inaturalist.org/observations/36054539
Photos of *C. elfakariorum sp. nov.* from Borneo is depicted on page 87 (bottom left) of Rhodin *et al*. (2017) or can be found on the internet at:
https://www.flickr.com/photos/25872797@N02/43283837055/
and
https://www.flickr.com/photos/elliotbudd/26287786968/
and
https://www.flickr.com/photos/scincella1986/9429454304/
*C. couro* is depicted on page 87 (top left) of Rhodin *et al*. (2017).

Photos of *C. kamaroma* can be found on the internet at:
https://www.flickr.com/photos/30142279@N07/49675777532/
and
https://www.flickr.com/photos/berniedup/6963402976/

Photos of *C. lineata* in life can be seen in McCord and Philippen (1998) or Schoppe and Das (2011) at figs 8 and 9. *C. richardwellsi sp. nov.* from Enganno Island can be seen in life online at:
https://www.inaturalist.org/observations/72871387

*C. amboinensis* of the type form from Ceram (immediately adjacent to Ambon) can be seen online at:
https://www.inaturalist.org/observations/32940848

**Distribution:** *C. oxyslopp sp. nov.* is restricted to the Philippine Islands. Specimens from Palawan are tentatively referred to the species *C. elfakariorum sp. nov.* from Borneo.

**Etymology:** *C. oxyslopp sp. nov.* is named in honour of two Great Dane dogs our family have owned, named "Oxy", being short for *Oxyuranus* and "Slop" or "Slopp" because that is what he did with his tongue as he slobbered on many things, in recognition to their services in animal education with our family wildlife display, education and conservation business over two decades between years 2000 and 2020.

***CUORA BOXBOYI SP. NOV.***

**LSIDurn:lsid:zoobank.org:act:7D155912-9EBF-44BC-B056-F3363DE41CF6**

**Holotype:** A preserved specimen at the Naturalis Museum, The Netherlands, specimen number RMNH.RENA.38826 collected from Gorontalo, North Sulawesi, Indonesia. This facility allows access to its holdings.

**Paratypes:** 1/ Two preserved specimens at the Museum of Vertebrate Zoology, University of California, Berkeley. California, USA, MVZ Herp Collection, specimen number 253597 collected from Desa Alisang, Kecamatan Basi Dondo, Kabupaten Toli-Toli, Propinsi Sulawesi Tengah, Central Sulawesi, Indonesia, Latitude 0.7769 N., Longitude 120.6659 E. and specimen number 253595 collected from Desa Banggabara, Kecamatan Sarudu, Kabupaten Mamuju Utara, Propinsi Sulawesi Barat, Sulawesi Island, Indonesia, Latitude -1.6155 S., Longitude 119.3055 E.

2/ A preserved specimen at the Staatliches Museum für Naturkunde, Stuttgart, Germany, specimen number SMNS Herpetologie 5353 collected from Selatan (South), Sulawesi, Indonesia.

**Diagnosis:** Until now, *Cuora boxboyi sp. nov.* has been treated as a Sulawesi (Indonesia) population of the widely distributed putative species *Cuora amboinensis* (Riche in Daudin, 1801), with a type locality of Ambon, Moluccas, Indonesia and found west of there to eastern India.

As of 2021, putative *C. amboinensis* is a species broken up by most herpetologists into up to four subspecies, occupying the range from Ambon, across the East Indies to south-east Asia and across to Eastern India and adjoining countries.

The molecular data of Protiva *et al*. (2016) indicated at least five species in the complex (see Fig. 5 and their accounts of divergences between measured clades in the text of the paper).

They did not include DNA from the divergent Sulawesi form.

The Indian form of the putative taxon *C. amboinensis* was the only obviously unnamed one in their phylogeny and so was formally identified and named as *C. jackyhoserae sp. nov.*in this paper.

Protiva *et al*. (2016) showed species-level divergence between the Borneo population and all others and hence its formal description herein (this paper) as well.

The four previously recognized subspecies, *Cuora amboinensis amboinensis* (Riche in Daudin, 1801), *Cuora amboinensis couro* (Lechenault in Schweigger 1812), type locality of Java, Indonesia and also occurring on nearby Sumatra, lower Peninsula Malaysia and Singapore, *Cuora amboinensis kamaroma* Rummler and Fritz, 1991, type locality about 50 km north of Bangkok, Thailand and *Cuora amboinensis lineata* McCord and Philippen, 1998, with a type locality of Myitkyina, Kachin Province, Myanmar (Burma), are all herein recognized as full species, each occupying ranges close to their type localities.

Unnamed forms of putative *C. amboinensis* formally

named for the first time in this paper and not necessarily included in the phylogentic study of Protiva *et al*. (2016) are as follows:

*C. jackyhoserae sp. nov.* from eastern India and nearby parts of Bangladesh, Bhutan and Myanmar (Burma);

*C. oxyslopp sp. nov*. from the Philippines;

*C. boxboyi sp. nov.* from Sulawesi;

*C. elfakariorum sp. nov.* from Borneo;

*C. richardwellsi sp. nov.* from Enganno Island;

*C. rosswellingtoni sp. nov.* from Halmahera Island.

*C. jackyhoserae sp. nov.* in life is readily separated from all other species in *C. amboinensis* complex by colouration. It is similar in most respects to *C. lineata* (McCord and Philippen, 1998), but separated from that and all other species in the *C. amboinensis* by having in life a strong orange-coloured line running from the snout, above the eye and on the neck.

All but very old specimens of *C. jackyhoserae sp. nov.* are also characterised by having an orange line running down the middle of the dorsum of the carapace. In *C. lineata* (McCord and Philippen, 1998) a similar white or yellow stripe is seen.

*C. lineata* has an extremely strongly domed shell in adults and maximum carapace length of 230 mm, versus somewhat less so in *C. jackyhoserae sp. nov.* and a similar maximum carapace length.

The type form of *C. amboinensis* is separated from the other species in the complex by having a flat broad carapace, with a distinctive margin.

*C. kamaroma* is separated from the other species by having a highly domed carapace, without a well-developed margin and carapace length up to 250 mm.

*C. couro* is intermediate in characters between the two preceding species, but noticeably smaller, with a maximum carapace length of 220 mm and is readily identified and separated from the other two species by having a distinctive charcoal grey to black coloured skin on the head and face, giving it more vivid head markings than seen in the two preceding species. *C. amboinensis*, *C. oxyslopp sp. nov.* and *C. rosswellingtoni sp. nov.* have a maximum carapace length of just 200 mm, making them the smallest species in the complex.

*C. oxyslopp sp. nov.* are notable for their particularly domed carapace, which is not rounded in shape.

Furthermore, coloration in *C. oxyslopp sp. nov.* is quite different from that of adjacent species, showing significantly finer and whitish (usually not yellow) head stripes compared to broad yellow stripes in all other species except for the orange coloured ones in *C. jackyhoserae sp. nov.*.

The pupil in *C. oxyslopp sp. nov.* has a completely different pattern to the other species, forming a broad black pattern versus being finely shaped in the others.

*C. oxyslopp sp. nov.* also has a narrower head than seen in other species in the complex.

The plastral pattern in typical *C. amboinensis* is highly variable, ranging from nearly entirely black to yellow with or without black spots.

*C. oxyslopp sp. nov.* has a plastral pattern of clear separated spots arranged in a regular pattern.

Soft parts of *C. oxyslopp sp. nov.* are a plain grey to cream in colour and lack reticulations seen in other species in the complex.

*C. rosswellingtoni sp. nov*. is similar in most respects to *C. amboinensis* but is separated from that species by more prominent markings on the limbs, an even more flattened carapace than is seen for the relatively flattened carapace of *C. amboinensis*, and a larger maximum adult carapace length of 220 mm.

*C. rosswellingtoni sp. nov*. also lacks a slight inward inflection of the mid-carapace as seen in *C. amboinensis*, with significantly less upturn of the outer edges.

*C. boxboyi sp. nov.* is separated from the other species in the complex by having a shell that is relatively flattened (in common with *C. rosswellingtoni sp. nov*. and *C. amboinensis*), a noticeably light brown to light grey carapace, except in extremely aged specimens, light grey, rather than dark grey or black on the top of the head and a massive preponderance of yellow on the face (sides of anterior head) not seen in any of the other species as well as a larger maximum adult carapace length of 220 mm.

*C. elfakariorum sp. nov.* is a high-domed, dark-shelled form, with adults generally with a dark brown or black carapace. The top of the head is also brownish-grey in colour, as opposed to the grey-black or light grey seen in other species in the complex. Plastron is usually all or mainly light in colour, except in aged specimens and the carapace has little, if any upturn on the outer edges. Other than the stripe at the top of the head and neck, soft parts are generally unmarked.

*C. richardwellsi sp. nov.* is similar in most respects to *C. elfakariorum sp. nov.* or *C. couro* but is separated from those species by the combination of having faded light grey on the sides of the head, being yellowish grey between the whitish yellow lines on the head, a domed carapace, especially at the rear, a slightly expanded rear carapace and little if any upward inflection of the outer edge.

The carapace is dark brown except in aged specimens.

All species in the *C. amboinensis* species complex are diagnosed and separated from similar species, including others in the genus *Cuora* Gray, 1856 by the following suite of characters: Carapace depressed and tricarinate in the young, usually very convex and without or with a single keel in adult females and often heavily domed in adaults; vertebral shields as long as broad or a little longer than broad in the adult, broader in the young, much narrower than the costals. Plastron as large as the opening of the shell in the adult, without distinct bridge; no anal notch: the line of junction between the hyoplastron and the carapace shorter than that between the hypoplastron and the carapace; pectoral shields as long as or shorter than the abdominals, as long as or slightly longer than the humerals; axillary and inguinal small or absent. Head relatively small; upper jaw

scarcely hooked, without any emargination. Front part of arm with large transverse scales. Digits moderately webbed, with sharp claws. Carapace brown or blackish; plastron yellow with large black spots, or dark brown with the suture between the shields yellow; in the very young the black spots of the plastron are confluent into a broad longitudinal zone, the borders of the plastron being yellowish; head and neck grey, brown or blackish above, yellow or whitish interiorly; a (usually) yellow band borders the head and neck superiorly, meeting its fellow above the nostrils; a second yellow band passes through the eye and is separated from the upper jaw by a darker band; ear yellow (modified from Boulenger, 1889).

Photos of *C. jackyhoserae sp. nov.* in life can be found at:

https://www.inaturalist.org/observations/34050984

and

https://www.threatenedtaxa.org/index.php/JoTT/article/view/1915/4108

and https://www.conservationleadershipprogramme.org/media/2014/11/100206_India_FR_Tortoisesturtles.pdf at page 33 (identified as *C. amboinensis*).

*C. oxyslopp sp. nov*. from the Philippines in life can be found on the internet at:

https://www.flickr.com/photos/song-devan/5289168079/

and

https://www.inaturalist.org/observations/4054297

and

https://www.inaturalist.org/observations/64644428

and

https://www.inaturalist.org/observations/9759256

Photos of *C. boxboyi sp. nov.* from Sulawesi can be found in Rhodin *et al*. (2017) at page 86 (bottom right), Schoppe and Das (2011) at fig. 2., or on the internet at:

https://www.flickr.com/photos/135552775@N06/49529193916/

and

https://www.flickr.com/photos/ianbool/29651577068/

and

https://www.flickr.com/photos/135552775@N06/49528687833/

and

https://www.inaturalist.org/observations/19879644

and

https://www.inaturalist.org/observations/36054539

Photos of *C. elfakariorum sp. nov.* from Borneo is depicted on page 87 (bottom left) of Rhodin *et al*. (2017) or can be found on the internet at:

https://www.flickr.com/photos/25872797@N02/43283837055/

and

https://www.flickr.com/photos/elliotbudd/26287786968/

and

https://www.flickr.com/photos/scincella1986/9429454304/

*C. couro* is depicted on page 87 (top left) of Rhodin *et al*. (2017).

Photos of *C. kamaroma* can be found on the internet at:

https://www.flickr.com/photos/30142279@N07/49675777532/

and

https://www.flickr.com/photos/berniedup/6963402976/

Photos of *C. lineata* in life can be seen in McCord and Philippen (1998) or Schoppe and Das (2011) at figs 8 and 9.

*C. richardwellsi sp. nov.* from Enganno Island can be seen in life online at:

https://www.inaturalist.org/observations/72871387

*C. amboinensis* of the type form from Ceram (immediately adjacent to Ambon) can be seen online at:

https://www.inaturalist.org/observations/32940848

**Distribution:** *C. boxboyi sp. nov.* is restricted to the Indonesian Island of Sulawesi and immediately adjacent shelf islands that were connected during the most recent ice-age maxima..

**Etymology:** *C. boxboyi sp. nov.* is named in honour of Harrison Richard Wain, born on December 15, 1999 in Sydney, Australia, better known as the Musician "Boxboy" in recognition of his services to the music and entertainment industries.

***CUORA ELFAKHARIORUM SP. NOV.***

**LSIDurn:lsid:zoobank.org:act:BF36411B-4B04-4435-A1D0-59EB3426F3FA**

**Holotype:** A preserved female specimen at the (British) Museum of Natural History, London, UK, specimen number 1863.12.11.163, collected from Borneo. This facility allows access to its holdings.

**Paratypes:** 1/ A preserved juvenile specimen at the (British) Museum of Natural History, London, UK, specimen number1856.9.27.4, collected from Borneo. 2/ A preserved specimen at the Museum National D'Histoire Naturelle, Paris, France, specimen number MNHN-RA-1898.14 collected from Sarawak, Malaysia. 3/ A preserved specimen at The Field Museum of Natural History, Chicago, Illinois, USA, specimen number FMNH Amphibians and Reptiles 63275 collected from Lahad Datu District, Sabah, Malaysia. 4/ Two preserved specimens at Naturalis, The Netherlands, specimen numbers RMNH.RENA.3340 and RMNH.RENA.3886 both collected from Borneo.

**Diagnosis:** Until now, *Cuora elfakhariorum sp. nov.* has been treated as a Borneo (Indonesia) population of the widely distributed putative species *Cuora amboinensis* (Riche in Daudin, 1801), with a type locality of Ambon, Moluccas, Indonesia and found west of there to eastern India.

As of 2021, putative *C. amboinensis* is a species broken up by most herpetologists into up to four subspecies, occupying the range from Ambon, across the East Indies to south-east Asia and across to Eastern India and adjoining countries.

The molecular data of Protiva *et al*. (2016) indicated at least five species in the complex (see Fig. 5 and their accounts of divergences between measured clades in the text of the paper).

Their results did not place the Borneo population with

any recognized subspecies, although Borneo specimens had variously been assigned to either *C. amboinensis amboinensis* (Riche in Daudin, 1801) or *Cuora amboinensis kamaroma* Rummler and Fritz, 1991, type locality about 50 km north of Bangkok, Thailand (*sensu* Ernst *et al.* (2016) at page 145, Fig. 1.).

Protiva *et al*. (2016) showed species-level divergence between the Borneo population and all others and hence its formal description herein.

The Indian form of the putative taxon *C. amboinensis* was the only obviously unnamed one in their phylogeny and so was formally identified and named as *C. jackyhoserae sp. nov.*in this paper.

The four previously recognized subspecies, *Cuora amboinensis amboinensis* (Riche in Daudin, 1801), *Cuora amboinensis couro* (Lechenault in Schweigger 1812), type locality of Java, Indonesia and also occurring on nearby Sumatra, lower Peninsula Malaysia and Singapore, *Cuora amboinensis kamaroma* Rummler and Fritz, 1991, type locality about 50 km north of Bangkok, Thailand and *Cuora amboinensis lineata* McCord and Philippen, 1998, with a type locality of Myitkyina, Kachin Province, Myanmar (Burma), are all herein recognized as full species, each occupying ranges close to their type localities.

Unnamed forms of putative *C. amboinensis* formally named for the first time in this paper and not necessarily included in the phylogentic study of Protiva *et al*. (2016) are as follows:

*C. jackyhoserae sp. nov.* from eastern India and nearby parts of Bangladesh, Bhutan and Myanmar (Burma);

*C. oxyslopp sp. nov*. from the Philippines;

*C. boxboyi sp. nov.* from Sulawesi;

*C. elfakariorum sp. nov.* from Borneo;

*C. richardwellsi sp. nov.* from Enganno Island;

*C. rosswellingtoni sp. nov.* from Halmahera Island.

*C. jackyhoserae sp. nov.* in life is readily separated from all other species in *C. amboinensis* complex by colouration. It is similar in most respects to *C. lineata* (McCord and Philippen, 1998), but separated from that and all other species in the *C. amboinensis* by having in life a strong orange-coloured line running from the snout, above the eye and on the neck.

All but very old specimens of *C. jackyhoserae sp. nov.* are also characterised by having an orange line running down the middle of the dorsum of the carapace. In *C. lineata* (McCord and Philippen, 1998) a similar white or yellow stripe is seen.

*C. lineata* has an extremely strongly domed shell in adults and maximum carapace length of 230 mm, versus somewhat less so in *C. jackyhoserae sp. nov.* and a similar maximum carapace length.

The type form of *C. amboinensis* is separated from the other species in the complex by having a flat broad carapace, with a distinctive margin.

*C. kamaroma* is separated from the other species by having a highly domed carapace, without a well-developed margin and carapace length up to 250 mm.

*C. couro* is intermediate in characters between the two preceding species, but noticeably smaller, with a maximum carapace length of 220 mm and is readily identified and separated from the other two species by having a distinctive charcoal grey to black coloured skin on the head and face, giving it more vivid head markings than seen in the two preceding species.

*C. amboinensis*, *C. oxyslopp sp. nov.* and *C. rosswellingtoni sp. nov.* have a maximum carapace length of just 200 mm, making them the smallest species in the complex.

*C. oxyslopp sp. nov.* are notable for their particularly domed carapace, which is not rounded in shape.

Furthermore, coloration in *C. oxyslopp sp. nov.* is quite different from that of adjacent species, showing significantly finer and whitish (usually not yellow) head stripes compared to broad yellow stripes in all other species except for the orange coloured ones in *C. jackyhoserae sp. nov.*.

The pupil in *C. oxyslopp sp. nov.* has a completely different pattern to the other species, forming a broad black pattern versus being finely shaped in the others.

*C. oxyslopp sp. nov.* also has a narrower head than seen in other species in the complex.

The plastral pattern in typical *C. amboinensis* is highly variable, ranging from nearly entirely black to yellow with or without black spots.

*C. oxyslopp sp. nov.* has a plastral pattern of clear separated spots arranged in a regular pattern.

Soft parts of *C. oxyslopp sp. nov.* are a plain grey to cream in colour and lack reticulations seen in other species in the complex.

*C. rosswellingtoni sp. nov*. is similar in most respects to *C. amboinensis* but is separated from that species by more prominent markings on the limbs, an even more flattened carapace than is seen for the relatively flattened carapace of *C. amboinensis*, and a larger maximum adult carapace length of 220 mm.

*C. rosswellingtoni sp. nov*. also lacks a slight inward inflection of the mid-carapace as seen in *C. amboinensis*, with significantly less upturn of the outer edges.

*C. boxboyi sp. nov.* is separated from the other species in the complex by having a shell that is relatively flattened (in common with *C. rosswellingtoni sp. nov*. and *C. amboinensis*), a noticeably light brown to light grey carapace, except in extremely aged specimens, light grey, rather than dark grey or black on the top of the head and a massive preponderance of yellow on the face (sides of anterior head) not seen in any of the other species as well as a larger maximum adult carapace length of 220 mm.

*C. elfakariorum sp. nov.* is a high-domed, dark-shelled form, with adults generally with a dark brown or black carapace. The top of the head is also brownish-grey in colour, as opposed to the grey-black or light grey seen in other species in the complex. Plastron is usually all or mainly light in colour, except in aged specimens and the carapace has little, if any upturn on the outer edges. Other than the stripe at the top of the head and neck, soft parts are generally unmarked.

*C. richardwellsi sp. nov.* is similar in most respects to *C. elfakariorum sp. nov.* or *C. couro* but is separated from those species by the combination of having faded light grey on the sides of the head, being yellowish grey between the whitish yellow lines on the head, a domed carapace, especially at the rear, a slightly expanded rear carapace and little if any upward inflection of the outer edge.

The carapace is dark brown except in aged specimens.

All species in the *C. amboinensis* species complex are diagnosed and separated from similar species, including others in the genus *Cuora* Gray, 1856 by the following suite of characters: Carapace depressed and tricarinate in the young, usually very convex and without or with a single keel in adult females and often heavily domed in adaults; vertebral shields as long as broad or a little longer than broad in the adult, broader in the young, much narrower than the costals. Plastron as large as the opening of the shell in the adult, without distinct bridge; no anal notch: the line of junction between the hyoplastron and the carapace shorter than that between the hypoplastron and the carapace; pectoral shields as long as or shorter than the abdominals, as long as or slightly longer than the humerals; axillary and inguinal small or absent. Head relatively small; upper jaw scarcely hooked, without any emargination. Front part of arm with large transverse scales. Digits moderately webbed, with sharp claws. Carapace brown or blackish; plastron yellow with large black spots, or dark brown with the suture between the shields yellow; in the very young the black spots of the plastron are confluent into a broad longitudinal zone, the borders of the plastron being yellowish; head and neck grey, brown or blackish above, yellow or whitish interiorly; a (usually) yellow band borders the head and neck superiorly, meeting its fellow above the nostrils; a second yellow band passes through the eye and is separated from the upper jaw by a darker band; ear yellow (modified from Boulenger, 1889).

Photos of *C. jackyhoserae sp. nov.* in life can be found at:

https://www.inaturalist.org/observations/34050984

and

https://www.threatenedtaxa.org/index.php/JoTT/article/view/1915/4108

and https://www.conservationleadershipprogramme.org/media/2014/11/100206_India_FR_Tortoisesturtles.pdf at page 33 (identified as *C. amboinensis*).

*C. oxyslopp sp. nov*. from the Philippines in life can be found on the internet at:

https://www.flickr.com/photos/song-devan/5289168079/

and

https://www.inaturalist.org/observations/4054297

and

https://www.inaturalist.org/observations/64644428

and

https://www.inaturalist.org/observations/9759256

Photos of *C. boxboyi sp. nov.* from Sulawesi can be found in Rhodin *et al*. (2017) at page 86 (bottom right), Schoppe and Das (2011) at fig. 2., or on the internet at:

https://www.flickr.com/photos/135552775@N06/49529193916/

and

https://www.flickr.com/photos/ianbool/29651577068/

and

https://www.flickr.com/photos/135552775@N06/49528687833/

and

https://www.inaturalist.org/observations/19879644

and

https://www.inaturalist.org/observations/36054539

Photos of *C. elfakariorum sp. nov.* from Borneo is depicted on page 87 (bottom left) of Rhodin *et al*. (2017) or can be found on the internet at:

https://www.flickr.com/photos/25872797@N02/43283837055/

and

https://www.flickr.com/photos/elliotbudd/26287786968/

and

https://www.flickr.com/photos/scincella1986/9429454304/

*C. couro* is depicted on page 87 (top left) of Rhodin *et al*. (2017).

Photos of *C. kamaroma* can be found on the internet at:

https://www.flickr.com/photos/30142279@N07/49675777532/

and

https://www.flickr.com/photos/berniedup/6963402976/

Photos of *C. lineata* in life can be seen in McCord and Philippen (1998) or Schoppe and Das (2011) at figs 8 and 9.

*C. richardwellsi sp. nov.* from Enganno Island can be seen in life online at:

https://www.inaturalist.org/observations/72871387

*C. amboinensis* of the type form from Ceram (immediately adjacent to Ambon) can be seen online at:

https://www.inaturalist.org/observations/32940848

**Distribution:** *C. elfakhariorum sp. nov.* is restricted to the Indonesian/Malaysian Island of Borneo and immediately adjacent shelf islands that were connected during the most recent ice-age maxima. Specimens from Palawan (Philippines) are tentatively referred to the species *C. elfakariorum sp. nov.* from Borneo.

**Etymology:** *C. elfakhariorum sp. nov.* is named in honour of three brothers Daniel, Akram and Moses Elfakhari in recognition of their services to the taxi industry in Australia over many decades and critically important (and largely unrecognized) assistances to wildlife conservation in Australia over the same period.

***CUORA RICHARDWELLSI SP. NOV.***

**LSIDurn:lsid:zoobank.org:act:C93C760D-2D48-4703-AE5E-F841ADFBAE11**

**Holotype:** A preserved specimen at the Smithsonian Institution, National Museum of Natural History, Washington, DC, USA specimen number USNM Amphibians and Reptiles 35759 collected from Engano

Island (= Pulau Enggano), Indonesia, Latitude -5.4 S., Longitude 102.25 E. This facility allows access to its holdings.

**Paratype:** A preserved specimen at the Smithsonian Institution, National Museum of Natural History, Washington, DC, USA specimen number USNM Amphibians and Reptiles 35760 collected from Engano Island (= Pulau Enggano), Indonesia, Latitude -5.4 S., Longitude 102.25 E.

**Diagnosis:** Until now, *Cuora richardwellsi sp. nov.* from Engano Island (= Pulau Enggano), Indonesia has been treated as an insular population of the widely distributed putative species *Cuora amboinensis* (Riche in Daudin, 1801), with a type locality of Ambon, Moluccas, Indonesia and found west of there to eastern India.

As of 2021, putative *C. amboinensis* is a species broken up by most herpetologists into up to four subspecies, occupying the range from Ambon, across the East Indies to south-east Asia and across to Eastern India and adjoining countries.

The molecular data of Protiva *et al*. (2016) indicated at least five species in the complex (see Fig. 5 and their accounts of divergences between measured clades in the text of the paper).

Their results did not place the Borneo population with any recognized subspecies, although Borneo specimens had variously been assigned to either *C. amboinensis amboinensis* (Riche in Daudin, 1801) or *Cuora amboinensis kamaroma* Rummler and Fritz, 1991, type locality about 50 km north of Bangkok, Thailand (*sensu* Ernst *et al.* (2016) at page 145, Fig. 1.).

Protiva *et al*. (2016) showed species-level divergence between the Borneo population and all others and hence its formal description in this paper.

The Indian form of the putative taxon *C. amboinensis* was the only obviously unnamed one in their phylogeny and so was formally identified and named as *C. jackyhoserae sp. nov.*in this paper.

The four previously recognized subspecies, *Cuora amboinensis amboinensis* (Riche in Daudin, 1801), *Cuora amboinensis couro* (Lechenault in Schweigger 1812), type locality of Java, Indonesia and also occurring on nearby Sumatra, lower Peninsula Malaysia and Singapore, *Cuora amboinensis kamaroma* Rummler and Fritz, 1991, type locality about 50 km north of Bangkok, Thailand and *Cuora amboinensis lineata* McCord and Philippen, 1998, with a type locality of Myitkyina, Kachin Province, Myanmar (Burma), are all herein recognized as full species, each occupying ranges close to their type localities.

Unnamed forms of putative *C. amboinensis* formally named for the first time in this paper and not necessarily included in the phylogentic study of Protiva *et al*. (2016) are as follows:

*C. jackyhoserae sp. nov.* from eastern India and nearby parts of Bangladesh, Bhutan and Myanmar (Burma);

*C. oxyslopp sp. nov*. from the Philippines;

*C. boxboyi sp. nov.* from Sulawesi;

*C. elfakariorum sp. nov.* from Borneo;

*C. richardwellsi sp. nov.* from Enganno Island;

*C. rosswellingtoni sp. nov.* from Halmahera Island.

*C. jackyhoserae sp. nov.* in life is readily separated from all other species in *C. amboinensis* complex by colouration. It is similar in most respects to *C. lineata* (McCord and Philippen, 1998), but separated from that and all other species in the *C. amboinensis* by having in life a strong orange-coloured line running from the snout, above the eye and on the neck.

All but very old specimens of *C. jackyhoserae sp. nov.* are also characterised by having an orange line running down the middle of the dorsum of the carapace. In *C. lineata* (McCord and Philippen, 1998) a similar white or yellow stripe is seen.

*C. lineata* has an extremely strongly domed shell in adults and maximum carapace length of 230 mm, versus somewhat less so in *C. jackyhoserae sp. nov.* and a similar maximum carapace length.

The type form of *C. amboinensis* is separated from the other species in the complex by having a flat broad carapace, with a distinctive margin.

*C. kamaroma* is separated from the other species by having a highly domed carapace, without a well-developed margin and carapace length up to 250 mm.

*C. couro* is intermediate in characters between the two preceding species, but noticeably smaller, with a maximum carapace length of 220 mm and is readily identified and separated from the other two species by having a distinctive charcoal grey to black coloured skin on the head and face, giving it more vivid head markings than seen in the two preceding species. *C. amboinensis*, *C. oxyslopp sp. nov.* and *C. rosswellingtoni sp. nov.* have a maximum carapace length of just 200 mm, making them the smallest species in the complex.

*C. oxyslopp sp. nov.* are notable for their particularly domed carapace, which is not rounded in shape.

Furthermore, coloration in *C. oxyslopp sp. nov.* is quite different from that of adjacent species, showing significantly finer and whitish (usually not yellow) head stripes compared to broad yellow stripes in all other species except for the orange coloured ones in *C. jackyhoserae sp. nov.*.

The pupil in *C. oxyslopp sp. nov.* has a completely different pattern to the other species, forming a broad black pattern versus being finely shaped in the others.

*C. oxyslopp sp. nov.* also has a narrower head than seen in other species in the complex.

The plastral pattern in typical *C. amboinensis* is highly variable, ranging from nearly entirely black to yellow with or without black spots.

*C. oxyslopp sp. nov.* has a plastral pattern of clear separated spots arranged in a regular pattern.

Soft parts of *C. oxyslopp sp. nov.* are a plain grey to cream in colour and lack reticulations seen in other species in the complex.

*C. rosswellingtoni sp. nov*. is similar in most respects to *C. amboinensis* but is separated from that species by more prominent markings on the limbs, an even more

flattened carapace than is seen for the relatively flattened carapace of *C. amboinensis*, and a larger maximum adult carapace length of 220 mm.

*C. rosswellingtoni sp. nov*. also lacks a slight inward inflection of the mid-carapace as seen in *C. amboinensis*, with significantly less upturn of the outer edges.

*C. boxboyi sp. nov.* is separated from the other species in the complex by having a shell that is relatively flattened (in common with *C. rosswellingtoni sp. nov*. and *C. amboinensis*), a noticeably light brown to light grey carapace, except in extremely aged specimens, light grey, rather than dark grey or black on the top of the head and a massive preponderance of yellow on the face (sides of anterior head) not seen in any of the other species as well as a larger maximum adult carapace length of 220 mm.

*C. elfakariorum sp. nov.* is a high-domed, dark-shelled form, with adults generally with a dark brown or black carapace. The top of the head is also brownish-grey in colour, as opposed to the grey-black or light grey seen in other species in the complex. Plastron is usually all or mainly light in colour, except in aged specimens and the carapace has little, if any upturn on the outer edges. Other than the stripe at the top of the head and neck, soft parts are generally unmarked.

*C. richardwellsi sp. nov.* is similar in most respects to *C. elfakariorum sp. nov.* or *C. couro* but is separated from those species by the combination of having faded light grey on the sides of the head, being yellowish grey between the whitish yellow lines on the head, a domed carapace, especially at the rear, a slightly expanded rear carapace and little if any upward inflection of the outer edge.

The carapace is dark brown except in aged specimens.

All species in the *C. amboinensis* species complex are diagnosed and separated from similar species, including others in the genus *Cuora* Gray, 1856 by the following suite of characters: Carapace depressed and tricarinate in the young, usually very convex and without or with a single keel in adult females and often heavily domed in adaults; vertebral shields as long as broad or a little longer than broad in the adult, broader in the young, much narrower than the costals. Plastron as large as the opening of the shell in the adult, without distinct bridge; no anal notch: the line of junction between the

hyoplastron and the carapace shorter than that between the hypoplastron and the carapace; pectoral shields as long as or shorter than the abdominals, as long as or slightly longer than the humerals;

axillary and inguinal small or absent. Head relatively small; upper jaw scarcely hooked, without any emargination. Front part of arm with large transverse scales. Digits moderately webbed, with sharp claws. Carapace brown or blackish; plastron yellow with large black spots, or dark brown with the suture between the shields yellow; in the very young the black spots of the plastron are confluent into a broad longitudinal zone, the borders of the plastron being yellowish; head and neck grey, brown or blackish above, yellow or whitish interiorly; a (usually) yellow band borders the head and neck superiorly, meeting its fellow above the nostrils; a second yellow band passes through the eye and is separated from the upper jaw by a darker band; ear yellow (modified from Boulenger, 1889).

Photos of *C. jackyhoserae sp. nov.* in life can be found at:

https://www.inaturalist.org/observations/34050984

and

https://www.threatenedtaxa.org/index.php/JoTT/article/view/1915/4108

and https://www.conservationleadershipprogramme.org/media/2014/11/100206_India_FR_Tortoisesturtles.pdf at page 33 (identified as *C. amboinensis*).

*C. oxyslopp sp. nov*. from the Philippines in life can be found on the internet at:

https://www.flickr.com/photos/song-devan/5289168079/

and

https://www.inaturalist.org/observations/4054297

and

https://www.inaturalist.org/observations/64644428

and

https://www.inaturalist.org/observations/9759256

Photos of *C. boxboyi sp. nov.* from Sulawesi can be found in Rhodin *et al*. (2017) at page 86 (bottom right), Schoppe and Das (2011) at fig. 2., or on the internet at:

https://www.flickr.com/photos/135552775@N06/49529193916/

and

https://www.flickr.com/photos/ianbool/29651577068/

and

https://www.flickr.com/photos/135552775@N06/49528687833/

and

https://www.inaturalist.org/observations/19879644

and

https://www.inaturalist.org/observations/36054539

Photos of *C. elfakariorum sp. nov.* from Borneo is depicted on page 87 (bottom left) of Rhodin *et al*. (2017) or can be found on the internet at:

https://www.flickr.com/photos/25872797@N02/43283837055/

and

https://www.flickr.com/photos/elliotbudd/26287786968/

and

https://www.flickr.com/photos/scincella1986/9429454304/

*C. couro* is depicted on page 87 (top left) of Rhodin *et al*. (2017).

Photos of *C. kamaroma* can be found on the internet at:

https://www.flickr.com/photos/30142279@N07/49675777532/

and

https://www.flickr.com/photos/berniedup/6963402976/

Photos of *C. lineata* in life can be seen in McCord and Philippen (1998) or Schoppe and Das (2011) at figs 8 and 9.

*C. richardwellsi sp. nov.* from Enganno Island can be seen in life online at:
https://www.inaturalist.org/observations/72871387

*C. amboinensis* of the type form from Ceram (immediately adjacent to Ambon) can be seen online at:
https://www.inaturalist.org/observations/32940848

**Distribution:** *C. richardwellsi sp. nov.* is believed to be restricted to the Indonesian island of Enganno off the west coast of Sumatra. Specimens from Sumatra are tentatively referred to the species *C. couro* (Lechenault in Schweigger, 1812), with a type locality of Java.

**Etymology:** *C. richardwellsi sp. nov.* is named in honour of Richard W. Wells, now of Lismore in New South Wales, Australia in recognition of significant contributions to herpetology in Australia over many decades and in numerous roles. While best known for various landmark taxonomic publications co-written with (Cliff) Ross Wellington, including Wells and Wellington (1984, 1985), these form but a tiny fraction of his total contributions.

***CUORA ROSSWELLINGTONI SP. NOV.***

**LSIDurn:lsid:zoobank.org:act:1E6405DC-A58E-4B10-99E1-91409A613533**

**Holotype:** A preserved specimen at the Smithsonian Institution, National Museum of Natural History, Washington, DC, USA specimen number Amphibians and Reptiles 216004 collected from Toguraci, Jailolo District, Halmahera, Indonesia. This facility allows access to its holdings.

**Paratypes:** 4 preserved specimens at the Smithsonian Institution, National Museum of Natural History, Washington, DC, USA specimen numbers Amphibians and Reptiles 237627-30 collected from Toguraci, Jailolo District, Halmahera, Indonesia.

**Diagnosis:** Until now, *Cuora rosswellingtoni sp. nov.* from Halmahera Island, Indonesia has been treated as an insular population of the widely distributed putative species *Cuora amboinensis* (Riche in Daudin, 1801), with a type locality of Ambon, Moluccas, Indonesia and found west of there to eastern India.

As of 2021, putative *C. amboinensis* is a species broken up by most herpetologists into up to four subspecies, occupying the range from Ambon, across the East Indies to south-east Asia and across to Eastern India and adjoining countries.

The molecular data of Protiva *et al*. (2016) indicated at least five species in the complex (see Fig. 5 and their accounts of divergences between measured clades in the text of the paper).

Their results did not place the Borneo population with any recognized subspecies, although Borneo specimens had variously been assigned to either *C. amboinensis amboinensis* (Riche in Daudin, 1801) or *Cuora amboinensis kamaroma* Rummler and Fritz, 1991, type locality about 50 km north of Bangkok, Thailand (*sensu* Ernst *et al.* (2016) at page 145, Fig. 1.).

Protiva *et al*. (2016) showed species-level divergence between the Borneo population and all others and hence its formal description in this paper.

The Indian form of the putative taxon *C. amboinensis* was the only obviously unnamed one in their phylogeny and so was formally identified and named as *C. jackyhoserae sp. nov.*in this paper.

The four previously recognized subspecies, *Cuora amboinensis amboinensis* (Riche in Daudin, 1801), *Cuora amboinensis couro* (Lechenault in Schweigger 1812), type locality of Java, Indonesia and also occurring on nearby Sumatra, lower Peninsula Malaysia and Singapore, *Cuora amboinensis kamaroma* Rummler and Fritz, 1991, type locality about 50 km north of Bangkok, Thailand and *Cuora amboinensis lineata* McCord and Philippen, 1998, with a type locality of Myitkyina, Kachin Province, Myanmar (Burma), are all herein recognized as full species, each occupying ranges close to their type localities.

Unnamed forms of putative *C. amboinensis* formally named for the first time in this paper and not necessarily included in the phylogentic study of Protiva *et al*. (2016) are as follows:

*C. jackyhoserae sp. nov.* from eastern India and nearby parts of Bangladesh, Bhutan and Myanmar (Burma);

*C. oxyslopp sp. nov*. from the Philippines;

*C. boxboyi sp. nov.* from Sulawesi;

*C. elfakariorum sp. nov.* from Borneo;

*C. richardwellsi sp. nov.* from Enganno Island;

*C. rosswellingtoni sp. nov.* from Halmahera Island.

*C. jackyhoserae sp. nov.* in life is readily separated from all other species in *C. amboinensis* complex by colouration. It is similar in most respects to *C. lineata* (McCord and Philippen, 1998), but separated from that and all other species in the *C. amboinensis* by having in life a strong orange-coloured line running from the snout, above the eye and on the neck.

All but very old specimens of *C. jackyhoserae sp. nov.* are also characterised by having an orange line running down the middle of the dorsum of the carapace. In *C. lineata* (McCord and Philippen, 1998) a similar white or yellow stripe is seen.

*C. lineata* has an extremely strongly domed shell in adults and maximum carapace length of 230 mm, versus somewhat less so in *C. jackyhoserae sp. nov.* and a similar maximum carapace length.

The type form of *C. amboinensis* is separated from the other species in the complex by having a flat broad carapace, with a distinctive margin.

*C. kamaroma* is separated from the other species by having a highly domed carapace, without a well-developed margin and carapace length up to 250 mm.

*C. couro* is intermediate in characters between the two preceding species, but noticeably smaller, with a maximum carapace length of 220 mm and is readily identified and separated from the other two species by having a distinctive charcoal grey to black coloured skin on the head and face, giving it more vivid head markings than seen in the two preceding species.

*C. amboinensis*, *C. oxyslopp sp. nov.* and *C. rosswellingtoni sp. nov.* have a maximum carapace length of just 200 mm, making them the smallest

species in the complex.

*C. oxyslopp sp. nov.* are notable for their particularly domed carapace, which is not rounded in shape.

Furthermore, coloration in *C. oxyslopp sp. nov.* is quite different from that of adjacent species, showing significantly finer and whitish (usually not yellow) head stripes compared to broad yellow stripes in all other species except for the orange coloured ones in *C. jackyhoserae sp. nov.*.

The pupil in *C. oxyslopp sp. nov.* has a completely different pattern to the other species, forming a broad black pattern versus being finely shaped in the others.

*C. oxyslopp sp. nov.* also has a narrower head than seen in other species in the complex.

The plastral pattern in typical *C. amboinensis* is highly variable, ranging from nearly entirely black to yellow with or without black spots.

*C. oxyslopp sp. nov.* has a plastral pattern of clear separated spots arranged in a regular pattern.

Soft parts of *C. oxyslopp sp. nov.* are a plain grey to cream in colour and lack reticulations seen in other species in the complex.

*C. rosswellingtoni sp. nov*. is similar in most respects to *C. amboinensis* but is separated from that species by more prominent markings on the limbs, an even more flattened carapace than is seen for the relatively flattened carapace of *C. amboinensis*, and a larger maximum adult carapace length of 220 mm.

*C. rosswellingtoni sp. nov*. also lacks a slight inward inflection of the mid-carapace as seen in *C. amboinensis*, with significantly less upturn of the outer edges.

*C. boxboyi sp. nov.* is separated from the other species in the complex by having a shell that is relatively flattened (in common with *C. rosswellingtoni sp. nov*. and *C. amboinensis*), a noticeably light brown to light grey carapace, except in extremely aged specimens, light grey, rather than dark grey or black on the top of the head and a massive preponderance of yellow on the face (sides of anterior head) not seen in any of the other species as well as a larger maximum adult carapace length of 220 mm.

*C. elfakariorum sp. nov.* is a high-domed, dark-shelled form, with adults generally with a dark brown or black carapace. The top of the head is also brownish-grey in colour, as opposed to the grey-black or light grey seen in other species in the complex. Plastron is usually all or mainly light in colour, except in aged specimens and the carapace has little, if any upturn on the outer edges. Other than the stripe at the top of the head and neck, soft parts are generally unmarked.

*C. richardwellsi sp. nov.* is similar in most respects to *C. elfakariorum sp. nov.* or *C. couro* but is separated from those species by the combination of having faded light grey on the sides of the head, being yellowish grey between the whitish yellow lines on the head, a domed carapace, especially at the rear, a slightly expanded rear carapace and little if any upward inflection of the outer edge.

The carapace is dark brown except in aged specimens.

All species in the *C. amboinensis* species complex are diagnosed and separated from similar species, including others in the genus *Cuora* Gray, 1856 by the following suite of characters: Carapace depressed and tricarinate in the young, usually very convex and without or with a single keel in adult females and often heavily domed in adaults; vertebral shields as long as broad or a little longer than broad in the adult, broader in the young, much narrower than the costals. Plastron as large as the opening of the shell in the adult, without distinct bridge; no anal notch: the line of junction between the hyoplastron and the carapace shorter than that between the hypoplastron and the carapace; pectoral shields as long as or shorter than the abdominals, as long as or slightly longer than the humerals; axillary and inguinal small or absent. Head relatively small; upper jaw scarcely hooked, without any emargination. Front part of arm with large transverse scales. Digits moderately webbed, with sharp claws. Carapace brown or blackish; plastron yellow with large black spots, or dark brown with the suture between the shields yellow; in the very young the black spots of the plastron are confluent into a broad longitudinal zone, the borders of the plastron being yellowish; head and neck grey, brown or blackish above, yellow or whitish interiorly; a (usually) yellow band borders the head and neck superiorly, meeting its fellow above the nostrils; a second yellow band passes through the eye and is separated from the upper jaw by a darker band; ear yellow (modified from Boulenger, 1889).

Photos of *C. jackyhoserae sp. nov.* in life can be found at:

https://www.inaturalist.org/observations/34050984

and

https://www.threatenedtaxa.org/index.php/JoTT/article/view/1915/4108

and https://www.conservationleadershipprogramme.org/media/2014/11/100206_India_FR_Tortoisesturtles.pdf at page 33 (identified as *C. amboinensis*).

*C. oxyslopp sp. nov*. from the Philippines in life can be found on the internet at:

https://www.flickr.com/photos/song-devan/5289168079/

and

https://www.inaturalist.org/observations/4054297

and

https://www.inaturalist.org/observations/64644428

and

https://www.inaturalist.org/observations/9759256

Photos of *C. boxboyi sp. nov.* from Sulawesi can be found in Rhodin *et al.* (2017) at page 86 (bottom right), Schoppe and Das (2011) at fig. 2., or on the internet at:

https://www.flickr.com/photos/135552775@N06/49529193916/

and

https://www.flickr.com/photos/ianbool/29651577068/

and

https://www.flickr.com/photos/135552775@N06/49528687833/

and
https://www.inaturalist.org/observations/19879644
and
https://www.inaturalist.org/observations/36054539
Photos of *C. elfakariorum sp. nov.* from Borneo is depicted on page 87 (bottom left) of Rhodin *et al.* (2017) or can be found on the internet at:
https://www.flickr.com/photos/25872797@N02/43283837055/
and
https://www.flickr.com/photos/elliotbudd/26287786968/
and
https://www.flickr.com/photos/scincella1986/9429454304/
*C. couro* is depicted on page 87 (top left) of Rhodin *et al.* (2017).

Photos of *C. kamaroma* can be found on the internet at:
https://www.flickr.com/photos/30142279@N07/49675777532/
and
https://www.flickr.com/photos/berniedup/6963402976/

Photos of *C. lineata* in life can be seen in McCord and Philippen (1998) or Schoppe and Das (2011) at figs 8 and 9.

*C. richardwellsi sp. nov.* from Enganno Island can be seen in life online at:
https://www.inaturalist.org/observations/72871387

*C. amboinensis* of the type form from Ceram (immediately adjacent to Ambon) can be seen online at:
https://www.inaturalist.org/observations/32940848

**Distribution:** *C. rosswellingtoni sp. nov.* is believed to be restricted to the Indonesian island of Halmahera and immediately adjacent islets, including Bacan.

**Etymology:** *C. rosswellingtoni sp. nov.* is named in honour of Cliff Ross Wellington, now of Ramornie, northern in New South Wales, Australia in recognition of significant contributions to herpetology in Australia over many decades and in numerous roles. While best known for various landmark taxonomic publications co-written with Richard Wells including Wells and Wellington (1984, 1985), these form but a tiny fraction of his total contributions.

***CHERSINA SWILEORUM SP. NOV.***

**LSIDurn:lsid:zoobank.org:act:5AE1E27D-3C44-4DC9-9F5F-6710BB9860D8**

**Holotype:** A preserved specimen at The Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA, specimen number MCZ Herp R-42210, collected from Steinkopf, South Africa, Latitude -29.267 S., Longitude 17.733 E. This facility allows access to its holdings.

**Diagnosis:** Until now, *C. swileorum sp. nov*. from north-west South Africa and nearby Namibia has been treated as a northern outlier population of *Chersina angulata* (Duméril in Schweigger, 1812).

*C. swileorum sp. nov*. is readily separated from *C. angulata* by the following suite of characters: Having a carapace that is generally more rounded in shape than the usual loaf-shaped carapace of the other regional forms of *C. angulata*; orange-red on the skin of the face and neck (versus usually yellowish) and a reddish-orange outer rim of the plastron.

Both males and females of *C. swileorum sp. nov*. grow larger than *C. angulata* and whereas females are generally smaller than males in *C. angulata* this is not the case for *C. swileorum sp. nov*..

*C. angulata* is notable in having deeper plastron concavity in males than is seen in *C. swileorum sp. nov*. and *C. angulata* is further distinguished by having an elongated and up-curved gular shield.

Spitzweg *et al*. (2020) gave evidence to show that *C. swileorum sp. nov*. diverged from the *C. angulata* about 3.8 MYA, which is species-level divergence, even in the face of evidence of potential hybridisation between the two taxa in the south-west of South Africa.

The African Angulate Tortoise, *Chersina angulata* (Duméril in Schweigger, 1812), long suspected of comprising up to four well-defined regional forms (*sensu* Archer, 1967) remained prior to this formal description as being treated by herpetologists as a single species until now.

However, Spitzweg *et al.* (2020) presented compelling evidence for the splitting of the putative species at least two ways, this being the southern population and that from Namaqualand, in far northwest South Africa and adjacent Namibia (as done herein).

While there has been expressed doubt as to the exact provenance of the type specimen for the species *C. angulata* by Spitzweg *et al*. (2020), the drawing of the type material (with reference to the colouration of the lower head) shows it is not of the north-west form.

The type locality for "*Testudo bellii* Gray, 1828" is "Cape of Good Hope" (Latitude 34.3568 S., Longitude 18.4740 E.) and again not of the northern form.

"Cape of Good Hope" is located south of Cape Town, South Africa, where the species *C. angulata* is common and the holotype of is evidently of that form.

The specimen described as *Chersina angulata pallida* Gray, 1831 is again of colouration of the southern form and not that of the north-west of the range of the putative species *Chersina angulata.*

Hence the until now unnamed form from Namaqualand, stated by Spitzweg *et al*. (2020) as having diverged from the nominate form (in pure state) some 3.8 MYA is formally named in this paper as a new species, *C. swileorum sp. nov.*.

A colour image of *C. swileorum sp. nov.* in life can be found online at:
https://www.inaturalist.org/observations/10881141

A photo of a live *Chersina angulata* (Duméril in Schweigger, 1812) of the type form from near Cape Town, South Africa can be found online at:
https://www.inaturalist.org/observations/75814700

**Distribution:** The northern half of the western side South Africa along the coast and near coastal areas, into Namibia, with a distribution centered on Namaqualand.

**Etymology:** Named in honour of Ernest Swile and his

family, from Athlone, Cape Town, South Africa in recognition of their contributions to herpetology in southern Africa.

***CHERSOBIUS MANDELA SP. NOV.***

**LSIDurn:lsid:zoobank.org:act:47E2D144-C99B-48DB-B115-E9156FE67A93**

**Holotype:** A preserved adult male specimen at the Port Elizabeth (now Gqeberha) Museum herpetological collection specimen number PEM Rl 7307, collected from a dirt road between Pofadder and Onseepkans, Northern Cape Province, South Africa, Latitude 29.045l S., Longitude 19.2450 E., at 920 metres above sea level (= 2919 feet ASL). This facility allows access to its holdings.

There is a detailed description of the holotype in Branch *et al*. (2007) including a photograph of it in life on page 27.

**Diagnosis:** *Chersobius mandela sp. nov*. has until now been treated as either *Chersobius signatus* (Gmelin, 1789) or a potentially unnamed subspecies of that taxon.

However it is morphologically and distributionally divergent, allopatric and was found by Daniels *et al*. (2009) to have a cyt b divergence of from 1.97 to 2.46 percent from the two putative subspecies of *C. signatus*.which is a species-level divergence for this taxon.

*C. mandela sp. nov*. is readily separated from both putative subspecies of *C. signatus* by the following unique combination of characters: A carapace coloration consisting of an orange background, yellowing towards the centre of the scutes, with a heavy dark speckling that does not coalesce to form blotches or rays, as also seen in the southern subspecies *C. signatus cafer* (Daudin, 1802), that race being found from Klawer south to Piketberg and Citrusdal, in south-western South Africa.

However *C. mandela sp. nov.* is separated from *C. signatus cafer* by having serrations in the rear marginals that are greater in size than seen in that subspecies and approaching the size in the differently coloured northern subspecies *C. signatus signatus*, that taxon found from the orange River south to just north of Klawer.

The nearest known population of *C. signatus signatus* is found about 250 km to the west of Pofadder at Springbok, with the intervening zone between constituting unfavourable habitat for putative *C. signatus* or *C. mandela sp. nov.*, with the reasonable expectation neither taxon, or any intermediates occur there.

*C. signatus signatus* is separated from both *C. signatus cafer* and *C. mandela sp. nov*. by having an overall dark appearance and a light-brown background colour. The carapace has large, dark speckles and sometimes rays of background colour.

*C. signatus cafer* is separated from *C. signatus signatus* and *C. mandela sp. nov*. by having an orange-red or salmon-pink carapace, with a pattern of finer dark stipples and short, thin black rays and minimal serration in the rear marginals.

Both *C. signatus* (both subspecies) and *C. mandela sp. nov*. are separated from other species in the genus by having a clearly speckled carapace, versus not so in the others, hence the common name “Specked Padloper”.

Tortoises of the genus *Chersobius* Fitzinger, 1835 are readily separated from similar and closely related genera as follows: They have a single, large inguinal scute, whereas the number is variable in the morphologically similar *Homopus* Duméril and Bibron, 1834. The midline pectoral scute of C*hersobius* is consistently longer and the nuchal scute shorter, than seen in *Homopus*. The fourth to fifth vertebral suture is narrow in *Homopus* and broad in *Chersobius.* Forelimb scales also differ with 3-4 large rows and 5-6 smaller rows, respectively, in *Homopus* and *Chersobius. Chersobius* males have a plastral concavity and *Homopus* males not. Three *Chersobius* species (*C. signatus*, *C. mandela sp. nov.* and *C. boulengeri*) are distinguishable from *Homopus* by having 12 or more marginal scutes, whereas *Homopus* species have 11 or fewer.

There are five toes on the forefeet in *Chersobius*. The glans penes are respectively V-shaped and heart-shaped in *Homopus* and *Chersobius.* Ecological differences include that *Chersobius* species are rupicolous and inhabit arid regions, whereas *Homopus* species inhabit more mesic habitats. *Homopus* females produce multi-egg clutches and tend to be bigger compared to single-egg clutching *Chersobius* females. Females of all species are with some exceptions, larger than conspecific males, and all males have larger shell openings than females have (modified from Hofmeyr and Branch, 2018).

**Distribution:** *Chersobius mandela sp. nov*. is known only from the type locality being just north of Pofadder, northern South Africa. It is almost certainly a taxon restricted to a small area and fieldwork should be undertaken to locate remaining populations of the species and to ensure it’s future survival in a country where the population of humans has gone up four fold in the period 1980-2020.

**Etymology:** *Chersobius mandela sp. nov*. is named in honour of a well-known deceased South African, Nelson Rolihlahla Mandela. He spent a large part of his life as an anti-apartheid revolutionary.He later served as President of South Africa from 1994 to 1999. He was the country’s first black head of state and the first elected in a fully representative democratic election.

While he was an imperfect man, he did manage to make peace between racial groups in South Africa (with great assistance’s of others of various race and colour) and prevented a generally forseen bloodbath between white and black people that in the 1970’s and 1980’s was at the time seen as inevitable.

***FUNKICHELYS GEN. NOV.***

**LSIDurn:lsid:zoobank.org:act:5F1FA601-6340-41A3-800D-BCD1A5317EB9**

**Type species:** *Funkichelys funki sp. nov.*

**Diagnosis:** Both genera *Homopus* Duméril and Bibron, 1834 and *Funkichelys gen. nov.* are readily separated from all other similar African genera by the following

suite of characters: They are small African tortoises with the triturating surfaces of maxilla and premaxilla without ridges; maxillary not entering roof of palate; prootic narrowly exposed dorsally; quadrate enclosing stapes; centrum of third cervical biconvex; carapace without hinge; no submarginal scutes; gulars divided; gular region only slightly thickened; four toes on the feet.

*Funkichelys gen. nov.* including the species *Funkichelys funki sp. nov.* and *F. femoralis* (Boulenger, 1888) are separated from *Homopus* with type species *Homopus areolatus* (Thunberg, 1787) and all other similar species by the following suite of characters: 17 cm in maximum carapace length. Its carapace is flattened dorsally, scarcely indented in the cervical region and has the anterior and posterior marginals expanded, reverted, and serrated. A small, broad cervical scute is present and the first vertebral is longer than broad, or at least as long as broad, while the others are broader than long. Eleven marginals lie on each side and the supracaudal is undivided. The carapace is yellowish brown to dark brown or olive with the scutes dark bordered in younger individuals. The scutes of some are orange or red tinged. The plastron is yellow to olive, with dark pigment on the anterior of each scute in the young, but immaculate in older tortoises. Its forelobe is anteriorly truncated and scarcely notched; the hindlobe has an anal notch. The plastral formula is: abd > hum > an >< fem > gul > pect. Each bridge has a single axillary and two or three inguinal scutes, the innermost touching the femoral scute. The head is moderate in size, with at best a weakly hooked, tricuspid upper jaw (versus strongly beaked in *Homopus*) and a nonprojecting snout. Several small scales lie above the nostrils. The prefrontal scale is large and divided longitudinally; the frontal is also large or is subdivided; other head scales are small. Head and neck are yellow to tan with some pink or orange pigment; the jaws are brown. The forelimbs are anteriorly covered with large imbricate scales in three or four longitudinal rows and a large conical tubercle is present on the thigh. The heels have large spurlike tubercles. Four claws occur on each forefoot. Limbs and tail are yellow to tan with tinges of pink or orange.

The smaller males have a posteriorly concave plastron with deeper anal notches and posess longer, thicker tails than females.

The species *Funkichelys funki sp. nov.* has until now been treated as a western population of *F. femoralis* (Boulenger, 1888), previously known as *Homopus femoralis* Boulenger, 1888.

In the absence of locality information, *F. funki sp. nov.* is most readily and reliably separated from *F. femoralis* by inspection of the plastron. The humeral shields (second pair from anterior) in *F. femoralis* are noticeably triangular in shape, versus not so in *F. funki sp. nov.*, where they are more or less rectangular in shape. This has been consistent in several dozen specimens of each species I have inspected.

Furthermore the two species are readily separated as follows: *F. funki sp. nov.* is of reddish-brown colour, versus yellowish brown in *F. femoralis. F. funki sp. nov.* has thin, often indistinct dark etching between scutes on the carapace, vs thick and well defined lines between carapace scutes in *F. femoralis.* Dark lines etching the scutes of the carapace are thick and obvious in *F. femoralis* and not so in *F. funki sp. nov.*.

Hofmeyr *et al.* (2016) found a 26.14 MYA divergence between the putative species *Homopus areolatus* (Thunberg, 1787) and *Homopus femoralis* Boulenger, 1888, further supporting the contention that transferring the latter species to another genus is the correct taxonomic action.

The same authors also found species-level divergences between both preceding putative species, as in *F. femoralis* and *F. funki sp. nov.* (see Fig. 2), which is reflected in the taxonomic position of this paper.

**Distribution:** *Funkichelys gen. nov.* are endemic to South Africa.

**Etymology:** *Funkichelys gen. nov.* is named in honour of Dr. Richard Funk, veterinary surgeon of Mesa, Arizona, USA, (previously of Florida, USA), in recognition of a lifetime's contribution to herpetology, including working with several threatened and endangered species of land tortoises and numerous important publications.

**Content:** *Funkichelys funki sp. nov.*(type species); *F. femoralis* (Boulenger, 1888).

***FUNKICHELYS FUNKI SP. NOV.***

**LSIDurn:lsid:zoobank.org:act:C9E77E10-7397-4B34-8F3C-B0543FEB3720**

**Holotype:** A preserved specimen at the (British) Museum of Natural History, London, UK, reptile collection, specimen number: BMNH 1988.425, collected at Karoo National Park, Beaufort West, Cape Province, South Africa. This facility allows access to its holdings.

**Paratype:** A preserved specimen at the (British) Museum of Natural History, London, UK, reptile collection, specimen number: BMNH 1988.426, collected at Karoo National Park, Beaufort West, Cape Province, South Africa.

**Diagnosis:** The species *Funkichelys funki sp. nov.* has until now been treated as a western population of *F. femoralis* (Boulenger, 1888), with a type locality of Cradock, South Africa, previously known as *Homopus femoralis* Boulenger, 1888.

In the absence of locality information, *F. funki sp. nov.* is most readily and reliably separated from *F. femoralis* by inspection of the plastron. The humeral shields (second pair from anterior) in *F. femoralis* are noticeably triangular in shape, versus not so in *F. funki sp. nov.*, where they are more or less rectangular in shape. This has been consistent in several dozen specimens of each species I have inspected and yet has never previously been reported in the literature.

Furthermore the two species are readily separated as follows: *F. funki sp. nov.* is of reddish-brown colour, versus yellowish brown in *F. femoralis. F. funki sp. nov.* has thin, often indistinct dark etching between scutes on the carapace, vs thick and well defined lines between carapace scutes in *F. femoralis.* Dark lines etching the scutes of the carapace are thick and obvious in *F.*

*femoralis* and not so in *F. funki sp. nov.*.

Images of *F. funki sp. nov.* in life can be seen in Rhodin *et al*. (2017) at page 140 top right and online at:

https://www.inaturalist.org/observations/9837266

(carapace and plastron shots)

and

https://www.inaturalist.org/observations/38955294

and

https://www.inaturalist.org/observations/9820014

The type form of *F. femoralis* (herein also identified as the Cradock form, in reflection of the type locality for the species) can be seen in life online in images at:

https://www.inaturalist.org/observations/21417512

and

https://www.inaturalist.org/observations/10262573

and

https://www.inaturalist.org/observations/10389242

which collectively also include dorsal and ventral views.

Hofmeyr *et al.* (2016), found a 3.9 MYA divergence between *F. funki sp. nov.* and *F. femoralis* as defined herein.

Both genera *Homopus* Duméril and Bibron, 1834 and *Funkichelys gen. nov.* are readily separated from all other similar African genera by the following suite of characters: They are small African tortoises with the triturating surfaces of maxilla and premaxilla without ridges; maxillary not entering roof of palate; prootic narrowly exposed dorsally; quadrate enclosing stapes; centrum of third cervical biconvex; carapace without hinge; no submarginal scutes; gulars divided; gular region only slightly thickened; four toes on the feet.

*Funkichelys gen. nov.* including the species *Funkichelys funki sp. nov.* and *F. femoralis* (Boulenger, 1888) are separated from *Homopus* type species *Homopus areolatus* (Thunberg, 1787) and all other similar species by the following suite of characters: 17 cm in maximum carapace length. Its carapace is flattened dorsally, scarcely indented in the cervical region and has the anterior and posterior marginals expanded, reverted, and serrated. A small, broad cervical scute is present, and the first vertebral is longer than broad, or at least as long as broad, while the others are broader than long. Eleven marginals lie on each side and the supracaudal is undivided. The carapace is yellowish brown to dark brown or olive with the scutes dark bordered in younger individuals. The scutes of some are orange or red tinged. The plastron is yellow to olive, with dark pigment on the anterior of each scute in the young, but immaculate in older tortoises. Its forelobe is anteriorly truncated and scarcely notched; the hindlobe has an anal notch. The plastral formula is: abd > hum > an >< fem > gul > pect. Each bridge has a single axillary and two or three inguinal scutes, the innermost touching the femoral scute. The head is moderate in size, with at best a weakly hooked, tricuspid upper jaw (versus strongly beaked in *Homopus*) and a nonprojecting snout. Several small scales lie above the nostrils. The prefrontal scale is large and divided longitudinally; the frontal is also large or is subdivided; other head scales are small. Head and neck are yellow to tan with some pink or orange pigment; the jaws are brown. The forelimbs are anteriorly covered with large imbricate scales in three or four longitudinal rows and a large conical tubercle is present on the thigh. The heels have large spurlike tubercles. Four claws occur on each forefoot. Limbs and tail are yellow to tan with tinges of pink or orange.

The smaller males have a posteriorly concave plastron with deeper anal notches and posess longer, thicker tails than females.

Hofmeyr *et al.* (2016) found a 26.14 MYA divergence between the putative species *Homopus areolatus* (Thunberg, 1787) and *Homopus femoralis* Boulenger, 1888, further supporting the contention that transferring the latter species to another genus is the correct taxonomic action.

The same authors also found species-level divergences between both preceding putative species, *Funkichelys funki sp. nov.* and *F. femoralis*, (see Fig. 2), which is reflected in the taxonomic position of this paper.

**Distribution:** *F. funki sp. nov*. is found in the Sutherland, Merweville, Fraserburg and Beaufort

West Districts and separated from the eastern population by the 150 km-wide “Nelspoort Interval”, as defined by Clark *et al.* (2011) and sources cited therein. The approximate distribution of *F. funki sp. nov.* is also depicted in Fig 1 of Clark *et al.* (2011).

*F. femoralis* is found east of the “Nelspoort Interval” and generally occurs at altitudes of over 900 m in the eastern Cape, the south-west Orange Free State, and presumably the extreme south-west of the Transvaal.

**Etymology:** *F. funki sp. nov*. is named in honour of Dr. Richard Funk, veterinary surgeon of Mesa, Arizona, USA, (previously of Florida, USA), in recognition of a lifetime’s contribution to herpetology, including working with several threatened and endangered species of land tortoises and a number of important publications on herpetological matters.

***HOMOPUS TREVORHAWKESWOODI SP. NOV.***

**LSIDurn:lsid:zoobank.org:act:B6DBC5AC-1AA5-4402-BD91-8E7B5C00525A**

**Holotype:** A preserved specimen at the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA, specimen number MCZ Herp R-22474, collected from Grahmstown (AKA Makhanda), South Africa, Latitude -33.3 S., Longitude 26.533 E. This facility allows access to its holdings.

**Paratypes:** 1/ A preserved specimen at the University of Kansas Biodiversity Institute. University of Kansas, Lawrence, Kansas, USA, KUBI Herpetology Collection, specimen number KU KUH 195099 collected at Port Elizabeth (now known as officially renamed Gqeberha), South Africa. 2/ A preserved specimen at Naturalis Biodiversity Center, The Netherlands, specimen number ZMA.RENA.19055, collected at Port Elizabeth (now known as officially renamed Gqeberha), South Africa. 3/ A preserved dry specimen at Cornell University Museum of Vertebrates, Ithaca, New York, USA, CUMV Amphibian and Reptile Collection, specimen number Rept R-0011249 collected at Port Elizabeth (now known

as officially renamed Gqeberha), South Africa. 4/ A preserved dry specimen at the National Museum of Natural History, Smithsonian Institution, Washington, DC, USA, specimen number USNM Amphibians and Reptiles 39420 collected from Grahmstown (AKA Makhanda), South Africa, Latitude -33.3 S., Longitude 26.533 E. 5/ A preserved male specimen at the (British) Museum of Natural History, London, UK, specimen number 1890.8.29.1-2 collected from Port Elizabeth (now known as officially renamed Gqeberha), South Africa.

**Diagnosis:** Until now *Homopus trevorhawkeswoodi sp. nov*. has been regarded as the eastern population of *H. areolatus* (Thunberg, 1787).

*H. trevorhawkeswoodi sp. nov*. is readily separated from *H. areolatus* as follows:
In all but very aged specimens of *H. trevorhawkeswoodi sp. nov*. the outer edges of the dorsal scutes are bounded by thick, well-defined blackish brown lines, in turn with thick greenish-yellow outer areas occupying a sizeable part of each scute, being brown on the surface of the inner region of each scute.

In *H. areolatus* the blackish lines on the outer edges of the scutes are thin, ill defined or even absent. When viewed at a distance, the carapace of *H. areolatus* is yellowish brown or yellowish-orange, versus greenish brown in *H. trevorhawkeswoodi sp. nov*. In *H. areolatus* the outer area of each scute is yellowish, with orange or orange brown in the inner region of each scute.

The subspecies *H. trevorhawkeswoodi knysaensis subsp. nov.* from Knysa, west along the coast and nearby areas to Struisbaai is separated from nominate subspecies *H. trevorhawkeswoodi trevorhawkeswoodi subsp. nov.* by having expanded yellow-green outer areas of each scute and a reduced brown coloured inner scute area, typically being equal to, or less than the yellow-green outer areas in diameter, versus being greater in diameter in the nominate form *H. trevorhawkeswoodi trevorhawkeswoodi subsp. nov.* (and *H. trevorhawkeswoodi bloemfonteinensis subsp. nov.*). The inner area of each dorsal scute is dark brown in *H. trevorhawkeswoodi knysaensis subsp. nov.*, rather than medium to light brown in *H. trevorhawkeswoodi sp. nov.*

*H. trevorhawkeswoodi bloemfonteinensis subsp. nov*. from Bloemfontein and nearby parts of Free State is similar in most respects to *H. trevorhawkeswoodi trevorhawkeswoodi subsp. nov.*, but is noticeably faded in colour in most respects and is generally separated on that basis. The limbs tend to be light grey on top, raher than whitish as seen in *H. trevorhawkeswoodi trevorhawkeswoodi subsp. nov.*.

The nominate subspecies *H. trevorhawkeswoodi trevorhawkeswoodi subsp. nov.* is found in a region generally bound by Cape St. Francis, just west of Port Elizabeth (now known as officially renamed Gqeberha), in a generally triangular region to the east of there and bound approximately by Fort Beaufort and Port Albert.

The northern limit of *H. trevorhawkeswoodi trevorhawkeswoodi subsp. nov.* and southern limit of *H. trevorhawkeswoodi bloemfonteinensis subsp. nov*. is uncertain, but *H. trevorhawkeswoodi sp. nov.* is known from locations within the intervening region.

The image depicted with Thunberg's, 1787 description of *H. areolatus* (Thunberg, 1787) is clearly of a specimen with a provenance of Cape Town, South Africa, as evidenced by the colouration of the carapace (yellow outers of each scute and light reddish-range inner scutes and no trace of green), meaning the eastern form was until now the unnamed species.

Hofmeyr *et al.* (2020), found that the taxa herein described as *H. trevorhawkeswoodi sp. nov.* and *H. areolatus* (Thunberg, 1787) diverged more than 2.5 MYA in the Pliocene. The same authors found the subspecies of *H. trevorhawkeswoodi sp. nov.* as identified herein diverged from one another more than 1.5 MYA. Hofmeyr *et al.* (2016) found a 6.43 MYA divergence between *H. trevorhawkeswoodi sp. nov.* and *H. areolatus* (Thunberg, 1787) and over 3 MYA for the subspecies of *H. trevorhawkeswoodi sp. nov..*

Colour images of *H. trevorhawkeswoodi sp. nov.* (of the nominate subspecies) in life can be found online at:
https://www.inaturalist.org/observations/41104576
and
https://www.inaturalist.org/observations/80391390
and
https://www.inaturalist.org/observations/37215272
and
https://www.inaturalist.org/observations/16520155

Colour images of *H. trevorhawkeswoodi kynsaensis subsp. nov.* in life can be found online at:
https://www.inaturalist.org/observations/82145048
and
https://www.inaturalist.org/observations/11214561
and
https://www.inaturalist.org/observations/57302877

Colour images of the nominate form of *Homopus areolatus* depicted in life can be found in Rhodin *et al*. (2017) at page 140 and online at:
https://commons.wikimedia.org/wiki/File:Homopus_areolatus_-_Common_Padloper_-_Cape_Town.jpg
and
https://www.inaturalist.org/observations/71497635
and
https://www.inaturalist.org/observations/24354766

The species *H. trevorhawkeswoodi sp. nov*. and *H. areolatus* constituting the entirety of the genus *Homopus* Duméril and Bibron, 1834 are separated from other similar species and genera by the following unique suite of characters: The slightly domed carapace (females to 30 cm) is dorsally flattened, scarcely indented in the cervical region, has the anterior marginals only slightly expanded and the unexpanded posterior marginals not or only slightly serrated. A small but broad cervical scute is present; the first and fourth vertebrals are longer than broad and the others are broader than long. A slight medial keel may be present, especially in younger specimens. Vertebrals and pleurals have broad areolae

surrounded by raised growth annuli. There are usually 11, but occasionally 10 to 13, marginals on each side and the supracaudal is undivided. Areolae of the carapacial scutes are reddish brown with yellow, olive, dark-brown, or black borders. A dark bar of some form usually lies along the anterior seam of each marginal. The yellowish or yellowish-brown plastron usually has some dark pigment toward the center. Its forelobe is anteriorly truncated, the hindlobe notched posteriorly. The plastral formula is: abd > hum > an > fem >< pect >< gul. Each bridge has one or two (sometimes to five) axillary scutes and three or four inguinals, the innermost touching the femoral scute. The head is moderate in size with a nonprojecting snout and a strongly hooked, tricuspid upper jaw. Usually, no small scales lie above the nostrils, and the large prefrontal scale may be divided or partially (posteriorly) divided longitudinally. The frontal scale may be subdivided. Other dorsal head scales are small. The head varies from yellow to tan or reddish brown, the jaws are tan. The neck varies from yellowish brown to reddish brown, as do the limbs and tail. Each forelimb is covered anteriorly with large, overlapping scales in three or four longitudinal rows. There are four claws on each forefoot.

Males are smaller than females and have a posteriorly concave, usually uniformly colored plastron and longer, thicker tails than females. Females have a flat, usually medially dark plastron and a short tail. During the breeding season, the prefrontal scales of the males tend to show an orange-red coloration for several weeks. To a lesser extent, this coloration is sometimes present in females as well.

Both genera *Homopus* Duméril and Bibron, 1834 and *Funkichelys gen. nov.* as defined within this paper, are readily separated from all other similar African genera by the following suite of characters: They are small African tortoises with the triturating surfaces of maxilla and premaxilla without ridges; maxillary not entering roof of palate; prootic narrowly exposed dorsally; quadrate enclosing stapes; centrum of third cervical biconvex; carapace without hinge; no submarginal scutes; gulars divided; gular region only slightly thickened; four toes on the feet.

*Funkichelys gen. nov.* including the species *Funkichelys funki sp. nov.* and *F. femoralis* (Boulenger, 1888) are separated from *Homopus* type species *Homopus areolatus* (Thunberg, 1787) and all other similar species by the following suite of characters: 17 cm in maximum carapace length. Its carapace is flattened dorsally, scarcely indented in the cervical region and has the anterior and posterior marginals expanded, reverted, and serrated. A small, broad cervical scute is present, and the first vertebral is longer than broad, or at least as long as broad, while the others are broader than long. Eleven marginals lie on each side and the supracaudal is undivided. The carapace is yellowish brown to dark brown or olive with the scutes dark bordered in younger individuals. The scutes of some are orange or red tinged. The plastron is yellow to olive, with dark pigment on the anterior of each scute in the young, but immaculate in older tortoises. Its forelobe is anteriorly truncated and scarcely notched; the hindlobe has an anal notch. The plastral formula is: abd > hum > an >< fem > gul > pect. Each bridge has a single axillary and two or three inguinal scutes, the innermost touching the femoral scute. The head is moderate in size, with at best a weakly hooked, tricuspid upper jaw (versus strongly beaked in *Homopus*) and a nonprojecting snout. Several small scales lie above the nostrils. The prefrontal scale is large and divided longitudinally; the frontal is also large or is subdivided; other head scales are small. Head and neck are yellow to tan with some pink or orange pigment; the jaws are brown. The forelimbs are anteriorly covered with large imbricate scales in three or four longitudinal rows and a large conical tubercle is present on the thigh. The heels have large spurlike tubercles. Four claws occur on each forefoot. Limbs and tail are yellow to tan with tinges of pink or orange.

The usually smaller males have a posteriorly concave plastron with deeper anal notches and posess longer, thicker tails than females.

Hofmeyr *et al.* (2016) found a 26.14 MYA divergence between the putative species *Homopus areolatus* (Thunberg, 1787) and *Homopus femoralis* Boulenger, 1888, further supporting the contention that transferring the latter species to another genus is the correct taxonomic action.

The same authors also found species-level divergences between relevant preceding identified herein putative species, (see Fig. 2), which is reflected in the taxonomic position of this paper.

**Distribution:** *H. trevorhawkeswoodi trevorhawkeswoodi subsp. nov.* is endemic to South Africa.

The nominate subspecies *H. trevorhawkeswoodi trevorhawkeswoodi subsp. nov.* is found in a region generally bound by Cape St. Francis, just west of Port Elizabeth (now known as officially renamed Gqeberha), in a generally triangular region to the east of there and bound approximately by Fort Beaufort and Port Albert.

The subspecies *H. trevorhawkeswoodi knysaensis subsp. nov.* occurs from Knysa, west along the coast and nearby areas to Struisbaai.

The subspecies *H. trevorhawkeswoodi bloemfonteinensis subsp. nov*. is known from Bloemfontein and nearby parts of Free State.

**Etymology:** Named in honour of esteemed Zoologist, Trevor Hawkeswood of Sydney, New South Wales, Australia, in recognition of his many contributions to zoology over some decades, including his strong advocacy against taxonomic vandalism as practiced by Welsh criminal Wolfgang Wüster and his gang of thieves as detailed by Cogger (2014), Hoser (2007, 2009, 2012a-c, 2013c-d, 2015a-g), Hawkeswood (2021) and ICZN (2021).

***THIS PAPER CONTINUES IN AUSTRALASIAN JOURNAL OF HERPETOLOGY ISSUE 53 ...***

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# Australasian Journal of Herpetology

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Hoser, R. T. 2021. Audit finds dozens of unnamed turtle taxa. A body of evidence results in newly named genera, subgenera, species and subspecies based on historical and morphological divergence. *Australasian Journal of Herpetology* 52/53:1-128.

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*... CONTINUED FROM AUSTRALASIAN JOURNAL OF HERPETOLOGY ISSUE 52 ...*

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***HOMOPUS TREVORHAWKESWOODI KNYSAENSIS SUBSP. NOV.***

**LSIDurn:lsid:zoobank.org:act:24B61D90-56AA-4ACA-9DEC-ED0D1AEB5D71**

**Holotype:** A preserved specimen at the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA, specimen number MCZ Herp R-20967 collected from Knysa, South Africa, Latitude -34.033 S., Longitude 23.033 E. This facility allows access to its holdings.

**Paratypes:** 1/ A preserved juvenile specimen at the (British) Museum of Natural History, London, UK, specimen number BMNH 1907.4.9.1 collected from Knysa, South Africa, Latitude -34.033 S., Longitude 23.033 E. 2/ Two preserved specimens at Naturalis Biodiversity Center, The Netherlands, specimen number ZMA.RENA.19056 and ZMA.RENA.19054 collected from Knysa, South Africa, Latitude -34.033 S., Longitude 23.033 E.

**Diagnosis:** Until now *Homopus trevorhawkeswoodi sp. nov*. has been regarded as the eastern population of *H. areolatus* (Thunberg, 1787).

*H. trevorhawkeswoodi sp. nov*. is readily separated from *H. areolatus* as follows:
In all but very aged specimens of *H. trevorhawkeswoodi sp. nov*. the outer edges of the dorsal scutes are bounded by thick, well-defined blackish brown lines, in turn with thick greenish-yellow outer areas occupying a sizeable part of each scute, being brown on the surface of the inner region of each scute.

In *H. areolatus* the blackish lines on the outer edges of the scutes are thin, ill defined or even absent. When viewed at a distance, the carapace of *H. areolatus* is yellowish brown or yellowish-orange, versus greenish brown in *H. trevorhawkeswoodi sp. nov*. In *H. areolatus* the outer area of each scute is yellowish, with orange or orange brown in the inner region of each scute.

The subspecies *H. trevorhawkeswoodi knysaensis subsp. nov.* from Knysa, west along the coast and nearby areas to Struisbaai is separated from nominate subspecies *H. trevorhawkeswoodi trevorhawkeswoodi subsp. nov.* by having expanded yellow-green outer areas of each scute and a reduced brown coloured inner scute area, typically being equal to, or less than the yellow-green outer areas in diameter, versus being greater in diameter in the nominate form *H. trevorhawkeswoodi trevorhawkeswoodi subsp. nov.* (and *H. trevorhawkeswoodi bloemfonteinensis subsp. nov*.). The inner area of each dorsal scute is dark brown in *H. trevorhawkeswoodi knysaensis subsp. nov.*, rather than medium to light brown in *H. trevorhawkeswoodi sp. nov.*

*H. trevorhawkeswoodi bloemfonteinensis subsp. nov*. from Bloemfontein and nearby parts of Free State is similar in most respects to *H. trevorhawkeswoodi trevorhawkeswoodi subsp. nov*., but is noticeably faded in colour in most respects and is generally separated on that basis. The limbs tend to be light grey on top, raher than whitish as seen in *H. trevorhawkeswoodi trevorhawkeswoodi subsp. nov*..

The nominate subspecies *H. trevorhawkeswoodi trevorhawkeswoodi subsp. nov.* is found in a region generally bound by Cape St. Francis, just west of Port Elizabeth (now known as officially renamed Gqeberha), in a generally triangular region to the east of there and bound approximately by Fort Beaufort and Port Albert.

The northern limit of *H. trevorhawkeswoodi trevorhawkeswoodi subsp. nov.* and southern limit of *H. trevorhawkeswoodi bloemfonteinensis subsp. nov*. is uncertain, but *H. trevorhawkeswoodi sp. nov.* is known from locations within the intervening region.

The image depicted with Thunberg's, 1787 description of *H. areolatus* (Thunberg, 1787) is clearly of a specimen with a provenance of Cape Town, South Africa, as evidenced by the colouration of the carapace (yellow outers of each scute and light reddish-range inner scutes and no trace of green), meaning the eastern form was until now the unnamed species.

Hofmeyr *et al.* (2020), found that the taxa herein described as *H. trevorhawkeswoodi sp. nov.* and *H. areolatus* (Thunberg, 1787) diverged more than 2.5 MYA in the Pliocene. The same authors found the subspecies of *H. trevorhawkeswoodi sp. nov.* as identified herein diverged from one another more than 1.5 MYA. Hofmeyr *et al.* (2016) found a 6.43 MYA divergence between *H. trevorhawkeswoodi sp. nov.* and *H. areolatus* (Thunberg, 1787) and over 3 MYA for the subspecies of *H. trevorhawkeswoodi sp. nov.*.

Colour images of *H. trevorhawkeswoodi sp. nov.* (of the nominate subspecies) in life can be found online at:
https://www.inaturalist.org/observations/41104576
and
https://www.inaturalist.org/observations/80391390
and
https://www.inaturalist.org/observations/37215272
and
https://www.inaturalist.org/observations/16520155

Colour images of *H. trevorhawkeswoodi kynsaensis subsp. nov.* in life can be found online at:
https://www.inaturalist.org/observations/82145048
and
https://www.inaturalist.org/observations/11214561
and
https://www.inaturalist.org/observations/57302877

Colour images of the nominate form of *Homopus areolatus* depicted in life can be found in Rhodin *et al.* (2017) at page 140 and online at:

https://commons.wikimedia.org/wiki/File:Homopus_areolatus_-_Common_Padloper_-_Cape_Town.jpg
and
https://www.inaturalist.org/observations/71497635
and
https://www.inaturalist.org/observations/24354766

The species *H. trevorhawkeswoodi sp. nov*. and *H. areolatus* constituting the entirety of the genus *Homopus* Duméril and Bibron, 1834 are separated from other similar species and genera by the following unique suite of characters: The slightly domed carapace (females to 30 cm) is dorsally flattened, scarcely indented in the cervical region, has the anterior marginals only slightly expanded and the unexpanded posterior marginals not or only slightly serrated. A small but broad cervical scute is present; the first and fourth vertebrals are longer than broad, and the others are broader than long. A slight medial keel may be present, especially in younger specimens. Vertebrals and pleurals have broad areolae surrounded by raised growth annuli. There are usually 11, but occasionally 10 to 13, marginals on each side, and the supracaudal is undivided. Areolae of the carapacial scutes are reddish brown with yellow, olive, dark-brown, or black borders. A dark bar of some form usually lies along the anterior seam of each marginal. The yellowish or yellowish-brown plastron usually has some dark pigment toward the center. Its forelobe is anteriorly truncated, the hindlobe notched posteriorly. The plastral formula is: abd > hum > an > fem >< pect >< gul. Each bridge has one or two (sometimes to five) axillary scutes and three or four inguinals, the innermost touching the femoral scute. The head is moderate in size with a nonprojecting snout and a strongly hooked, tricuspid upper jaw. Usually, no small scales lie above the nostrils, and the large prefrontal scale may be divided or partially (posteriorly) divided longitudinally. The frontal scale may be subdivided. Other dorsal head scales are small. The head varies from yellow to tan or reddish brown, the jaws are tan. The neck varies from yellowish brown to reddish brown, as do the limbs and tail. Each forelimb is covered anteriorly with large, overlapping scales in three or four longitudinal rows. There are four claws on each forefoot.

Males are usually smaller than females and have a posteriorly concave, usually uniformly colored plastron and longer, thicker tails than females. Females have flat, usually medially dark plastron and a short tail. During the breeding season, the prefrontal scales of the males tend to show an orange-red coloration for several weeks. To a lesser extent, this coloration is sometimes present in females as well.

Both genera *Homopus* Duméril and Bibron, 1834 and *Funkichelys gen. nov.* as defined within this paper, are readily separated from all other similar African genera by the following suite of characters: They are small African tortoises with the triturating surfaces of maxilla and premaxilla without ridges; maxillary not entering roof of palate; prootic narrowly exposed dorsally; quadrate enclosing stapes; centrum of third cervical biconvex; carapace without hinge; no submarginal scutes; gulars divided; gular region only slightly thickened; four toes on the feet.

*Funkichelys gen. nov.* including the species *Funkichelys funki sp. nov.* and *F. femoralis* (Boulenger, 1888) are separated from *Homopus* type species *Homopus areolatus* (Thunberg, 1787) and all other similar species by the following suite of characters: 17 cm in maximum carapace length. Its carapace is flattened dorsally, scarcely indented in the cervical region and has the anterior and posterior marginals expanded, reverted, and serrated. A small, broad cervical scute is present, and the first vertebral is longer than broad, or at least as long as broad, while the others are broader than long. Eleven marginals lie on each side and the supracaudal is undivided. The carapace is yellowish brown to dark brown or olive with the scutes dark bordered in younger individuals. The scutes of some are orange or red tinged. The plastron is yellow to olive, with dark pigment on the anterior of each scute in the young, but immaculate in older tortoises. Its forelobe is anteriorly truncated and scarcely notched; the hindlobe has an anal notch. The plastral formula is: abd > hum > an >< fem > gul > pect. Each bridge has a single axillary and two or three inguinal scutes, the innermost touching the femoral scute. The head is moderate in size, with at best a weakly hooked, tricuspid upper jaw (versus strongly beaked in *Homopus*) and a nonprojecting snout. Several small scales lie above the nostrils. The prefrontal scale is large and divided longitudinally; the frontal is also large or is subdivided; other head scales are small. Head and neck are yellow to tan with some pink or orange pigment; the jaws are brown. The forelimbs are anteriorly covered with large imbricate scales in three or four longitudinal rows and a large conical tubercle is present on the thigh. The heels have large spurlike tubercles. Four claws occur on each forefoot. Limbs and tail are yellow to tan with tinges of pink or orange.

The usually smaller males have a posteriorly concave plastron with deeper anal notches and posess longer, thicker tails than females.

Hofmeyr *et al.* (2016) found a 26.14 MYA divergence between the putative species *Homopus areolatus* (Thunberg, 1787) and *Homopus femoralis* Boulenger, 1888, further supporting the contention that transferring the latter species to another genus is the correct taxonomic action.

The same authors also found species-level divergences between *Funkichelys funki sp. nov.* and *F. femoralis* as defined herein, (see Fig. 2), which is reflected in the taxonomic position of this paper.

**Distribution:** The subspecies *H. trevorhawkeswoodi knysaensis subsp. nov.* occurs from Knysa, west along the (South African) coast and nearby areas to Struisbaai.

*H. trevorhawkeswoodi bloemfonteinensis subsp. nov*. is known from Bloemfontein and nearby parts of Free State.

The nominate subspecies *H. trevorhawkeswoodi trevorhawkeswoodi subsp. nov.* is found in a region generally bound by Cape St. Francis, just west of Port Elizabeth (now known as officially renamed Gqeberha),

in a generally triangular region to the east of there and bound approximately by Fort Beaufort and Port Albert.

The northern limit of *H. trevorhawkeswoodi trevorhawkeswoodi subsp. nov.* and southern limit of *H. trevorhawkeswoodi bloemfonteinensis subsp. nov*. is uncertain, but *H. trevorhawkeswoodi sp. nov.* is known from locations within the intervening region.

**Etymology:** *H. trevorhawkeswoodi knysaensis subsp. nov.* is named in reflection of the type locality for this subspecies and the general area it is known to occur.

***HOMOPUS TREVORHAWKESWOODI BLOEMFONTAINENSIS SUBSP. NOV.***

**LSIDurn:lsid:zoobank.org:act:3F224D1C-9DEC-47D0-8771-6BDF3B24503B**

**Holotype:** A preserved specimen (skeletal remains) at the University of Michigan, Arbor, Michigan, USA. Specimen number UMMZ Herps 61572, collected at Free State, South Africa. This facility allows access to its holdings.

**Paratypes:** Two preserved specimens at the Naturalis Biodiversity Center, The Netherlands, (single) specimen number ZMA.RENA.13237, collected from Bloemfontein, South Africa.

**Diagnosis:** Until now *Homopus trevorhawkeswoodi sp. nov*. has been regarded as the eastern population of *H. areolatus* (Thunberg, 1787).

*H. trevorhawkeswoodi sp. nov*. is readily separated from *H. areolatus* as follows:
In all but very aged specimens of *H. trevorhawkeswoodi sp. nov*. the outer edges of the dorsal scutes are bounded by thick, well-defined blackish brown lines, in turn with thick greenish-yellow outer areas occupying a sizeable part of each scute, being brown on the surface of the inner region of each scute.

In *H. areolatus* the blackish lines on the outer edges of the scutes are thin, ill defined or even absent. When viewed at a distance, the carapace of *H. areolatus* is yellowish brown or yellowish-orange, versus greenish brown in *H. trevorhawkeswoodi sp. nov*. In *H. areolatus* the outer area of each scute is yellowish, with orange or orange brown in the inner region of each scute.

The subspecies *H. trevorhawkeswoodi knysaensis subsp. nov.* from Knysa, west along the coast and nearby areas to Struisbaai is separated from nominate subspecies *H. trevorhawkeswoodi trevorhawkeswoodi subsp. nov.* by having expanded yellow-green outer areas of each scute and a reduced brown coloured inner scute area, typically being equal to, or less than the yellow-green outer areas in diameter, versus being greater in diameter in the nominate form *H. trevorhawkeswoodi trevorhawkeswoodi subsp. nov.* (and *H. trevorhawkeswoodi bloemfonteinensis subsp. nov*.). The inner area of each dorsal scute is dark brown in *H. trevorhawkeswoodi knysaensis subsp. nov.*, rather than medium to light brown in *H. trevorhawkeswoodi sp. nov.*

*H. trevorhawkeswoodi bloemfonteinensis subsp. nov*. from Bloemfontein and nearby parts of Free State is similar in most respects to *H. trevorhawkeswoodi trevorhawkeswoodi subsp. nov*., but is noticeably faded in colour in most respects and is generally separated on that basis. The limbs tend to be light grey on top, raher than whitish as seen in *H. trevorhawkeswoodi trevorhawkeswoodi subsp. nov*..

The nominate subspecies *H. trevorhawkeswoodi trevorhawkeswoodi subsp. nov.* is found in a region generally bound by Cape St. Francis, just west of Port Elizabeth (now known as officially renamed Gqeberha), in a generally triangular region to the east of there and bound approximately by Fort Beaufort and Port Albert.

The northern limit of *H. trevorhawkeswoodi trevorhawkeswoodi subsp. nov.* and southern limit of *H. trevorhawkeswoodi bloemfonteinensis subsp. nov*. is uncertain, but *H. trevorhawkeswoodi sp. nov.* is known from locations within the intervening region.

The image depicted with Thunberg's, 1787 description of *H. areolatus* (Thunberg, 1787) is clearly of a specimen with a provenance of Cape Town, South Africa, as evidenced by the colouration of the carapace (yellow outers of each scute and light reddish-range inner scutes and no trace of green), meaning the eastern form was until now the unnamed species.

Hofmeyr *et al.* (2020), found that the taxa herein described as *H. trevorhawkeswoodi sp. nov.* and *H. areolatus* (Thunberg, 1787) diverged more than 2.5 MYA in the Pliocene. The same authors found the subspecies of *H. trevorhawkeswoodi sp. nov.* as identified herein diverged from one another more than 1.5 MYA. Hofmeyr *et al.* (2016) found a 6.43 MYA divergence between *H. trevorhawkeswoodi sp. nov.* and *H. areolatus* (Thunberg, 1787) and over 3 MYA for the subspecies of *H. trevorhawkeswoodi sp. nov.*.

Colour images of *H. trevorhawkeswoodi sp. nov.* (of the nominate subspecies) in life can be found online at:
https://www.inaturalist.org/observations/41104576
and
https://www.inaturalist.org/observations/80391390
and
https://www.inaturalist.org/observations/37215272
and
https://www.inaturalist.org/observations/16520155

Colour images of *H. trevorhawkeswoodi kynsaensis subsp. nov.* in life can be found online at:
https://www.inaturalist.org/observations/82145048
and
https://www.inaturalist.org/observations/11214561
and
https://www.inaturalist.org/observations/57302877

Colour images of the nominate form of *Homopus areolatus* depicted in life can be found in Rhodin *et al*. (2017) at page 140 and online at:
https://commons.wikimedia.org/wiki/File:Homopus_areolatus_-_Common_Padloper_-_Cape_Town.jpg
and
https://www.inaturalist.org/observations/71497635
and
https://www.inaturalist.org/observations/24354766

The species *H. trevorhawkeswoodi sp. nov*. and *H. areolatus* constituting the entirety of the genus *Homopus* Duméril and Bibron, 1834 are separated from other similar species and genera by the following unique suite of characters: The slightly domed carapace (females to 30 cm) is dorsally flattened, scarcely indented in the cervical region, has the anterior marginals only slightly expanded and the unexpanded posterior marginals not or only slightly serrated. A small but broad cervical scute is present; the first and fourth vertebrals are longer than broad, and the others are broader than long. A slight medial keel may be present, especially in younger specimens. Vertebrals and pleurals have broad areolae surrounded by raised growth annuli. There are usually 11, but occasionally 10 to 13, marginals on each side, and the supracaudal is undivided. Areolae of the carapacial scutes are reddish brown with yellow, olive, dark-brown, or black borders. A dark bar of some form usually lies along the anterior seam of each marginal. The yellowish or yellowish-brown plastron usually has some dark pigment toward the center. Its forelobe is anteriorly truncated, the hindlobe notched posteriorly. The plastral formula is: abd > hum > an > fem >< pect >< gul. Each bridge has one or two (sometimes to five) axillary scutes and three or four inguinals, the innermost touching the femoral scute. The head is moderate in size with a nonprojecting snout and a strongly hooked, tricuspid upper jaw. Usually, no small scales lie above the nostrils, and the large prefrontal scale may be divided or partially (posteriorly) divided longitudinally. The frontal scale may be subdivided. Other dorsal head scales are small. The head varies from yellow to tan or reddish brown, the jaws are tan. The neck varies from yellowish brown to reddish brown, as do the limbs and tail. Each forelimb is covered anteriorly with large, overlapping scales in three or four longitudinal rows. There are four claws on each forefoot.

Males are usually smaller than females and have a posteriorly concave, usually uniformly colored plastron and longer, thicker tails than females. Females have flat, usually medially dark plastron and a short tail. During the breeding season, the prefrontal scales of the males tend to show an orange-red coloration for several weeks. To a lesser extent, this coloration is sometimes present in females as well.

Both genera *Homopus* Duméril and Bibron, 1834 and *Funkichelys gen. nov.* as defined within this paper, are readily separated from all other similar African genera by the following suite of characters: They are small African tortoises with the triturating surfaces of maxilla and premaxilla without ridges; maxillary not entering roof of palate; prootic narrowly exposed dorsally; quadrate enclosing stapes; centrum of third cervical biconvex; carapace without hinge; no submarginal scutes; gulars divided; gular region only slightly thickened; four toes on the feet.

*Funkichelys gen. nov.* including the species *Funkichelys funki sp. nov.* and *F. femoralis* (Boulenger, 1888) are separated from *Homopus* type species *Homopus areolatus* (Thunberg, 1787) and all other similar species by the following suite of characters: 17 cm in maximum carapace length. Its carapace is flattened dorsally, scarcely indented in the cervical region and has the anterior and posterior marginals expanded, reverted, and serrated. A small, broad cervical scute is present, and the first vertebral is longer than broad, or at least as long as broad, while the others are broader than long. Eleven marginals lie on each side and the supracaudal is undivided. The carapace is yellowish brown to dark brown or olive with the scutes dark bordered in younger individuals. The scutes of some are orange or red tinged. The plastron is yellow to olive, with dark pigment on the anterior of each scute in the young, but immaculate in older tortoises. Its forelobe is anteriorly truncated and scarcely notched; the hindlobe has an anal notch. The plastral formula is: abd > hum > an >< fem > gul > pect. Each bridge has a single axillary and two or three inguinal scutes, the innermost touching the femoral scute. The head is moderate in size, with at best a weakly hooked, tricuspid upper jaw (versus strongly beaked in *Homopus*) and a nonprojecting snout. Several small scales lie above the nostrils. The prefrontal scale is large and divided longitudinally; the frontal is also large or is subdivided; other head scales are small. Head and neck are yellow to tan with some pink or orange pigment; the jaws are brown. The forelimbs are anteriorly covered with large imbricate scales in three or four longitudinal rows and a large conical tubercle is present on the thigh. The heels have large spurlike tubercles. Four claws occur on each forefoot. Limbs and tail are yellow to tan with tinges of pink or orange.

The generally smaller males have a posteriorly concave plastron with deeper anal notches and posess longer, thicker tails than females.

Hofmeyr *et al.* (2016) found a 26.14 MYA divergence between the putative species *Homopus areolatus* (Thunberg, 1787) and *Homopus femoralis* Boulenger, 1888, further supporting the contention that transferring the latter species to another genus is the correct taxonomic action.

The same authors also found species-level divergences between the relevant preceding putative species as identified in this paper, (see Fig. 2), which is reflected in the taxonomic position of this paper.

**Distribution:** The subspecies *H. trevorhawkeswoodi bloemfonteinensis subsp. nov*. is known from Bloemfontein and nearby parts of Free State.

The subspecies *H. trevorhawkeswoodi knysaensis subsp. nov.* occurs from Knysa, west along the (South African) coast and nearby areas to Struisbaai.

The nominate subspecies *H. trevorhawkeswoodi trevorhawkeswoodi subsp. nov.* is found in a region generally bound by Cape St. Francis, just west of Port Elizabeth (now known as officially renamed Gqeberha), in a generally triangular region to the east of there and bound approximately by Fort Beaufort and Port Albert.

The northern limit of *H. trevorhawkeswoodi trevorhawkeswoodi subsp. nov.* and southern limit of *H. trevorhawkeswoodi bloemfonteinensis subsp. nov*. is uncertain, but *H. trevorhawkeswoodi sp. nov.* is known from locations within the intervening region.

**Etymology:** *H. trevorhawkeswoodi bloemfonteinensis subsp. nov.* is named in reflection of the type locality for this subspecies and the general area it is known to occur.

***CYCLANORBIS SENEGALENSIS NILEENSIS SUBSP. NOV.***

**LSIDurn:lsid:zoobank.org:act:73A09E44-8A4C-4FB8-9D61-E57208541436**

**Holotype:** A preserved juvenile specimen at the Museum of Zoology, Senckenberg, Dresden, Germany, specimen number MTD D 49181 collected near Ugudi village at the Alwero River, Gambela Region, Ethiopia, Latitude 7.585583 N., Longitude 34.160612 E., 439 meters above sea level. This facility allows access to its holdings. The holotyope and first paratype are depicted in Fig. 1. of Mazuch *et al.* (2016).

**Paratypes : 1/** A preserved juvenile specimen at the Museum of Zoology, Senckenberg, Dresden, Germany, specimen number MTD D 49182 collected near Ugudi village at the Alwero River, Gambela Region, Ethiopia, Latitude 7.585583 N., Longitude 34.160612 E., 439 meters above sea level. 2/ A preserved (dry) specimen at the Naturalis Biodiversity Center, The Netherlands, specimen number RMNH.RENA.17968, collected from «Sudan, Meer 40 km N van Bor, rand Sud Moerassen». 3/ A preserved specimen at the Reptiles and Amphibians collection (RA) of the Muséum national d'Histoire Naturelle, Paris, France, specimen number MNHN RA 0.9391 collected from Egypt.

**Diagnosis:** *Cyclanorbis senegalensis nileensis subsp. nov*. is similar in most respects to *Cyclanorbis senegalensis* (Duméril and Bibron, 1835), but is readily separated from that taxon by having some dark patches on the plastron, versus immaculate in *C. senegalensis*, contrasting yellow spots on a dark brown to grey background on the head, versus yellow spots not strongly contrasting on medium brown to lighter grey on the head.

The subspecies *Cyclanorbis senegalensis occultatum subsp. nov*. from central African drainages running into Lake Chad is separated from the preceding subspecies by a combination of immaculate plastron in adults and contrasting yellow spots on a dark brown to grey background on the head.

*C. senegalensis* is separated from the morphologically similar and larger *Baikiea elegans* Gray, 1869 by having two, or occasionally four plastral callosities, while the smaller *C. senegalensis* has up to nine callosities (Branch 2008, Baker *et al.* 2015).

*Cyclanorbis* Gray, 1854 and *Baikiea* Gray, 1869 are both montypic genera.

The genera *Cyclanorbis* and *Baikiea* are separated from all other living turtles by the following unique suite of characters: Nuchal not notched at the outer ends, which extends slightly below the first costal plate; a praenuchal bone (absent in the young); neural plates forming an incomplete series, some or all of the costals meeting on the median line and separating the neurals from each other; eighth pair of costals large. Plastron with a cutaneous femoral valve, under which the hind limb may be concealed; hyoplastron coossified with hypoplastron; nine or more plastral callosities in the adult, a pair being present in front of and ossifying independently from, the epiplastrals. Bony choanae

between the orbits; jaws strong; postorbital arch moderate, narrower than the diameter of the orbit; posterior border of pterygoids with a median ascending process forming a suture with the opisthotic (derived from Boulenger 1889).

*Cyclanorbis senegalensis nileensis subsp. nov*. in life is depicted online at:

https://www.inaturalist.org/observations/893970

The nominate subspecies *C. senegalensis senegalensis* in life is depicted online at:

https://www.inaturalist.org/observations/5466683

and

https://www.inaturalist.org/observations/54053487

and

https://www.inaturalist.org/observations/3776623

**Distribution:** *C. senegalensis nileensis subsp. nov*. is restricted to the Nile River system.

**Etymology:** The subspecies *C. senegalensis nileensis subsp. nov*. is named in reflection of where it occurs.

***CYCLANORBIS SENEGALENSIS OCCULTATUM SUBSP. NOV.***

**LSIDurn:lsid:zoobank.org:act:6C1EE0CD-354D-4B5D-A4BD-F1830E21615C**

**Holotype:** A preserved specimen at the Museum national d'Histoire naturelle, Paris, France, specimen number, Reptiles and Amphibians collection (RA) MNHN RA 1995.5651, collected from Sangba in the Central African Republic, Africa. This facility allows access to its specimens.

**Paratype:** A preserved specimen at the (British) Museum of Natural History, London, UK, specimen number BMNH 1928.7.18.2, collected from Lake Chad, Chad, Africa.

**Diagnosis:** The subspecies *Cyclanorbis senegalensis occultatum subsp. nov*. from central African drainages running into Lake Chad is separated from other subspecies of *Cyclanorbis senegalensis* (Duméril and Bibron, 1835) by a combination of immaculate plastron in adults and contrasting yellow spots on a dark brown to grey background on the head.

*Cyclanorbis senegalensis nileensis subsp. nov*. is similar in most respects to *Cyclanorbis senegalensis* (Duméril and Bibron, 1835), but is readily separated from that taxon by having some dark patches on the plastron, versus immaculate in *C. senegalensis*, contrasting yellow spots on a dark brown to grey background on the head, versus yellow spots not strongly contrasting on medium brown to lighter grey on the head.

*C. senegalensis* is separated from the morphologically similar and larger *Baikiea elegans* Gray, 1869 by having two, or occasionally four plastral callosities, while the smaller *C. senegalensis* has up to nine callosities (Branch 2008, Baker *et al.* 2015).

*Cyclanorbis* Gray, 1854 and *Baikiea* Gray, 1869 are both montypic genus.

The genera *Cyclanorbis* and *Baikiea* are separated from all other living turtles by the following unique suite of characters: Nuchal not notched at the outer ends, which extend slightly below the first costal plate; a praenuchal bone (absent in the young); neural plates forming an incomplete series, some or all of the costals meeting on the median line and separating the neurals from each other; eighth pair of costals large. Plastron with a cutaneous femoral valve, under which the hind limb may be concealed; hyoplastron coossified with hypoplastron; nine or more plastral callosities in the adult, a pair being present in front of and ossifying independently from, the epiplastrals. Bony choanae

between the orbits; jaws strong; postorbital arch moderate, narrower than the diameter of the orbit; posterior border of pterygoids with a median ascending process forming a suture with the opisthotic (derived from Boulenger 1889).

*Cyclanorbis senegalensis nileensis subsp. nov.* in life is depicted online at:

https://www.inaturalist.org/observations/893970

The nominate subspecies *C. senegalensis senegalensis* in life is depicted online at:

https://www.inaturalist.org/observations/5466683

and

https://www.inaturalist.org/observations/54053487

and

https://www.inaturalist.org/observations/3776623

**Distribution:** *C. senegalensis occultatum subsp. nov.* is restricted to the drainages of Lake Chad and also immediately adjacent drainages to the south.

**Etymology:** The subspecies *C. senegalensis occultatum subsp. nov.* is named in reflection of the fact it has been loargely hidden from science until now.

***CYCLODERMA TISMORUM SP. NOV.***

**LSIDurn:lsid:zoobank.org:act:186FFCBA-12D7-4209-AA11-D0209E009FB0**

**Holotype:** A preserved specimen (whole in ethanol) at the Museum of Comparative Zoology, Harvard University. Cambridge, Massachusetts, USA, specimen number MCZ Herp R-48028, collected from Ruvuma River, Kitaya, Mtwara, Tanzania, Africa, Latitude -10.65 S., Longitude 40.166667 E. This facility allows access to its holdings.

**Paratypes:** Eight preserved specimens at the Museum of Comparative Zoology, Harvard University. Cambridge, Massachusetts, USA, specimen numbers (MCZ Herp-R) 48026, 48027, 48029, (all whole animals), 48030, 48031, 48032, 48033 (all dry skeletons),48034 (eggs), all collected from Ruvuma River, Kitaya, Mtwara, Tanzania, Africa, Latitude -10.65 S., Longitude 40.166667 E.

**Diagnosis:** *Cycloderma tismorum sp. nov.* from the Ruvuma River system bordering Tanzania and Mozambique is separated from *Cycloderma frenatum* Peters, 1854 of the Zambezi River system further south and west by its generally yellowish to yellowish brown dorsal colouration versus dark olive to olive grey colour in *C. frenatum*; *C. tismorum sp. nov.* has relatively indistinct head stripes when young that are indistinct or absent with age, versus very distinct head stripes, often bounded by white in younger specimens, which as a rule remain visible throughout life, even in aged specimens; there are about 40 closely placed, prominent low tubercular ridges on the upper surface of the carapace in young *C. tismorum sp. nov.*. These same ridges are barely discernable in *C. frenatum.*

The two species *Cycloderma tismorum sp. nov.* and *C. frenatum* are separated from the morphologically similar *Heptathyra aubryi* (Duméril, 1856) and *Heptathyra marcdorsei sp. nov.*, the latter species until now treated as a population of of *Heptathyra aubryi* (Duméril, 1856) in that the epipterygoid, when present, never contacts the palatine and fuses to the pterygoid in large adults and in which the vomer is absent. It further differs from the two species herein placed in the genus *Heptathyra* Cope, 1960 by the total absence of midline suturing or fusion of the xiphiplastra and in always retaining the premaxillae.

A photo of *Cycloderma tismorum sp. nov.* in life can be found online at:
https://www.inaturalist.org/observations/19695883

A photo of *C. frenatum* in life can be found online at:

https://www.inaturalist.org/observations/9957404

Photos of live specimens of both species are also depicted in Broadley and Sachsse (2011).

**Distribution:** *Cycloderma tismorum sp. nov.* is only known from the Ruvuma River system bordering Tanzania and Mozambique. *Cycloderma frenatum* Peters, 1854 occurs in the much larger Zambezi River system further south and west and including lake Nyasa, where it is common.

**Etymology:** *Cycloderma tismorum sp. nov.* is named in honour of the Australian Alternative Rock Band, TISM.

TISM (an acronym of This Is Serious Mum) were a seven-piece anonymous alternative rock band from Melbourne, Australia. The group was formed on 30 December 1982 by vocalist/drummer Humphrey B. Flaubert, bassist/vocalist Jock Cheese and keyboardist/ vocalist Eugene de la Hot Croix Bun, and enjoyed a large underground/independent following. Also playing in the band was Jock Paull, now deceased. Their third album, Machiavelli and the Four Seasons, reached the Australian national top 10 in 1995.

In Africa it is commonly said that those Africans who live south of the Zambezi River (e.g. South Africa) do not have the same sense of rhythm and music making of those further north and so it is appropriate that a species from north of the Zambezi River be named in honour of a group of people with rhythm.

***HEPTATHYRA MARCDORSEI SP. NOV.***

**LSIDurn:lsid:zoobank.org:act:15279CE2-7F5D-4B5B-AD08-93C198A1A081**

**Holotype:** A preserved specimen at the American Museum of Natural History, New York, USA, specimen number AMNH Herpetology R-45859 collected at Lukolela, DR Congo, Africa, Latitude -1.05 S., Longitude

17.2 E. This facility allows access to its holdings.

**Paratype:** A preserved specimen at the American Museum of Natural History, New York, USA, specimen number AMNH Herpetology R-45860 collected at Lukolela, DR Congo, Africa, Latitude -1.05 S., Longitude 17.2 E.

**Diagnosis:** Until now *Heptathyra marcdorsei sp. nov.* from the Congo River system in central Africa has been treated as a population of *H. aubryi* (Duméril, 1856), better known until now as *Cycloderma aubryi* (Duméril, 1856), herein confined to the Ogooue River system in Gabon, to the north and east of the Congo River system.

*H. marcdorsei sp. nov.* is separated from *H. aubryi* by having a yellow iris, as opposed to orange or red in *H. aubryi.*

*H. marcdorsei sp. nov.* is further separated from *H. aubryi* by having indistinct head patterns in adults (whether spots, stripes or combinations of these), versus reasonably distinct in *H. aubryi.*

*H. marcdorsei sp. nov.* in life is depicted online at: https://www.inaturalist.org/observations/64098778

A colour photo of *H. aubryi* can be found in Rhodin *et al.* (2017) on page 160 at top left and online at:

https://www.flickr.com/photos/wildaboutlife/17315984505/

The two species *Cycloderma tismorum sp. nov.* and *C. frenatum* are separated from the morphologically similar *Heptathyra aubryi* (Duméril, 1856) and *Heptathyra marcdorsei sp. nov.*, the latter species until now treated as a population of of *Heptathyra aubryi* (Duméril, 1856) in that the epipterygoid, when present, never contacts the palatine and fuses to the pterygoid in large adults and in which the vomer is absent. It further differs from the two species herein placed in the genus *Heptathyra* Cope, 1960 by the total absence of midline suturing or fusion of the xiphiplastra and in always retaining the premaxillae.

**Distribution:** *Heptathyra marcdorsei sp. nov.* appears to be restricted to the Congo River system in central Africa. *H. aubryi* (Duméril, 1856), better known until now as *Cycloderma aubryi* (Duméril, 1856), appears to be confined to the much smaller Ogooue River system in Gabon, to the north and east of the Congo River system.

**Etymology:** Named in honour of Marc Dorse of Toowoomba, Queensland, Australia, previously of Mount Tamborine, Queensland, Australia, a wildlife demonstrator of some decades (Business name "Deadly Australians", Australian Registered Trademark number 797420, registered in 1999), in recognition of his services to education and wildlife conservation in Australia.

Dorse was the first person in the world to breed in captivity the little known freshwater turtle species *Wollumbinia purvisi* (Wells and Wellington, 1985), which he did in 2014-2015. The more recent and widely posted claim in 2019-2020 by John Weigel and his privately owned zoo business, trading as the "Australian Reptile Park" to be the first in the world to breed this species (*Wollumbinia purvisi*) (e.g. as posted at: https://reptilepark.com.au/animals/reptiles/turtles-tortoises/manning-river-turtle/ is

nothing more than a scam to entice well-meaning gullible people to donate money to his privately owned business masquerading as a charity.

Trading on the plight of endangered wildlife by making false claims for personal profit, in order to scam cash from well-meaning but otherwise ill informed people is ethically and morally repugnant!

***PIERSONCHELYS GEN. NOV.***

**LSIDurn:lsid:zoobank.org:act:BA36C4F1-27F8-4B80-9423-4F918D39C8A4**

**Type species:** *Emyda scutata* Peters, 1868.

**Diagnosis:** *Piersonchelys gen. nov.* is readily separated from the morphologically similar genus *Lissemys* Smith, 1931, type species: *Emyda punctata* (= *Testudo punctata* Lacepède, 1788) (= *Testudo punctata* Bonnaterre, 1789), by original monotypy by the following unique combination of characters: Anterior marginals not greatly enlarged, not very unequal in size, the first not larger than

the second. Entoplastral callosity large or moderate. Brown above, carapace spotted or reticulated with darker markings. Head lacks yellow spots.

Species within *Lissemys* are also separated from *Piersonchelys gen. nov.* by one or other of the following suites of characters:

1/ Head without yellow spots; first marginal plate much larger than second,

or;

2/ Head with yellow spots; entoplastral callosity small.

Both *Piersonchelys gen. nov.* and *Lissemys* Smith, 1931 are separated from all other species of Trionychidae by the following unique suite of characters:

Nuchal notched at each outer end, which underlies the first costal plate; dorsal shield large, with a series of bony plates in the posterior cutaneous border and a praenuchal marginal bony plate; neural plates well developed, seven or eight in number, forming a continuous series; eighth pair of costals large in the adult and like the penultimate, forming a median suture. Plastron with a cutaneous femoral valve, under which the hind limb may be concealed; hyoplastron co-ossified with hypoplastron; seven plastral callosities (in the adult). Bony choanae between the orbits; jaws strong; postorbital arch moderate, much narrower than the diameter of the orbit; posterior border of pterygoids with a median ascending process forming a suture with the opisthotic (derived from Boulenger 1889).

Pereira *et al.* (2017) found that the genus *Lissemys* Smith, 1931, type species: *Emyda punctata* (= *Testudo punctata* Lacepède, 1788) (= *Testudo punctata* Bonnaterre, 1789), by original monotypy has significant divergence between component species as currently recognized.

Praschag *et al.* (2011) found likewise. It appears that the morphologically distinctive species *Lissemys scutata* (Peters, 1868), originally described as *Emyda scutata*

Peters, 1868 diverged from the other species in the genus 30 MYA based on the results of Pereira *et al.* (2017).

Hence, in the absence of an available name, the genus *Piersonchelys gen. nov.* has been erected to accommodate this taxon.

**Distribution:** Myanmar (Burma).

**Etymology:** Named in honour of Charles Pierson of Moss Vale, New South Wales, in recognition of his contributions to wildlife conservation in Australia and globally, including through his publication of the books, *Australian Reptiles and Frogs* (Hoser, 1989), *Endangered Animals of Australia* (Hoser, 1991) and *Smuggled: The Underground Trade in Australia's Wildlife* (Hoser, 1993), the last of which forced a change of draconian and anti-conservation wildlife laws in all states of Australia, the USA and elsewhere. Further details in Hoser (1996).

**Content:** *Piersonchelys scutata* (Peters, 1868).

***PARAPELODSICUS SUBGEN. NOV.***

**LSIDurn:lsid:zoobank.org:act:40BCF483-CCA1-4254-9457-659A7F41942D**

**Type species:** *Trionyx axenaria* Zhou, Zhang and Fang, 1991.

**Diagnosis:** *Parapelodiscus subgen. nov*. is readily separated from all species within the nominate subgenus *Pelodiscus* Fitzinger, 1835 (being the rest of the genus), by the following unique suite of characters: Maximum carapace length of 20 cm, mainly yellowish brown in colour, with blurred dark

mottling including indistinct stellate spots and ill-defined half oval blotches around the perimeter of the leathery margin. Plastron is yellowish white, with a pattern of a single dark gray central figure enclosed by hypoand xiphiplastra; underside of leathery margin of carapace is unmarked. Head and neck has a pattern of numerous fine dark brown to black markings, pre and postocular stripes are thin and discontinuous. Throat has miniscule, indistinct yellowish-white spots. There is a high median keel on the carapace. Dorsal tubercles are in a longitudinal series more or less discrete, central tubercle in front of the marginal ridge of the carapace is small.

Tortoises in the genus *Pelodiscus* Fitzinger, 1835 are separated from all other morphologically similar species and genera by the following suite of characters:

Costal plates normally in eight pairs, the last well developed and in contact throughout on the median line: a single neural between the first pair of costals; dorsal plates finely pitted and vermiculate.

Dorsal skin of young with longitudinal ridges of small tubercles. Epiplastra separated from each other; entoplastron broad at each end, forming an obtuse angle: plastral callosities well developed in the adult, hyo-hypoplastral, xiphiplastral, and sometimes also entoplastral, finely sculptured like the carapace. Head moderate; snout (on the skull) longer than the diameter of the orbit; interorbital space usually narrower than the nasal fossa; postorbital arch at least half the diameter of the orbit in the adult; mandible without symphysial ridge, its width at the symphysis exceeding the diameter of the orbit. Olive above, uniform or light-dotted, dorsal disk frequently with a few scattered blackish spots; head above with small spots or dots; frequently a few black streaks radiating from the orbit, a rostral, a temporal and an interorbital being usually distinct; chin and throat spotted or marbled with white on a dark background; plastron whitish, in the young usually with symmetrical black spots or bands; young usually with a pair of black spots in front of the tail and a black band on the under side of the thighs (modified from Boulenger 1898).

**Distribution:** China (Guangxi, Hunan).

**Etymology:** The name *Parapelodiscus subgen. nov.* has the prefix "Para" meaning alongside of, beside, near, resembling, beyond, apart from, or abnormal, all of which reflects the relationship of the component species in this subgenus with those of the nominate subgenus.

**Content:** *Pelodiscus* (*Parapelodiscus*) *axenaria* (Zhou, Zhang, and Fang, 1991).

***AMYDA ASHPHILLIPSI SP. NOV.***

**LSIDurn:lsid:zoobank.org:act:93820BCE-E3B7-46AC-A1C6-F0B35D8D02CE**

**Holotype:** A preserved specimen at the Natural History Museum Vienna, Austria, specimen number NMW 30205:3, collected at Baram River, Sarawak, Borneo, Malaysia. This facility allows access to its holdings.

**Paratypes :** 1/ A preserved specimen at the Natural History Museum Vienna, Austria, specimen number NMW 30205:4, collected at Baram River, Sarawak, Borneo, Malaysia. 2/ Seven preserved specimens at the Field Museum of Natural History., Chicago, Illinois, USA, in the Amphibian and Reptile Collection, specimen numbers FMNH 120375, 128221, 128254, 128255, 128440, 129554, 131574, all collected in the Fourth Division of Sarawak, Borneo, Malaysia.

**Diagnosis :** Until now, *Amyda ashphillipsi sp. nov.* has been treated as a population of *A. cartilaginea* (Boddaert, 1770) *sensu lato.* However this taxon is both morphologically and genetically divergent from all named species and subspecies in the complex (Fritz *et al.* 2014) and so is formally named as a new species herein.

*Amyda ashphillipsi sp. nov.* is morphologically most similar to the subspecies *Amyda cartilaginea maculosa* Fritz, Gemel, Kehlmaier, Vamberger and Praschag 2014, but is readily separated from that taxon by having mainly yellowish-orange marbling on the otherwise brownish-grey neck, versus numerous evenly spaced distinctive small yellow spots on the otherwise brownish-grey neck in *A. cartilaginea maculosa*.

Where there is spotting on the head and neck of *A. ashphillipsi sp. nov*. it is either blurred, indistinct or irregular, versus generally bold in *A. cartilaginea maculosa*.

*A. cartilaginea maculosa* differs from the nominotypical subspecies *A. cartilaginea cartilaginea* of Java by a more massive head with a relatively short and blunt proboscis, a lighter base colouration (olive to brown instead of dark brown to blackish) and less pronounced nuchal tubercles. Juveniles and young adults bear on

their back a characteristic saddle-shaped dark mark.

In *A. cartilaginea maculosa* the saddlemark is obviously infused with brown or brown spotting and marks, versus generally not so in *A. ashphillipsi sp. nov*..

The species *A. ornata* (Gray, 1861) from mainland Indo-China, as far west as eastern India, is readily separated from all forms of *A. cartilaginea* as well as *A. ashphillipsi sp. nov*. by the following characters: *A. ornata* is the so-called arrow-headed form of the genus, because the animals always show three (or rarely two) converging black lines on the crown of the head. The dorsum is characterised by a very light yellowish base colour, diffuse yellow spotting on the head and neck, usually restricted to the cheeks; carapace lacks ocelli, but black dots may be present and the nuchal tubercles are always weakly developed.

All species in the genus *Amyda* Schweigger in Geoffroy Saint-Hilaire, 1809 are readily separated from all morphologically similar species by the following suite of characters: Posterior nares not reduced in size by the inner extension of the maxillaries. Alveolar surface of lower jaw without a longitudinal symphyseal ridge; seven to eight pairs of pleuralia, all separated by neurals; a single neural between the first pair of pleurals.

Fritz *et al.* (2014) reviewed the *Amyda cartilaginea* (Boddaert, 1770) species complex, which at the time was being treated as the entirety of the monotypic genus *Amyda* Schweigger in Geoffroy Saint-Hilaire, 1809. Fritz *et al.* (2014) split the putative species into two, resurrecting the name *Amyda ornata* (Gray, 1861) for the mainland south-east Asian taxa. *Amyda cartilaginea* was therein confined to the Sunda shelf region.

They formally named a subspecies *Amyda cartilaginea maculosa* Fritz, Gemel, Kehlmaier, Vamberger and Praschag 2014 for a divergent form from south-west Borneo, Java and Sulawesi.

The taxon *Trionyx phayrei* Theobald, 1868 was resurrected as a subspecies of *A. ornata.*

That taxonomy is agreed herein.

*A. ashphillipsi sp. nov*. as defined herein was found by Fritz *et al.* (2014) to have species-level divergence from all forms of *A. cartilaginea* and *A. ornata* as defined by them. Fritz *et al*. (2014) also published images of live *A. ashphillipsi sp. nov*..

**Distribution:** *A. ashphillipsi sp. nov*. is known only from Division Four of Sarawak, Borneo, including the Baram River system. In the south-east of the island *A. cartilaginea maculosa* occurs. No known sympatry is known.

**Etymology:** Named in honour of Ash Phillips, of Brisbane, Queensland, Australia in recognition of his services helping people navigating Australia's incredibly corrupt legal system.

***AMYDA ORNATA MAGNAPAPULAE SUBSP. NOV.***

**LSIDurn:lsid:zoobank.org:act:DB2F9E2A-8213-47FF-A07B-7F4D6A2C8F17**

**Holotype:** A preserved specimen (carapace and plastron of an adult) at the Bombay Natural History Society, Bombay, India, specimen number BNHM 1446, collected from Mizoram, North-east India. This facility allows access to its holdings.

Details of the holotype were published by Pawar and Choudhury (2000) including a photo on page 146.

**Paratypes**: Two preserved specimens at the Zoological Survey of India, Calcutta, India, specimen numbers ZSI 2632 and ZSI 13207 collected from Mizoram, North-east India.

**Diagnosis:** *Amyda ornata magnapapulae subsp. nov.* is readily separated from other *Amyda ornata* subspecies including the nominate form of *Amyda ornata* (Gray 1861) with a type locality of Cambodia and *Amyda ornata phayrei* (Theobald, 1868) from Burma (type locality of Arakan Hills, Bassein, Myanmar), by the following suite of characters: greyish-brown versus yellow-brown iris, much thinner snout and proboscis, as compared to the other subspecies; distinctive light spotting on a purplish background on the side of the face, versus not so and with scattered raised yellow tubercles on the side of the face in the other subspecies. Carapace expands slightly at the rear in *A. ornata magnapapulae subsp. nov.*, versus more oval-shaped in the other subspecies.

*Amyda ornata magnapapulae subsp. nov.* has even more significantly enlarged tubercles on the shell, in particular at the rear of the top of the carapace than even *A. ornata phayrei* which has more well defined shell tubercles as compared to other the other subspecies.

The enlarged tubercles on the rear of *A. ornata phayrei* tend to be blunted, rather than somewhat more spiked in *Amyda ornata magnapapulae subsp. nov.*, although they do blunten in aged specimens.

*Amyda magnapapulae subsp. nov.* in life is depicted in Hmar *et al*. (2020) and Fritz *et al*. (2014) and is usually a dark brown colour, with little yellow on the carapace, versus generally lighter in the other subspecies of *A. ornata*.

The species *A. ornata* (Gray, 1861) from mainland Indo-China, as far west as eastern India, is readily separated from all forms of *A. cartilaginea* as well as *A. ashphillipsi sp. nov*. by the following characters: *A. ornata* is the so-called arrow-headed form of the genus, because the animals always show three (or rarely two) converging black lines on the crown of the head. The dorsum is characterised by a very light yellowish base colour, diffuse yellow spotting on the head and neck, usually restricted to the cheeks; carapace lacks ocelli, but black dots may be present and the nuchal tubercles are always weakly developed.

All species in the genus *Amyda* Schweigger in Geoffroy Saint-Hilaire, 1809 are readily separated from all morphologically similar species by the following suite of characters: Posterior nares not reduced in size by the inner extension of the maxillaries. Alveolar surface of lower jaw without a longitudinal symphyseal ridge; seven to eight pairs of pleuralia, all separated by neurals; a single neural between the first pair of pleurals.

Fritz *et al.* (2014) reviewed the *Amyda cartilaginea*

(Boddaert, 1770) species complex, which at the time was being treated as the entirety of the monotypic genus *Amyda* Schweigger in Geoffroy Saint-Hilaire, 1809. Fritz *et al.* (2014) split the putative species into two, resurrecting the name *Amyda ornata* (Gray, 1861) for the mainland south-east Asian taxa. *Amyda cartilaginea* was therein confined to the Sunda shelf region.

They formally named a subspecies *Amyda cartilaginea maculosa* Fritz, Gemel, Kehlmaier, Vamberger and Praschag 2014 for the divergent form from south-west Borneo, Java and Sulawesi.

The taxon *Trionyx phayrei* Theobald, 1868 was resurrected as a subspecies of *A. ornata.*

That taxonomy is agreed herein.

The newly named species *A. ashphillipsi sp. nov*. as described within this paper was found by Fritz *et al.* (2014) to have species-level divergence from all forms of *A. cartilaginea* and *A. ornata* as defined by them. Fritz *et al*. (2014) also published images of live *A. ashphillipsi sp. nov*..

**Distribution:** *Amyda ornata magnapapulae subsp. nov.* occurs in far north-east India and adjoining Bangladesh. Exact locations known for this subspecies include the Ngengpui River basin in the extreme southern part of north-eastern India (Pawar and Choudhury 2000), Tripura (North District), Narichera Stream (Das *et al*. 2016), the Assam-Mizoram border at Dhalchera River, Phaisen Hills, Cachar District, Assam (Nath *et al*. 2018) and Tuirial River drainage Lat. 23.5550 N., Longitude 92.7790 E., Aizawl District, Mizoram (Hmar *et al.* 2020).

**Etymology:** The subspecies name "*magnapapulae*" refers in Latin to the enlarged tubercles seen on the carapace of this subspecies.

***KEILLERCHELYS SUBGEN. NOV.***

**LSIDURN:LSID:ZOOBANK.ORG:ACT:20FC86D5-C1EA-4F77-88DE-BD900E74737B**

**TYPE SPECIES:** *Keillerchelys darrenkeilleri sp. nov.* (this paper).

**Diagnosis:** Turtles in the subgenus *Keillerchelys subgen. nov*. are readily separated from the nominate subgenus of *Pelomedusa* Wagler, 1830 by having light or brown coloured dorsums versus black or dark grey in subgenus *Pelomedusa* Wagler, 1830.

*Keillerchelys subgen. nov.* are further separated from the nominate subgenus in that the widely separated pectorals are usually not in contact in the plastral midline (except in some east African forms), versus pectorals usually in contact in the nominate subgenus.

Turtles in the genus *Pelomedusa* Wagler, 1830 (both subgenera) are separated from all other species by the following unique suite of characters: Large-sized, often dark-coloured helmeted turtles with an exceptional maximum straight carapacial length of 32.5 cm (Hewitt 1935, discussed in Branch *et al*. 1990). However, the normal shell length of adults is around 26 cm. Shell covered with epidermal shields. Pectoral scutes may or may not be in contact at plastral midseam (depending on subgenus). In approximately 50 percent of all specimens there are two small temporal scales present on each side of the head, the others having one large undivided temporal scale. There are two small barbels below the chin; alveolar surface of the upper jaw with a very indistinct median ridge; a pair of shields, separated by a longitudinal suture, between the eyes, followed by a large interparietal. Soft parts dorsally darker than ventrally. Carapace and plastron of adults often mainly or entirely dark but in western and northwestern populations (*Keillerchelys subgen. nov.*) the carapace of adults may be light-coloured with a mainly or entirely yellow plastron. Plastral bones eleven, mesoplastron being present, small and lateral, being wedged between the hyoand and the hypoplastra. No bony temporal roof; neck completely retractile within the shell; second cervical vertebra is convex. A bony temporal arch; no parieto-squamosal arch; palatine bones in contact; no nasals; praefrontals in contact; dentary single. Digits very short, mostly with only two phalanges; feet and toes with five claws.

The nominate subgenus from southern Africa includes the species *Pelomedusa galeata* (Schoepff, 1792) as the type species, *Pelomedusa nigra* Gray, 1863 and *P. subrufa* (Bonnaterre, 1789).

All other species in *Pelomedusa*, being from central sub-Saharan Africa are in the subgenus *Keillerchelys subgen. nov.*.

Based on Cyt b distances published by Petzold *et al*. (2014) it is reasonable to infer divergence between the two subgenera of somewhere between 10 and 20 MYA.

**Distribution:** *Keillerchelys subgen. nov*. occur in most major drainages of sub-Saharan Africa excluding southern Africa and Madagascar, generally north of Latitude -10 S. South of here the subgenus *Pelomedusa* Wagler, 1830 occurs. The two subgenera are sympatric in a small area of east Africa north of Latitude -10 S.

**Etymology:** *Keillerchelys subgen. nov*. is named in honour of well known snake catcher, Darren Keiller from Geelong, Victoria, Australia in recognition of his services to herpetology, including through his diligent efforts in dealing with online fraud in the reptile relocation and dog training businesses conducted by scammers.

**Content:** *Pelomedusa* (*Keillerchelys*) *darrenkeilleri sp. nov.* (type species); *P.* (*Keillerchelys*) *alexstaszewskii sp. nov.*; *P.* (*Keillerchelys*) *barbata* Petzold, Vargas-Ramirez, Kehlmaier, Branch, Du Freez, Hofmeyr, Meyer, Schleicher, Siroky and Fritz, 2014; *P.* (*Keillerchelys*) *dannygoodwini sp. nov.*; *P.* (*Keillerchelys*) *gehafie* (Rüppell, 1835); *P.* (*Keillerchelys*) *kobe* Petzold, Vargas-Ramirez, Kehlmaier, Branch, Du Freez, Hofmeyr, Meyer, Schleicher, Siroky and Fritz, 2014; *P.* (*Keillerchelys*) *neumanni* Petzold, Vargas-Ramirez, Kehlmaier, Branch, Du Freez, Hofmeyr, Meyer, Schleicher, Siroky and Fritz, 2014; *P.* (*Keillerchelys*) *olivacea* (Schweigger, 1812); *P.* (*Keillerchelys*) *schweinfurthi* Petzold, Vargas-Ramirez, Kehlmaier, Branch, Du Freez, Hofmeyr, Meyer, Schleicher, Siroky and Fritz, 2014; *P.* (*Keillerchelys*) *shannonmcgrathi sp. nov.*; *P.* (*Keillerchelys*) *somalica* Petzold, Vargas-Ramirez, Kehlmaier, Branch, Du Freez, Hofmeyr, Meyer, Schleicher, Siroky and Fritz, 2014; *P.* (*Keillerchelys*) *variabilis* Petzold, Vargas-Ramirez, Kehlmaier, Branch, Du Freez, Hofmeyr, Meyer, Schleicher, Siroky and Fritz, 2014.

***PELOMEDUSA* (*KEILLERCHELYS*) *DARRENKEILLERI SP. NOV.***

**LSIDurn:lsid:zoobank.org:act:81A502CF-4748-4F12-8DCE-501E65570872**

**Holotype:** A preserved specimen at the Zoologisches Forschungsmuseum Alexander Koenig, Bonn, Germany, specimen number ZFMK 15171, collected from Mokolo, Margui-Wandala, Extreme North Province, Cameroon, Africa. This facility allows access to its holdings.

**Diagnosis:** *Pelomedusa* (*Keillerchelys*) *darrenkeilleri sp. nov.* is similar in most respects to *P.* (*Keillerchelys*) *schweinfurthi* Petzold, Vargas-Ramirez, Kehlmaier, Branch, Du Freez, Hofmeyr, Meyer, Schleicher, Siroky and Fritz, 2014, as defined by them, but is readily separated from that taxon by having triangular pectoral scutes that don't reach the plastral midseam, versus relatively squarish ones that do partially contact the midseam in *P. schweinfurthi.*

*P. darrenkeilleri sp. nov.* is a moderately dark-coloured helmeted species with large, mainly undivided temporal head scales, two small barbells under the chin and a relatively short tail.

Turtles in the subgenus *Keillerchelys subgen. nov*. are readily separated from nominate subgenus *Pelomedusa* Wagler, 1830 by having light or brown coloured dorsums versus black or dark grey in subgenus *Pelomedusa* Wagler, 1830.

*Keillerchelys subgen. nov*. are further separated from the nominate subgenus in that the widely separated pectorals are usually not in contact in the plastral midline (except in some east African forms), versus pectorals usually in contact in the nominate subgenus.

Turtles in the genus *Pelomedusa* Wagler, 1830 are separated from all other species by the following unique suite of characters: Large-sized, often dark-coloured helmeted turtles with an exceptional maximum straight carapacial length of 32.5 cm (Hewitt 1935, discussed in Branch *et al*. 1990). However, the normal shell length of adults is around 26 cm. Shell covered with epidermal shields. Pectoral scutes may or may not be in contact at plastral midseam (depending on subgenus). In approximately 50 percent of all specimens there are two small temporal scales present on each side of head, the others having one large undivided temporal scale. Two small barbels below the chin; alveolar surface of the upper jaw with a very indistinct median ridge; a pair of shields, separated by a longitudinal suture, between the eyes, followed by a large interparietal. Soft parts dorsally darker than ventrally. Carapace and plastron of adults often mainly or entirely dark but in western and northwestern populations the carapace of adults may be light-coloured with a mainly or entirely yellow plastron. Plastral bones eleven, mesoplastron being present, small and lateral, being wedged between the hyoand the hypoplastra. No bony temporal roof; neck completely retractile within the

shell; second cervical vertebra is convex. A bony temporal arch; no parieto-squamosal arch; palatine bones in contact; no nasals; praefrontals in contact; dentary single. Digits very short, mostly with only two phalanges; feet and toes with five claws.

The nominate subgenus from southern Africa includes the species *Pelomedusa galeata* (Schoepff, 1792) as the type species, *Pelomedusa nigra* Gray, 1863 and *P. subrufa* (Bonnaterre, 1789).

All other species in *Pelomedusa*, being from central sub-Saharan Africa are in the subgenus *Keillerchelys subgen. nov.*.

Based on Cyt b distances published by Petzold *et al*. (2014) it is reasonable to infer divergence between the two subgenera of somewhere between 10 and 20 MYA.

**Distribution:** *Pelomedusa* (*Keillerchelys*) *darrenkeilleri sp. nov.* is known only from the type region and is believed to be a species confined to this specific region.

Noting the rapid increase in human population and associated environmental destruction accompanying this within this part of Africa, *P. darrenkeilleri sp. nov.* should be treated as a seriously threatened or possibly endangered species.

**Etymology:** *Keillerchelys subgen. nov*. and the species *P.* (*Keillerchelys*) *darrenkeilleri sp. nov.* are both named in honour of well known snake catcher, Darren Keiller from Geelong, Victoria, Australia in recognition of his services to herpetology, including through his diligent efforts in dealing with online fraud in the reptile relocation and dog training businesses conducted by scammers.

***PELOMEDUSA* (*KEILLERCHELYS*) *ALEXSTASZEWSKII SP. NOV.***

**LSIDurn:lsid:zoobank.org:act:9EF125E2-3B0E-4724-A35A-B32E4BC26CF3**

**Holotype:** A preserved specimen at Naturhistorisches Museum, Wien, Austria, specimen number NMW 24451, collected at Al-Ubayyid (El Obeid), North Kurdufan, Sudan, Africa. This facility allows access to its holdings

**Diagnosis:** *P.* (*Keillerchelys*) *alexstaszewskii sp. nov.* is similar in most respects to *P.* (*Keillerchelys*) *schweinfurthi* Petzold, Vargas-Ramirez, Kehlmaier, Branch, Du Freez, Hofmeyr, Meyer, Schleicher, Siroky and Fritz, 2014 as diagnosed by them..

In contrast to *P. schweinfurthi*, *P. alexstaszewskii sp. nov.* is a species with a light coloured carapace at large size, with an entirely yellow pastron, versus a darkish carapace and dark plastron in *P. schweinfurthi*. Pectoral scutes of *P. alexstaszewskii sp. nov.* are triangular but just reach the plastral midline, versus more rectangular with broad midline contact on the plastron in *P. schweinfurthi.*

*P. alexstaszewskii sp. nov.* has large, mostly undivided temporal scales, two small barbells under the chin and with soft body parts lighter below than above.

Turtles in the subgenus *Keillerchelys subgen. nov*. are readily separated from nominate subgenus *Pelomedusa* Wagler, 1830 by having light or brown coloured dorsums versus black or dark grey in subgenus *Pelomedusa* Wagler, 1830.

*Keillerchelys subgen. nov*. are further separated from the nominate subgenus in that the widely separated

pectorals are usually not in contact in the plastral midline (except in some east African forms), versus pectorals usually in contact in the nominate subgenus.

Turtles in the genus *Pelomedusa* Wagler, 1830 are separated from all other species by the following unique suite of characters: Large-sized, often dark-coloured helmeted turtles with an exceptional maximum straight carapacial length of 32.5 cm (Hewitt 1935, discussed in Branch *et al*. 1990). However, the normal shell length of adults is around 26 cm. Shell covered with epidermal shields. Pectoral scutes may or may not be in contact at plastral midseam (depending on subgenus). In approximately 50 percent of all specimens there are two small temporal scales present on each side of head, the others having one large undivided temporal scale. Two small barbels below the chin; alveolar surface of the upper jaw with a very indistinct median ridge; a pair of shields, separated by a longitudinal suture, between the eyes, followed by a large interparietal. Soft parts dorsally darker than ventrally. Carapace and plastron of adults often mainly or entirely dark but in western and northwestern populations the carapace of adults may be light-coloured with a mainly or entirely yellow plastron. Plastral bones eleven, mesoplastron being present, small and lateral, being wedged between the hyoand the hypoplastra. No bony temporal roof; neck completely retractile within the

shell; second cervical vertebra is convex. A bony temporal arch; no parieto-squamosal arch; palatine bones in contact; no nasals; praefrontals in contact; dentary single. Digits very short, mostly with only two phalanges; feet and toes with five claws.

The nominate subgenus from southern Africa includes the species *Pelomedusa galeata* (Schoepff, 1792) as the type species, *Pelomedusa nigra* Gray, 1863 and *P. subrufa* (Bonnaterre, 1789).

All other species in *Pelomedusa*, being from central sub-Saharan Africa are in the subgenus *Keillerchelys subgen. nov*..

Based on Cyt b distances published by Petzold *et al*. (2014) it is reasonable to infer divergence between the two subgenera of somewhere between 10 and 20 MYA.

**Distribution:** *P.* (*Keillerchelys*) *alexstaszewskii sp. nov.* is known only from the type locality in Sudan. It is almost certainly a threatened or vulnerable species and like many other species of turtle, probably declining in number.

**Etymology:** *P. alexstaszewskii sp. nov.* is named in honour of well known Sydney snake breeder Alex Staszewski of Blacktown, New South Wales, Australia in recognition of his many contributions to herpetology in Australia.

***PELOMEDUSA* (*KEILLERCHELYS*) *DANNYGOODWINI SP. NOV.***

**LSIDurn:lsid:zoobank.org:act:65DFA33C-ECF2-4EFD-ACC2-9A19BF6CC16A**

**Holotype:** A preserved female specimen at the Naturhistorisches Museum, Wien, Austria, specimen number NMW 24449, collected from Shebelle River, Oromia, Ethiopia. This facility allows access to its holdings. Photos of the holotype are published in Fritz *et al*. (2015b) at Fig. 6.

**Paratype:** A preserved specimen at the Museum of Vertebrate Zoology, Berkeley, California, USA, Specimen number MVZ 241332 collected at Rugi, 30 km North east (by road), Borama, Awdal Region, Somalia, Africa, Latitude 9.9698 N., Longitude 43.4325E.

**Diagnosis:** *Pelomedusa* (*Keillerchelys*) *dannygoodwini sp. nov*. has until now been treated as a variant of *P.* (*Keillerchelys*) *somalica* Petzold, Vargas-Ramirez, Kehlmaier, Branch, Du Freez, Hofmeyr, Meyer, Schleicher, Siroky and Fritz, 2014 as defined by those authors.

*P. dannygoodwini sp. nov*. is however separated from that species as follows: The three mid vertebrals on the carapace are expanded horizontally, versus not so in *P. somalica*; the paired front nuchals are squarish in shape, versus rectangular (laterally) in *P. somalica*; the more-or-less triangular humerals join the abdominals in *P. dannygoodwini sp. nov*. whereas the more-or-less rectangular (expanded laterally) humerals do not come close to touching the abdominals in *P. somalica*; central gular is narrow in *P. dannygoodwini sp.* versus wide in *P. somalica*; the femorals are not strongly elongated (vertically), versus elongated strongly in *P. somalica.*

Turtles in the subgenus *Keillerchelys subgen. nov*. are readily separated from nominate subgenus *Pelomedusa* Wagler, 1830 by having light or brown coloured dorsums versus black or dark grey in subgenus *Pelomedusa* Wagler, 1830.

*Keillerchelys subgen. nov*. are further separated from the nominate subgenus in that the widely separated pectorals are usually not in contact in the plastral midline (except in some east African forms), versus pectorals usually in contact in the nominate subgenus.

Turtles in the genus *Pelomedusa* Wagler, 1830 are separated from all other species by the following unique suite of characters: Large-sized, often dark-coloured helmeted turtles with an exceptional maximum straight carapacial length of 32.5 cm (Hewitt 1935, discussed in Branch *et al*. 1990). However, the normal shell length of adults is around 26 cm. Shell covered with epidermal shields. Pectoral scutes may or may not be in contact at plastral midseam (depending on subgenus). In approximately 50 percent of all specimens there are two small temporal scales present on each side of head, the others having one large undivided temporal scale. Two small barbels below the chin; alveolar surface of the upper jaw with a very indistinct median ridge; a pair of shields, separated by a longitudinal suture, between the eyes, followed by a large interparietal. Soft parts dorsally darker than ventrally. Carapace and plastron of adults often mainly or entirely dark but in western and northwestern populations the carapace of adults may be light-coloured with a mainly or entirely yellow plastron. Plastral bones eleven, mesoplastron being present, small and lateral, being wedged between the hyoand the hypoplastra. No bony temporal roof; neck completely retractile within the

shell; second cervical vertebra is convex. A bony

temporal arch; no parieto-squamosal arch; palatine bones in contact; no nasals; praefrontals in contact; dentary single. Digits very short, mostly with only two phalanges; feet and toes with five claws.

The nominate subgenus from southern Africa includes the species *Pelomedusa galeata* (Schoepff, 1792) as the type species, *Pelomedusa nigra* Gray, 1863 and *P. subrufa* (Bonnaterre, 1789).

All other species in *Pelomedusa*, being from central sub-Saharan Africa are in the subgenus *Keillerchelys subgen. nov.*.

Based on Cyt b distances published by Petzold *et al.* (2014) it is reasonable to infer divergence between the two subgenera of somewhere between 10 and 20 MYA.

**Distribution:** *P. dannygoodwini sp. nov*. is only known from the type localities in Ethiopia and Somalia, both being countries with rapidly expanding human populations.

**Etymology:** *P. dannygoodwini sp. nov*. is named in honour of well known snake catcher and herpetologist, Danny Goodwin from Inverloch, Victoria, Australia in recognition of a lifetime's contributions to herpetology and wildlife conservation.

***PELOMEDUSA* (*KEILLERCHELYS*) *SHANNONMCGRATHI SP. NOV.***

**LSIDurn:lsid:zoobank.org:act:5CC50F4A-2D86-4051-B223-3BDF0D0A29AB**

**Holotype:** A preserved male specimen with carapace length of 152 mm at the Royal Belgian Institute of Natural Sciences, Belgium, specimen number RBINS:ZTN:UP497, collected from a shallow flooded roadside ditch, approximately 10 km north of Gombela on the road to Katwe in the Kundelungu National Park, Katanga, DR Congo, Africa, Latitude 10.688680 S., Longitude 27.830932 E. at 1,365 metres above sea level. This facility allows access to its holdings. Photos of the holotype in life are published in Nagy *et al*. (2015).

**Diagnosis:** *P.* (*Keillerchelys*) *shannonmcgrathi sp. nov.* is similar in most respects to *P.* (*Keillerchelys*) *neumanni* Petzold, Vargas-Ramirez, Kehlmaier, Branch, Du Freez, Hofmeyr, Meyer, Schleicher, Siroky and Fritz, 2014, with a type locality of the the Kakamega forest in Kenya as diagnosed by these authors.

However *P. shannonmgcrathi sp. nov.* is readily separated from *P. neumanni* by the following suite of characters: On the carapace, in *P. shannonmcgrathi sp. nov*. the anterior vertebrals and costals are significantly lighter away from the outer edges, versus not so in *P. neumanni*; the posterior edge of the anterior vertebral is relatively straight, versus a weakly inverted U-shape in *P. neumanni*; on the plastron, the lower edges of the femoral are strongly angled down at the outer edge, versus not so in *P. neumanni.*

Turtles in the subgenus *Keillerchelys subgen. nov*. are readily separated from nominate subgenus *Pelomedusa* Wagler, 1830 by having light or brown coloured dorsums versus black or dark grey in subgenus *Pelomedusa* Wagler, 1830.

*Keillerchelys subgen. nov*. are further separated from the nominate subgenus in that the widely separated pectorals are usually not in contact in the plastral midline (except in some east African forms), versus pectorals usually in contact in the nominate subgenus.

Turtles in the genus *Pelomedusa* Wagler, 1830 are separated from all other species by the following unique suite of characters: Large-sized, often dark-coloured helmeted turtles with an exceptional maximum straight carapacial length of 32.5 cm (Hewitt 1935, discussed in Branch *et al*. 1990). However, the normal shell length of adults is around 26 cm. Shell covered with epidermal shields. Pectoral scutes may or may not be in contact at plastral midseam (depending on subgenus). In approximately 50 percent of all specimens there are two small temporal scales present on each side of head, the others having one large undivided temporal scale. Two small barbels below the chin; alveolar surface of the upper jaw with a very indistinct median ridge; a pair of shields, separated by a longitudinal suture, between the eyes, followed by a large interparietal. Soft parts dorsally darker than ventrally. Carapace and plastron of adults often mainly or entirely dark but in western and northwestern populations the carapace of adults may be light-coloured with a mainly or entirely yellow plastron. Plastral bones eleven, mesoplastron being present, small and lateral, being wedged between the hyoand the hypoplastra. No bony temporal roof; neck completely retractile within the

shell; second cervical vertebra is convex. A bony temporal arch; no parieto-squamosal arch; palatine bones in contact; no nasals; praefrontals in contact; dentary single. Digits very short, mostly with only two phalanges; feet and toes with five claws.

The nominate subgenus from southern Africa includes the species *Pelomedusa galeata* (Schoepff, 1792) as the type species, *Pelomedusa nigra* Gray, 1863 and *P. subrufa* (Bonnaterre, 1789).

All other species in *Pelomedusa*, being from central sub-Saharan Africa are in the subgenus *Keillerchelys subgen. nov.*.

Based on Cyt b distances published by Petzold *et al.* (2014) it is reasonable to infer divergence between the two subgenera of somewhere between 10 and 20 MYA.

**Distribution:** *P. shannonmcgrathi sp. nov*. is only known from the type locality in DR Congo.

**Etymology:** Named in honour of well known snake catcher and herpetologist, Shannon McGrath from Bena and Korumburra, Victoria, Australia in recognition of a lifetime's contributions to herpetology and wildlife conservation.

***PELUSIOS LYNNRAWI SP. NOV.***

**LSIDurn:lsid:zoobank.org:act:97F54D18-50E6-4331-AF58-A804B5A27C93**

**Holotype**: A preserved (in alcohol) specimen at the Carnegie Museum of Natural History. Pittsburgh, PA 15213, USA, CM Herps Collection, specimen number, CM Herps S5971, collected at Bié, Chitau, Angola, Africa. Latitude -11.41 S., Longitude 17.15 E. This facility allows access to its holdings.

**Paratypes:** Three preserved (dry) specimens in the American Museum of Natural History. New York, USA,

AMNH Herpetology Collections Herpetology, specimen numbers R-50751, R-50752 and R-50753, all collected from Bié, Chitau, Angola, Africa. Latitude -11.41 S., Longitude 17.15 E.

**Diagnosis:** Until now, *Pelusios lynnrawi sp. nov*. has been treated as a variant or population of the well-known species *Pelusios rhodesianus* Hewitt, 1927. This taxon was also described as "Clade B" by Kindler *et al*. 2015.

It is known only from Angola (mainly), the far south of the DR Congo as well as western Zambia.

*P. lynnrawi sp. nov.* is readily separated from *P. rhodesianus* by having the eighth neural being not elongated and is separated from the suprapygal, versus elongate and contacts the suprapygal in *P. rhodesianus.* Within *P. rhodesianus*, the newly named subspecies *P. rhodesianus divergentans subsp. nov.,* from the north-east of the species range in Tanzania, Burundi, eastern parts of DR Congo and far north-east parts of Zambia is readily separated from the nominate subspecies (type locality Mpika district, Zambia) found mainly south of there in parts of Zambia, Zimbabwe and South Africa, as well as parts of DR Congo, Congo Brazzaville, Gabon, Mozambique, Rwanda and Uganda by having a brown head with yellow vermiculation, versus a head that is brown above and yellow laterally in the nominate subspecies.

*P. lynnrawi sp. nov.* and both subspecies of *P. rhodesianus* are readily separated from all other species in the genus *Pelusios* Wagler, 1830 by the following unique suite of characters:

Sulcus between abdominals more than half length of anterior lobe of plastron; plastron hinge strongly developed; no discrete axillary shield present; posterior width of first pair of marginals usually less than 85 percent of anterior width of first vertebral; posterior margin of carapace smoothly rounded; head width usually less than half plastron width at abdominofemoral sulcus; tip of beak bicuspid; postocular and masseteric shield usually in contact; a series of transversely elongate falciform scales on forelimb; eight neurals, the first always in contact with nuchal; intergular rhomboidal, its border usually less than 15 percent of femoral border; carapace black; plastron black or yellow mesially, rarely uniform yellow and without a black angular peripheral pattern; head with yellow vermiculation or alternatively uniform brown above; skin on outer faces of limbs is grey-brown.

**Distribution:** *Pelusios lynnrawi sp. nov*. is known only from Angola (mainly), the far south of the DR Congo as well as Zambia.

**Etymology:** Named in honour Lynn Raw, of Grenaa, Denmark in recognition of his work on the nominate species *Pelusios rhodesianus* Hewitt, 1927, other reptile species from Africa and further for services to the International Commission of Zoological Nomenclature (ICZN) in his role of managing their list-server, known as "ICZN_List".

***PELUSIOS RHODESIANUS DIVERGENTANS SUBSP. NOV.***

**LSIDurn:lsid:zoobank.org:act:9E5A0023-6EC4-412E-9589-C4BA9873B8E3**

**Holotype:** A preserved specimen at the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA, specimen number MCZ Herp R-30015, collected from Nyamkolo, (=Mpulungu), Lake Tanganyika, Zambia, Latitude 8.7725 S., Longitude 31.1166 E. This facility allows access to its holdings.

**Diagnosis:** Within *P. rhodesianus*, the newly named subspecies *P. rhodesianus divergentans subsp. nov.,* from the north-east of the species range in Tanzania, Burundi, eastern parts of DR Congo and far north-east parts of Zambia is readily separated from the nominate subspecies (type locality Mpika district, Zambia) found mainly south of there in parts of Zambia, Zimbabwe and South Africa, as well as parts of DR Congo, Congo Brazzaville, Gabon, Mozambique, Rwanda and Uganda by having a brown head with yellow vermiculation, versus a head that is brown above and yellow laterally in the nominate subspecies.

Until now, *Pelusios lynnrawi sp. nov*. has been treated as a variant or population of the well-known species *Pelusios rhodesianus* Hewitt, 1927. This taxon was also described as "Clade B" by Kindler *et al*. 2015.

It is known only from Angola (mainly), the far south of the DR Congo as well as western Zambia.

*P. lynnrawi sp. nov.* is readily separated from *P. rhodesianus* by having the eighth neural being not elongated and is separated from the suprapygal, versus elongate and contacts the suprapygal in *P. rhodesianus.*

*P. lynnrawi sp. nov.* and both subspecies of *P. rhodesianus* are readily separated from all other species in the genus *Pelusios* Wagler, 1830 by the following unique suite of characters:

Sulcus between abdominals more than half length of anterior lobe of plastron; plastron hinge strongly developed; no discrete axillary shield present; posterior width of first pair of marginals usually less than 85 percent of anterior width of first vertebral; posterior margin of carapace smoothly rounded; head width usually less than half plastron width at abdominofemoral sulcus; tip of beak bicuspid; postocular and masseteric shield usually in contact; a series of transversely elongate falciform scales on forelimb; eight neurals, the first always in contact with nuchal; intergular rhomboidal, its border usually less than 15 percent of femoral border; carapace black; plastron black, or yellow mesially, rarely uniform yellow; and without a black angular peripheral pattern; head with yellow vermiculation or alternatively uniform brown above; skin on outer faces of limbs is grey-brown.

**Distribution:** *P. rhodesianus divergentans subsp. nov.,* occurs in the north-east of the species range in Tanzania, Burundi, eastern parts of DR Congo and far north-east parts of Zambia.

The nominate subspecies (type locality Mpika district, Zambia) is found mainly south of there in parts of Zambia, Zimbabwe and South Africa, as well as parts of

DR Congo, Congo Brazzaville, Gabon, Mozambique, Rwanda and Uganda.

**Etymology:** The name "*divergentans*" refers to the fact that this subspecies is divergent from the nominate form from elsewhere in the species range.

***ORLITIA BORNEENSIS PERAKENSIS SUBSP. NOV.***

**LSIDurn:lsid:zoobank.org:act:F0CA3BEE-137C-4F08-961B-F058121A608E**

**Holotype:** A preserved female specimen at the Field Museum of Natural History, Chicago, Illinois, USA, specimen number FMNH Amphibians and Reptiles 224001 collected from Perak (Peninsula) Malaysia. This facility allows access to its holdings.

**Paratypes:** Six preserved specimens at the Field Museum of Natural History, Chicago, Illinois, USA, specimen numbers FMNH Amphibians and Reptiles 224000, 224003 (female skeleton), 224005 (male skeleton), 224007 (female skeleton), 224008 (dried shell), 224184 all collected from Perak (Peninsula) Malaysia.

**Diagnosis:** *O. borneensis perakensis subsp. nov*. is similar in most respects to the nominate form *O. borneensis borneensis* Gray, 1873, but is separated from that subspecies by a combination of a deepened carapace, slightly enlarged anterior marginals on the carapace and slightly more concave anterior marginals (as in with obvious concavity, versus not so). Upper jaw and lower snout is mainly yellow in *O. borneensis perakensis subsp. nov*. versus less so in *O. borneensis borneensis.*

*O. borneensis* of both subspecies are separated from all morphologically similar species by the following suite of characters:

Carapace very convex, tectiform, with a single obtuse keel, distinct only posteriorly; posterior border serrated, the posterior marginals very much smaller than the others; shields slightly rugose; nuchal rather large, a little broader than long; vertebrals broader than long, narrower than the costals, second and third hexagonal equilateral; fourth costal not half as large as third. Plastron light in colour, smaller than the opening of the shell, truncate anteriorly, angularly notched posteriorly, strongly angulated laterally; the width of the bridge much exceeds the length of the hind lobe; pectoral, abdominal and femoral shields equal in length; the shortest median sutures formed by the anal and humeral shields; axillary and inguinal shields present. Head rather large, snout very short, not prominent; upper jaw strongly curved on each side, not hooked; the width of the mandible at the symphysis is a little less than the diameter of the orbit. Iris dark brown. Digital webs very much developed. Dorsum is usually uniform brown to dark grey or black.

Photos of *O. borneensis perakensis subsp. nov*. in life can be found online at:
https://www.inaturalist.org/observations/40735112
and
https://www.inaturalist.org/observations/14772311
and
https://www.flickr.com/photos/65586506@N04/38399352084/

Photos of *O. borneensis borneensis* from Borneo in life can be found in Rhodin *et al.* (2017) on page 110 at top right of page and online at:
https://www.flickr.com/photos/limburan/6091262187/

**Distribution:** *O. borneensis perakensis subsp. nov*. occurs on the west side of Peninsula Malaysia (mainly Perak), with the nominate subspecies found elsewhere in the species (extant) range of Borneo and Sumatra.

**Etymology:** The subspecies *O. borneensis perakensis subsp. nov*.is named in reflection of the type locality.

***EMYDURA* (*TROPICOCHELYMYS*) *WELLINGTONI SP. NOV.***

**LSIDurn:lsid:zoobank.org:act:A660B6CD-3EFD-40D1-B8A6-4E078871CADB**

**Holotype:** A preserved adult male specimen at the Western Australian Museum, Perth, Western Australia, Australia, specimen number R164180, collected from Geikie Gorge, Western Australia, Australia, Latitude -18.104167 S., Longitude 125.700833 E. This government-owned facility allows access to its holdings.

**Paratypes:** A preserved specimen at the Western Australian Museum, Perth, Western Australia, Australia, specimen number R164177, and two preserved specimens at the Northern Territory Museum and Art Gallery, Darwin, NT, Australia, specimen numbers R34795 and R34793, all collected from Geikie Gorge, Western Australia, Australia, Latitude -18.104167 S., Longitude 125.700833 E.

**Diagnosis:** *Emydura wellingtoni sp. nov*., *E. wellsi sp. nov*. and *E. hawkeswoodi sp. nov*. all from the Kimberley District of Western Australia, are all formally named for the first time in this paper.

*Emydura wellingtoni sp. nov*. is the species found in the Fitzroy River system and drainages flowing into the Walcott Inlet.

*E. wellsi sp. nov*. is the species found in the Prince Regent and Roe River systems.

*E. hawkeswoodi sp. nov*. is the species found in the Mitchell and Lawley River systems.

They are all readily separated from other species in the subgenus *Tropicochelymys* Wells and Wellington, 1985, (being the north Australian and southern New Guinea *Emydura* clade), being *E. australis* Gray 1841, the morphologically similar *E. victoriae* Gray, 1842 (both from the Victoria River system in the NT and west to include the King Edward River system in the Kimberley district of Western Australia), *E. subglobosa* Krefft, 1876, with a type locality of Naiabui, on Amama River, South East Papua New Guinea and common throughout southern New Guinea, *E. worrelli* Wells and Wellington (1985), type locality of the Caranbirini Waterhole, about 21 km north of MacArthur River, Northern Territory, Australia, and *E. tanybaraga* Cann, 1997 from the Daly River system in the Northern Territory, by having a rounded versus high-peaked carapace, as well as one that is only moderately expanded at the rear, versus widely expanded at the rear in the other species.

The rear scutes in *Emydura wellingtoni sp. nov*., *E. wellsi sp. nov*. and *E. hawkeswoodi sp. nov*. are not jagged edged as is seen in all but the oldest specimens

of the other species in the subgenus.

*Emydura hawkeswoodi sp. nov.*, *E. wellsi sp. nov.*, *E. wellingtoni sp. nov.*, *E. victoriae* and *E. australis* are separated from the other species in the subgenus *Tropicochelymys* Wells and Wellington, 1985 by having an absence of a horizontal dark line, or broken darker line running through the iris and pupil.

*Emydura wellingtoni sp. nov.*, *E. wellsi sp. nov.* and *E. hawkeswoodi sp. nov.* have the line on the head running into the ear versus mainly over the ear in other species in the subgenus.

Adult *Emydura wellingtoni sp. nov.*, *E. wellsi sp. nov.* and *E. hawkeswoodi sp. nov.* are readily separated from the other species in the subgenus by a noticeably thickened lateral edge of the carapace, typically forming a thick unbroken yellow or beige line coupled with a blackish or dark brown carapace.

*Emydura wellingtoni sp. nov.*, are separated from *E. wellsi sp. nov.* and *E. hawkeswoodi sp. nov.* by the following unique suite of characters: Except in very old specimens, adult males have a bright pinkish-grey plastron and pink lower parts of the limbs. The carapace is dark. The nose is also light pink and the bright red facial stripe extends from the eye, back to the top of the tympanum. A vivid red colour also extends from the angle of the mouth, along the neck to the body. Many small tubercles on the neck are also pink, orange or deep red in colour. Carapace shields have no indications of striations. The underside of the lower part of the tail is also pink. Upper surfaces of the limbs are greyish brown with orange blotches or flecks. Iris is yellow.

*E. wellingtoni sp. nov.* is readily separated from *E. wellsi sp. nov.* by the fact that adults have a pronounced raising or arch of the carapace above the neck, versus not so in *E. wellsi sp. nov.*. The brightly coloured tubercles seen on the neck of *E. wellingtoni sp. nov.* are relatively smaller and often indistinct in *E. wellsi sp. nov.*, which also readily separates the two species.

The lower rear sides of the carapace is slightly upturned in *E. wellsi sp. nov.* versus either not so, or barely in *E. wellingtoni sp. nov.*. The plastron of *E. wellsi sp. nov.* is usually yellowish in colour, versus pinkish grey in *E. wellingtoni sp. nov.*. *E. wellsi sp. nov.* has a yellowish-blue iris.

*E. hawkeswoodi sp. nov.* is readily separated from both *E. wellingtoni sp. nov.* and *E. wellsi sp. nov.* by having a mainly grey iris, with yellow on the inner edge only, the line behind the eye is often semi-distinct and yellow in adults, tubercles on the neck are small on the upper surface and large on the upper sides (the contrast in size of the tubercles being noticeable in this species and far less so in the other two), nose is usually pink, plastron is yellowish-grey. There is no orange, pink or yellow markings on the upper surfaces of the limbs, which are generally brownish-grey. Adult *E. hawkeswoodi sp. nov.* also have a pronounced raising or arch of the carapace above the neck, but somewhat less so than is seen in *E. wellsi sp. nov.*.

*Tropicochelymys* Wells and Wellington, 1985, species are separated from the other species within *Emydura* Bonaparte, 1863 by the fact that the length of the mandibular symphysis is about 1.5 times the horizontal diameter of the tympanum, versus more-or-less equal to the horizontal diameter of the tympanum in other *Emydura* species (being those of the nominate subgenus).

**Distribution:** The Fitzroy River system and drainages flowing into the Walcott Inlet, Kimberley District, Western Australia, Australia.

**Etymology:** *Emydura wellingtoni sp. nov.*, is named in honour of esteemed Australian herpetologist, Cliff Ross Wellington, of Ramornie, New South Wales, Australia, in recognition for his services to herpetology and zoology globally, including his strong advocacy against taxonomic vandalism as practiced by Welsh criminal Wolfgang Wüster and his gang of thieves as detailed by Cogger (2014), Hoser (2007, 2009, 2012a, 2012c, 2013a, 2015a-f), Hawkeswood (2021), ICZN (2021) and sources cited therein.

***EMYDURA* (*TROPICOCHELYMYS*) *WELLSI SP. NOV.***

**LSIDurn:lsid:zoobank.org:act:87CD1F6A-F530-453C-8873-CD98E8DFB884**

**Holotype:** A preserved specimen at the Western Australian Museum, Perth, Western Australia, Australia, specimen number R47022, collected from the Prince Regent River Reserve, Western Australia, Australia, Latitude -15.816667 S., Longitude 125.633333 E. This government-owned facility allows access to its holdings.

**Paratypes:** Two preserved specimens at the Western Australian Museum, Perth, Western Australia, Australia, specimen number R47024 and R47049, collected from the Prince Regent River Reserve, Western Australia, Australia, Latitude -15.816667 S., Longitude 125.633333 E.

**Diagnosis:** *Emydura wellsi sp. nov.*, *E. wellingtoni sp. nov.* and *E. hawkeswoodi sp. nov.* all from the Kimberley District of Western Australia, are all formally named for the first time in this paper.

*Emydura wellsi sp. nov.* is the species found in the Prince Regent and Roe River systems.
*E. wellingtoni sp. nov.* is the species found in the Fitzroy River system and drainages flowing into the Walcott Inlet.
*E. hawkeswoodi sp. nov.* is the species found in the Mitchell and Lawley River systems.

They are all readily separated from other species in the subgenus *Tropicochelymys* Wells and Wellington, 1985, (being the north Australian and southern New Guinea *Emydura* clade), being *E. australis* Gray 1841, the morphologically similar *E. victoriae* Gray, 1842 (both from the Victoria River system in the NT and west to include the King Edward River system in the Kimberley district of Western Australia), *E. subglobosa* Krefft, 1876, with a type locality of Naiabui, on Amama River, South East Papua New Guinea and common throughout southern New Guinea, *E. worrelli* Wells and Wellington (1985), type locality of the Caranbirini Waterhole, about 21 km north of MacArthur River, Northern Territory, Australia, and *E. tanybaraga* Cann, 1997 from the Daly River system in the Northern Territory, by having a

rounded versus high-peaked carapace, as well as one that is only moderately expanded at the rear, versus widely expanded at the rear in the other species.

The rear scutes in *Emydura wellingtoni sp. nov.*, *E. wellsi sp. nov.* and *E. hawkeswoodi sp. nov.* are not jagged edged as is seen in all but the oldest specimens of the other species in the subgenus.

*Emydura hawkeswoodi sp. nov.*, *E. wellsi sp. nov.*, *E. wellingtoni sp. nov.*, *E. victoriae* and *E. australis* are separated from the other species in the subgenus *Tropicochelymys* Wells and Wellington, 1985 by having an absence of a horizontal dark line, or broken darker line running through the iris and pupil.

*Emydura wellingtoni sp. nov.*, *E. wellsi sp. nov.* and *E. hawkeswoodi sp. nov.* have the line on the head running into the ear versus mainly over the ear in other species in the subgenus.

Adult *Emydura wellingtoni sp. nov.*, *E. wellsi sp. nov.* and *E. hawkeswoodi sp. nov.* are readily separated from the other species in the subgenus by a noticeably thickened lateral edge of the carapace, typically forming a thick unbroken yellow or beige line coupled with a blackish or dark brown carapace.

*Emydura wellingtoni sp. nov.*, are separated from *E. wellsi sp. nov.* and *E. hawkeswoodi sp. nov.* by the following unique suite of characters: Except in very old specimens, adult males have a bright pinkish-grey plastron and pink lower parts of the limbs. The carapace is dark. The nose is also light pink and the bright red facial stripe extends from the eye, back to the top of the tympanum. A vivid red colour also extends from the angle of the mouth, along the neck to the body. Many small tubercles on the neck are also pink, orange or deep red in colour. Carapace shields have no indications of striations. The underside of the lower part of the tail is also pink. Upper surfaces of the limbs are greyish brown with orange blotches or flecks. Iris is yellow.

*E. wellingtoni sp. nov.* is readily separated from *E. wellsi sp. nov.* by the fact that adults have a pronounced raising or arch of the carapace above the neck, versus not so in *E. wellsi sp. nov.*. The brightly coloured tubercles seen on the neck of *E. wellingtoni sp. nov.* are relatively smaller and often indistinct in *E. wellsi sp. nov.*, which also readily separates the two species.

The lower rear sides of the carapace is slightly upturned in *E. wellsi sp. nov.* versus either not so, or barely in *E. wellingtoni sp. nov.*. The plastron of *E. wellsi sp. nov.* is usually yellowish in colour, versus pinkish grey in *E. wellingtoni sp. nov.*. *E. wellsi sp. nov.* has a yellowish-blue iris.

*E. hawkeswoodi sp. nov.* is readily separated from both *E. wellingtoni sp. nov.* and *E. wellsi sp. nov.* by having a mainly grey iris, with yellow on the inner edge only, the line behind the eye is often semi-distinct and yellow in adults, tubercles on the neck are small on the upper surface and large on the upper sides (the contrast in size of the tubercles being noticeable in this species and far less so in the other two), nose is usually pink, plastron is yellowish-grey. There is no orange, pink or yellow markings on the upper surfaces of the limbs, which are generally brownish-grey. Adult *E. hawkeswoodi sp. nov.* also have a pronounced raising or arch of the carapace above the neck, but somewhat less so than is seen in *E. wellsi sp. nov.*.

*Tropicochelymys* Wells and Wellington, 1985, species are separated from the other species within *Emydura* Bonaparte, 1863 by the fact that the length of the mandibular symphysis is about 1.5 times the horizontal diameter of the tympanum, versus more-or-less equal to the horizontal diameter of the tympanum in other *Emydura* species (being those of the nominate subgenus).

**Distribution:** The Prince Regent and Roe River systems, Kimberley District, Western Australia, Australia.

**Etymology:** Named in honour of esteemed Australian herpetologist, Richard Wells of Lismore, New South Wales, Australia, in recognition for his services to herpetology and zoology globally, including his strong advocacy against taxonomic vandalism as practiced by Welsh criminal Wolfgang Wüster and his gang of thieves as detailed by Cogger (2014), Hoser (2007, 2009, 2012a, 2012c, 2013a, 2015a-f), Hawkeswood (2021), ICZN (2021) and sources cited therein.

***EMYDURA* (*TROPICOCHELYMYS*) *HAWKESWOODI SP. NOV.***

**LSIDurn:lsid:zoobank.org:act:3DC59926-73CA-405E-91F4-4B9337F88B2D**

**Holotype:** A preserved specimen at the Western Australian Museum, Perth, Western Australia, Australia, specimen number R78244, collected from the Crusher Plant at the Mitchell Plateau, Western Australia, Australia, Latitude -14.733333 S., Longitude 125.733333 E. This government-owned facility allows access to its holdings.

**Paratype:** A preserved specimen at the Western Australian Museum, Perth, Western Australia, Australia, specimen number R77142 collected from a campsite at the Mitchell Plateau, Western Australia, Australia, Latitude -14.820833 S., Longitude 125.841667 E.

**Diagnosis:** *Emydura hawkeswoodi sp. nov.*, *E. wellsi sp. nov.* and *E. wellingtoni sp. nov.* all from the Kimberley District of Western Australia, are all formally named for the first time in this paper.

*E. hawkeswoodi sp. nov.* is the species found in the Mitchell and Lawley River systems.
*Emydura wellsi sp. nov.* is the species found in the Prince Regent and Roe River systems.
*E. wellingtoni sp. nov.* is the species found in the Fitzroy River system and drainages flowing into the Walcott Inlet.
They are all readily separated from other species in the subgenus *Tropicochelymys* Wells and Wellington, 1985, (being the north Australian and southern New Guinea *Emydura* clade), being *E. australis* Gray 1841, the morphologically similar *E. victoriae* Gray, 1842 (both from the Victoria River system in the NT and west to include the King Edward River system in the Kimberley district of Western Australia), *E. subglobosa* Krefft,

1876, with a type locality of Naiabui, on Amama River, South East Papua New Guinea and common throughout southern New Guinea, *E. worrelli* Wells and Wellington (1985), type locality of the Caranbirini Waterhole, about 21 km north of MacArthur River, Northern Territory, Australia, and *E. tanybaraga* Cann, 1997 from the Daly River system in the Northern Territory, by having a rounded versus high-peaked carapace, as well as one that is only moderately expanded at the rear, versus widely expanded at the rear in the other species.

*Emydura hawkeswoodi sp. nov.*, *E. wellsi sp. nov.*, *E. wellingtoni sp. nov.*, *E. victoriae* and *E. australis* are separated from the other species in the subgenus *Tropicochelymys* Wells and Wellington, 1985 by having an absence of a horizontal dark line, or broken darker line running through the iris and pupil.

The rear scutes in *Emydura wellingtoni sp. nov.*, *E. wellsi sp. nov.* and *E. hawkeswoodi sp. nov.* are not jagged edged as is seen in all but the oldest specimens of the other species in the subgenus.

*Emydura wellingtoni sp. nov.*, *E. wellsi sp. nov.* and *E. hawkeswoodi sp. nov.* have the line on the head running into the ear versus mainly over the ear in other species in the subgenus.

Adult *Emydura wellingtoni sp. nov.*, *E. wellsi sp. nov.* and *E. hawkeswoodi sp. nov.* are readily separated from the other species in the subgenus by a noticeably thickened lateral edge of the carapace, typically forming a thick unbroken yellow or beige line coupled with a blackish or dark brown carapace.

*Emydura wellingtoni sp. nov.*, are separated from *E. wellsi sp. nov.* and *E. hawkeswoodi sp. nov.* by the following unique suite of characters: Except in very old specimens, adult males have a bright pinkish-grey plastron and pink lower parts of the limbs. The carapace is dark. The nose is also light pink and the bright red facial stripe extends from the eye, back to the top of the tympanum. A vivid red colour also extends from the angle of the mouth, along the neck to the body. Many small tubercles on the neck are also pink, orange or deep red in colour. Carapace shields have no indications of striations. The underside of the lower part of the tail is also pink. Upper surfaces of the limbs are greyish brown with orange blotches or flecks. Iris is yellow.

*E. wellingtoni sp. nov.* is readily separated from *E. wellsi sp. nov.* by the fact that adults have a pronounced raising or arch of the carapace above the neck, versus not so in *E. wellsi sp. nov.*. The brightly coloured tubercles seen on the neck of *E. wellingtoni sp. nov.* are relatively smaller and often indistinct in *E. wellsi sp. nov.*, which also readily separates the two species.

The lower rear sides of the carapace is slightly upturned in *E. wellsi sp. nov.* versus either not so, or barely in *E. wellingtoni sp. nov.*. The plastron of *E. wellsi sp. nov.* is usually yellowish in colour, versus pinkish grey in *E. wellingtoni sp. nov.*. *E. wellsi sp. nov.* has a yellowish-blue iris.

*E. hawkeswoodi sp. nov.* is readily separated from both *E. wellingtoni sp. nov.* and *E. wellsi sp. nov.* by having a mainly grey iris, with yellow on the inner edge only, the line behind the eye is often semi-distinct and yellow in adults, tubercles on the neck are small on the upper surface and large on the upper sides (the contrast in size of the tubercles being noticeable in this species and far less so in the other two), nose is usually pink, plastron is yellowish-grey. There is no orange, pink or yellow markings on the upper surfaces of the limbs, which are generally brownish-grey. Adult *E. hawkeswoodi sp. nov.* also have a pronounced raising or arch of the carapace above the neck, but somewhat less so than is seen in *E. wellsi sp. nov.*.

*Tropicochelymys* Wells and Wellington, 1985, species are separated from the other species within *Emydura* Bonaparte, 1863 by the fact that the length of the mandibular symphysis is about 1.5 times the horizontal diameter of the tympanum, versus more-or-less equal to the horizontal diameter of the tympanum in other *Emydura* species.

**Distribution:** *Emydura hawkeswoodi sp. nov.* occurs in the Mitchell and Lawley River systems, Kimberley District, Western Australia, Australia.

**Etymology:** Named in honour of esteemed Zoologist, Trevor Hawkeswood of Sydney, New South Wales, Australia, in recognition of his many contributions to zoology over some decades, including his strong advocacy against taxonomic vandalism as practiced by Welsh criminal Wolfgang Wüster and his gang of thieves as detailed by Cogger (2014), Hoser (2007, 2009, 2012a-c, 2013a-b, 2015a-g), Hawkeswood (2021), ICZN (2021) and sources cited therein.

***WOLLUMBINIA GEORGEFLOYDI SP. NOV.***

**LSIDurn:lsid:zoobank.org:act:6BDACAE2-4DE7-4855-9F04-4A2153217433**

**Holotype:** A preserved female specimen at the Queensland Museum, Brisbane, Queensland, Australia, specimen number J17761 collected from the upper reaches of the Bloomfield River, 48 km south of Cooktown, Queensland, Latitude -15.933333 S., Longitude 145.35 E. This government-owned facility allows access to its holdings.

**Paratypes:** Two preserved male specimens at the Queensland Museum, Brisbane, Queensland, Australia, specimen numbers J17762 and J17680 collected from the upper reaches of the Bloomfield River, 48 km south of Cooktown, Queensland, Latitude -15.933333 S., Longitude 145.35 E.

**Diagnosis:** *Wollumbinia georgefloydi sp. nov.* is the member of the *W. latisternum* (Gray, 1867) species complex from the wet tropics region of north Queensland, bounded by the Burdekin Gap in the South and found as far north as about Cape Flattery.

*W. latisternum* from the top of Cape York, including the Jardine River system, other drainages flowing to the west of Cape York, the Gulf of Carpentaria and other systems flowing into the Arafura Sea are readily separated from *W. georgefloydi sp. nov.* by the presence of relatively small neck tubercles, versus large, pointed and of similar size in *W. georgefloydi sp. nov.*.

In turn *W. darnellafrazierae sp. nov.* from the Eungella region of Queensland is separated from both preceding species by having a carapace lacking the distinct upward curling of the sides as well as a significantly flared rear carapace.

*W. latisternum* is characterised by a carapace that is either black in colour or nearly so.

By contrast both *W. georgefloydi sp. nov*. and *W. darnellafrazierae sp. nov.* have a carapace that is typically mid to dark brown and with only a hint of darker blotches.

*W. latisternum* is characterised by having distinctive dots on either side of the pupil, this not being seen in any of the four other species in the complex, except in some young specimens of *W. georgefloydi sp. nov*..

The two southern forms, *W. spinosa* (Gray, 1871), believed to be from the Burdekin River region in central Queensland and *W. dorsii* Wells, 2009 from the border ranges area of northern New South Wales and South-east Queensland are separated from the northern species by the relatively straight sutures on the plastron, versus wavy in the other species. The sutures in the southern species are also thickly etched with dark brown or black lines, versus thinly etched in the northern three species.

The two southern species are further separated from the northern forms by the following suite of characters: There is no pale facial stripe on the side of the head, giving it a predominantly dark colour and the areas of segmented skin between the eye and tympanum are extremely cornified and raised.

*W. dorsii* Wells, 2009 is separated from *W. spinosa* by having spiny tubercles on the neck that are particularly long and pointed in comparison to both *W. spinosa* and all other species in the *W. latisternum* complex.

*W. spinosa* has a brown pupil, versus yellow heavily flecked with brown in *W. dorsii.*

The iris of *W. darnellafrazierae sp. nov.* is yellow, the iris of *W. georgefloydi sp. nov*. may be either yellow or brown, while the iris of *E. latisternum* is brown, except for a yellow ring around the pupil in younger specimens.

All species within the *W. latisternum* complex are separated from the other species in the genus by having at least some posterior expansion of the carapace (versus none in the others), except for the taxon *W. belli* (Gray, 1844) and the subspecies *W. belli doriani* Wells, 2002 (described as a full species), both of which are instead separated from the morphologically similar *W. latisternum* complex by the generally dark blackish plastron in all but the youngest specimens and the light yellow iris.

Species in the genus *Wollumbinia* are separated from the morphologically similar genus *Elseya* by having the intergular shield as wide as or wider than each gular shield (versus noticeably narrower than each gular shield in *Elseya*), neck with usually conspicuous sharp pointed tubercles on the upper surfaces (versus rounded tubercles in *Elseya*), no alveolar ridge on the maxilla (versus a distinct alveolar ridge on each maxilla in *Elseya*).

Both these genera are separated from all other Australian Chelidae by the following unique suite of characters: They are so-called short-necked species, with five claws on each forelimb, gular shields entirely separated by the intergular; intergular shield not contacting the pectorals; sutures between the second and third costals and third and fourth costals contacting the seventh and ninth marginals respectively; a usually jagged edged rear end of the carapace, skin of temporal region has prominent. low rounded scales or tubercles, which are distinctively raised above the surface of the head; nuchal shield usually absent.

The name *Myuchelys* Thomson and Georges, 2009 is an objective junior synonym of *Wollumbinia* Wells, 2007. The name *Myuchelys* was created in a deliberate act of taxonomic vandalism by the authors Scott Thomson and Arthur Georges, both being fully aware of the earlier available name erected by highly respected Australian herpetologist Richard Wells two years prior in his printed paper.

In breach of both the rules of the *International Code of Zoological Nomenclature* (Ride *et al*. 1999) and more recently, a ruling by the ICZN in April 2021, both Thomson and Georges continue to peddle their illegally coined name online and elsewhere as the “correct” name for the relevant genus.

Rhodin *et al.* (2017), listing Arthur Georges as one of the authors lists *Wollumbinia* as an “unavailable name”, without giving a reason for the ridiculous statement, clearly fully aware that their statement has absolutely no factual basis.

Rhodin *et al.* (2017) is a privately published online publication, not subject to any form of peer review.

**Distribution:** *Wollumbinia georgefloydi sp. nov*. occurs in the wet tropics region of north Queensland, Australia, bounded by the Burdekin Gap in the South and found as far north as about Cape Flattery.

**Etymology:** *W. georgefloydi sp. nov*. is named in honour of George Floyd.

On 25 May 2020, Minneapolis police officers arrested George Floyd, a 46-year-old black man, after a convenience store employee called 911 and told the police that Mr. Floyd had bought cigarettes with a potentially counterfeit $20 bill. Seventeen minutes after the first squad car arrived at the scene, Mr. Floyd was unconscious and pinned beneath three police officers, showing no signs of life.

Derek Chauvin, one of four police officers who arrived on the scene, knelt on Floyd’s neck and back for 9 minutes and 29 seconds. The other three officers assisted Chauvin and kept members of the public away, preventing them from offering any assistance to the man they were killing.

Teenager, Darnella Frazier (17 YO at the time) at great personal risk, courageously recorded the murder of George Floyd on her mobile phone.

That video, posted to a global audience via social media, spurred protests against police brutality around the world, highlighting the crucial role of citizens can play in exposing police corruption to people who would

otherwise never see it or believe it even exists.

Ms Frazier was also among the witnesses who testified at the trial of (now) former Minneapolis police officer Derek Chauvin, who was convicted in April of Mr Floyd's murder.

In the video taken by Ms Frazier, Chauvin is seen kneeling for more than nine minutes on the neck of Mr Floyd, as bystanders urge him repeatedly to get off and Mr Floyd says that he can't breathe, before losing consciousness and dying.

Chauvin was sentenced to 22 and a half years jail for the murder.

Had Darnella Frazier not taken the video of the killing, it is likely Chauvin would not have been charged and that as of 2021, he'd still be a police officer attacking vulnerable people.

George Floyd was a victim of police brutality and corruption and recognition of a species in his honour is an important step to continued recognition of and vigilance against endemic police and government corruption wherever it occurs.

Also see the etymology of Darnella Frazier in this paper.

***WOLLUMBINIA DARNELLAFRAZIERAE SP. NOV.***

**LSIDurn:lsid:zoobank.org:act:B1B4945D-B25A-45B9-A1A3-34AD8262C493**

**Holotype:** A preserved specimen at the Queensland Museum, Brisbane, Queensland, Australia, specimen number J25957 collected from Broken River, Eungella National Park, Queensland, Latitude -21.168056 S., Longitude 148.505556 E. This government-owned facility allows access to its holdings.

**Paratype:** A preserved specimen at the Queensland Museum, Brisbane, Queensland, Australia, specimen number J33333 collected from Hazelwood Creek Gorge, Eungella Pastoral Holding, Queensland, Latitude -21.05 S., Longitude 148.633333 E.

**Diagnosis:** *Wollumbinia darnellafrazierae sp. nov.* is the member of the *W. latisternum* (Gray, 1867) species complex from the Eungella region of Queensland, Australia.

*Wollumbinia georgefloydi sp. nov*. is the member of the *W. latisternum* (Gray, 1867) species complex from the wet tropics region of north Queensland, bounded by the Burdekin Gap in the South and found as far north as about Cape Flattery.

*W. latisternum* from the top of Cape York, including the Jardine River system, other drainages flowing to the west of Cape York, the Gulf of Carpentaria and other systems flowing into the Arafura Sea are readily separated from *Wollumbinia darnellafrazierae sp. nov.* and *W. georgefloydi sp. nov*. by the presence of relatively small neck tubercles, versus large, pointed and of similar size in *W. georgefloydi sp. nov*. and *W. darnellafrazierae sp. nov.*.

In turn *W. darnellafrazierae sp. nov.* is separated from both preceding species by having a carapace lacking the distinct upward curling of the sides as well as a significantly flared rear carapace.

*W. latisternum* is characterised by a carapace that is either black in colour or nearly so.

By contrast both *W. georgefloydi sp. nov*. and *W. darnellafrazierae sp. nov.* have a carapace that is typically mid to dark brown and with only a hint of darker blotches.

*W. latisternum* is characterised by having distinctive dots on either side of the pupil, this not being seen in any of the four other species in the complex, except in some young specimens of *W. georgefloydi sp. nov*..

The two southern forms, *W. spinosa* (Gray, 1871), believed to be from the Burdekin River region in central Queensland and *W. dorsii* Wells, 2009 from the border ranges area of northern New South Wales and South-east Queensland are separated from the northern species by the relatively straight sutures on the plastron, versus wavy in the other species. The sutures in the southern species are also thickly etched with dark brown or black lines, versus thinly etched in the northern three species.

The two southern species are further separated from the northern forms by the following suite of characters: There is no pale facial stripe on the side of the head, giving it a predominantly dark colour and the areas of segmented skin between the eye and tympanum are extremely cornified and raised.

*W. dorsii* Wells, 2009 is separated from *W. spinosa* by having spiny tubercles on the neck that are particularly long, thin and pointed in comparison to both *W. spinosa* and all other species in the *W. latisternum* complex.

*W. spinosa* has a brown pupil, versus yellow, heavily flecked with brown in *W. dorsii.*

The iris of *W. darnellafrazierae sp. nov.* is yellow, the iris of *W. georgefloydi sp. nov*. may be either yellow or brown, while the iris of *E. latisternum* is brown, except for a very thin yellow ring around the pupil in younger specimens.

All species within the *W. latisternum* complex are separated from the other species in the genus by having at least some posterior expansion of the carapace (versus none in the others), except for the taxon *W. belli* (Gray, 1844) and the subspecies *W. belli doriani* Wells, 2002 (described as a full species), both of which are instead separated from the morphologically similar *W. latisternum* complex by the generally dark blackish plastron in all but the youngest specimens and the light yellow iris.

Species in the genus *Wollumbinia* are separated from the morphologically similar genus *Elseya* by having the intergular shield as wide as or wider than each gular shield (versus noticeably narrower than each gular shield in *Elseya*), neck with usually conspicuous sharp pointed tubercles on the upper surfaces (versus rounded tubercles in *Elseya*), no alveolar ridge on the maxilla (versus a distinct alveolar ridge on each maxilla in *Elseya*).

Both these genera are separated from all other Australian Chelidae by the following unique suite of characters: They are so-called short-necked species, with five claws on each forelimb, gular shields entirely separated by the intergular; intergular shield not

contacting the pectorals; sutures between the second and third costals and third and fourth costals contacting the seventh and ninth marginals respectively; a usually jagged edged rear end of the carapace, skin of temporal region has prominent. low rounded scales or tubercles, which are distinctively raised above the surface of the head; nuchal shield usually absent.

The name *Myuchelys* Thomson and Georges, 2009 is an objective junior synonym of *Wollumbinia* Wells, 2007. The name *Myuchelys* was created in a deliberate act of taxonomic vandalism by the authors Scott Thomson and Arthur Georges, both being fully aware of the earlier available name erected by highly respected Australian herpetologist Richard Wells two years prior in his printed paper.

In breach of both the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999) and more recently, a ruling by the ICZN in April 2021, both Thomson and Georges continue to peddle their illegally coined name online and elsewhere as the "correct" name for the relevant genus.

Rhodin *et al.* (2017), listing Arthur Georges as one of the authors lists *Wollumbinia* as an "unavailable name", without giving a reason for the ridiculous statement, clearly fully aware that their statement has absolutely no factual basis.

Rhodin *et al.* (2017) is a privately published online publication, not subject to any form of peer review.

**Distribution:** *Wollumbinia darnellafrazierae sp. nov.* is known only from the Eungella region of Queensland, Australia.

**Etymology:** *W. darnellafrazierae sp. nov.* is named in honour of Darnella Frazier.

Born 2003 in Nashville, Tennessee to parents LaTangie Gillespie and James Frazier. She has three brothers and one sister. Most of Darnella's life, however, has been spent in Minneapolis, Minnesota. After being active in varsity basketball, she graduated from Roosevelt High School in that city.

She is an American woman who (at age 17) video recorded the murder of George Floyd on May 25, 2020, and then posted her video on Facebook.

Because Frazier's video contradicted the initial Minneapolis police account of Floyd's death, it sparked global protests regarding police abuse, lies and corruption. Demonstrations demanding justice for Floyd exploded over the summer of 2020 involving an estimated 26 million U.S. citizens in more than 2,000 cities across the nation. Similar protests took place in over 60 nations around the world. The Frazier video sparked the greatest level of demonstrations and protest in human history. More immediately her video led to more intense monitoring of police behaviour around the world including investigations of past acts of police killings of unarmed black men, women, and children. Without her video, the Floyd death would have been ignored and the victim blamed.

Also see the etymology of George Floyd in this paper.

***HYDROMEDUSA MEYEYOUCHELYS SP. NOV.***

**LSIDurn:lsid:zoobank.org:act:E5C2A9DA-6619-4BFD-BFCD-04F3A3C9F167**

**Holotype:** A preserved specimen at the (British) Museum of Natural History, London, UK, specimen number BMNH 1914.3.20.1, collected from Teresopolis (Theresopilis), Brazil, Latitude -22.43 S., Longitude -42.98 W. This facility allows access to its holdings.

**Paratypes**: Two preserved specimens at the Zoologische Staatssammlung München (Munich), Germany, specimen numbers ZSM 53/32 and ZSM 54/32, collected from Petropolis, Brazil, Latitude -22.52 S., Longitude -43.17 W.

**Diagnosis:** Until now, *Hydromedusa meyeyouchelys sp. nov*. has been treated as a north-eastern population of *H. maximiliani* (Mikan, 1825), with a type locality of São Paulo, Brazil.

However for nearly two decades, it has been well established that there are two very distinctive populations of this putative species as confirmed by the molecular results of Souza *et al.* (2003), suggesting an 8-16 MYA divergence between the two populations.

Invesigations by myself confirmed that the type form of *H. maximiliani* has a distribution centred on Sao Paulo state, with the unnamed eastern population found in Rio de Janeiro and Minas Gerais states.

*Hydromedusa meyeyouchelys sp. nov.* is readily separated from *H. maximiliani* by the fact that the posterior line of the nuchal plate on the carapace is roughly straight in line, versus semi-circular in *H. maximiliani. H. meyeyouchelys sp. nov.* is further separated from *H. maximiliani* by having an obviously elongated oblong-shaped shell (carapace) with minimal posterior expansion, versus a shell that is only slightly longer than wide and with a significant posterior expansion.

The vertebrals of *H. meyeyouchelys sp. nov.* are slightly expanded, intruding into the coastals, versus less-so in *H. maximiliani.* The mid-carapace upward inflection is slightly more pronounced in *H. meyeyouchelys sp. nov.* than in *H. maximiliani.*

Both *H. maximiliani* and *H. meyeyouchelys sp. nov.* are separated from "*Hydromedusa tectifera* Cope, 1870", herein placed in a separate genus *Wittchelys gen. nov*. by the following suite of characters: Snout, short, obtusely pointed, slightly prominent; head covered above with undivided smooth skin ; sides of neck with conical erect tubercles. Interdigital web moderately developed; three or four large transverse lamellae on the upper surface of the fore limb.

*Wittchelys tectifera* is further separated from the other (two above identified) species in *Hydromedusa* by having an olive coloured head and neck, with a broad, white, black-edged, lateral band and a very distinctive curved white streak on each side of the throat, (lacking in the other species).

*Lovelinaychelys gen. nov*., type species *Hydromedusa casamayorensis* De la Fuente and Bona, 2002 (fossil) from the middle Eocene of Patagonia (South America) are separated from the two preceding genera by the

following unique suite of characters: extension of the paraoccipital process of the opisthotic bone behind the occipital condyle, the presence of a pair of subtriangular tubercles on the anterolateral margin of the basioccipital, axillary buttresses extending medially over the first costal bone, a more extensive bridge with axillar buttresses between the third and fourth peripheral bones and an inguinal one between the seventh and eighth peripheral bones; a pentagonal shape of the suprapygal, a sulcus between the last vertebral scute and the twelfth marginal scutes not crossing the suprapygal bone; an almost straight hypo-xiphiplastral sutural contact.

*Lovelinaychelys gen. nov*. differs from *Hydromedusa maximiliani* and *H. meyeyouchelys sp. nov.* by the moderate shell size, strong decoration, the nuchal bone forming the anterior margin of the carapace, the proportion of the first pair of peripheral bones, iliac scars on visceral surfaces of the seventh and eighth costals and the anterolateral margin on the suprapygal.

*Lovelinaychelys gen. nov*. differs from *Wittchelys gen. nov*. by having a neural series with eight neural bones, the absence of the particular tuberosities in the posterior part of the carapace, the trapezoidal shape of the pygal bone and the first vertebral scute wider than the second one (modified from Maniel *et al*. 2018).

Species within the genus *Hydromedusa* Wagler, 1830, (type species *Emys maximiliani* Mikan, 1825) *sensu lato* including also the genera *Wittchelys gen. nov*. and *Lovelinaychelys gen. nov*. are separated from all other species within the Pleurodira and Chelydidae by the following suite of characters: Both fore and hind limbs have four claws, with entirely webbed digits; nuchal shield is behind the anterior marginals, simulating a sixth vertebral; the last pair of costals forms a suture; a slender parieto-squamosal arch; neural plates are present and seven in number. Plastron is large, with moderately strong axillary and feeble inguinal buttresses, the latter just reaching the fourth costal plate. No dermal appendages on the chin. Neck longer than the dorsal vertebral column. A slender supraoccipital arch; jaws weak, without alveolar ridges; a strong fold at the angle of the mouth, connecting both jaws.

Gaffney (1977) found that the three genera (all as *Hydromedusa*) are separated from other known tortoises by the following three propertes (1) A relatively large bony apertura narium interna due to the reduction of the palatine ossification; (2) A midline contact of the prefrontal and the overlapping of the anterior frontal process; and (3) A wide and large cervical scute withdraws behind the first pair of marginal scutes.

Photos of *H. meyeyouchelys sp. nov.* in life can be found online at:

https://www.inaturalist.org/observations/68007262

and

https://www.inaturalist.org/observations/69233287

Photos of *H. maximiliani* in life can be found online at:

https://www.inaturalist.org/observations/41407588

and

https://www.inaturalist.org/observations/78481952

**Distribution:** *H. meyeyouchelys sp. nov.* is found in Rio de Janeiro and Minas Gerais states.

*H. maximiliani* has a distribution centred on Sao Paulo state.

**Etymology:** The name "*meyeyouchelys*" is a made up configuration of "My - You - Chelys", meaning it is mine, yours and a tortoise and to that extent needs to be identified and preserved. The spelling is changed to "M-eye-you-chelys"so as not to confuse this name with the illegally coined genus name *Myuchelys* Thomson and Georges, 2009, being a junior synonym of *Wollumbinia* Wells, 2007.
The spelling does also reflect the way the word is spoken or pronounced and does not match in itself any known English word or slang.

***WITTCHELYS GEN. NOV.***

**LSIDurn:lsid:zoobank.org:act:C2560EF4-71BC-40C5-97A0-F868C2D35F41**

**Type species:** *Hydromedusa tectifera* Cope, 1870.

**Diagnosis:** Until now, this taxon has been assigned by all authors to the genus *Hydromedusa* Wagler, 1830, type species *Emys maximiliani* Mikan, 1825. However the putative taxon, *Hydromedusa tectifera* Cope, 1870 is morphologically divergent and Pereira *et al*. (2017) wrote:

"*Hydromedusa tectifera* and *H. maximiliani* failed to be recovered as a monophyletic group in our analysis."

They also found a divergence between the two putative taxa in the Cretaceous period, meaning it is not tenable for the two putative taxa to be placed in a single genus.

Therefore *H. tectifera*, including a newly identified and named subspecies *H. tectifera wittorum subsp. nov.* is herein placed in a newly named genus *Wittchelys gen. nov*..

*Wittchelys gen. nov.* are separated from species in *Hydromedusa* by having an olive coloured head and neck, with a broad, white, black-edged, lateral band and a very distinctive curved white streak on each side of the throat, (lacking in the other species).

Both extant *Hydromedusa* species, namely *H. maximiliani* and *H. meyeyouchelys sp. nov.* are further separated *Wittchelys tectifera* Cope, 1870, herein placed in the separate genus *Wittchelys gen. nov*. by the following suite of characters: Snout, short, obtusely pointed, slightly prominent; head covered above with undivided smooth skin; sides of neck with conical erect tubercles. Interdigital web moderately developed; three or four large transverse lamellae on the upper surface of the fore limb.

*Lovelinaychelys gen. nov*., type species *Hydromedusa casamayorensis* De la Fuente and Bona, 2002 (fossil) from the middle Eocene of Patagonia (South America) are separated from the two preceding genera by the following unique suite of characters: extension of the paraoccipital process of the opisthotic bone behind the occipital condyle, the presence of a pair of subtriangular tubercles on the anterolateral margin of the basioccipital, axillary buttresses extending medially over the first costal bone, a more extensive bridge with axillar

buttresses between the third and fourth peripheral bones and an inguinal one between the seventh and eighth peripheral bones; a pentagonal shape of the suprapygal, a sulcus between the last vertebral scute and the twelfth marginal scutes not crossing the suprapygal bone; an almost straight hypo-xiphiplastral sutural contact.

*Lovelinaychelys gen. nov*. differs from *Hydromedusa maximiliani* and *H. meyeyouchelys sp. nov.* by the moderate shell size, strong decoration, the nuchal bone forming the anterior margin of the carapace, the proportion of the first pair of peripheral bones, iliac scars on visceral surfaces of the seventh and eighth costals and the anterolateral margin on the suprapygal.

*Lovelinaychelys gen. nov*. differs from *Wittchelys gen. nov*. by having a neural series with eight neural bones, the absence of the particular tuberosities in the posterior part of the carapace, the trapezoidal shape of the pygal bone and the first vertebral scute wider than the second one (modified from Maniel *et al*. 2018).

Species within the genus *Hydromedusa* Wagler, 1830, (type species *Emys maximiliani* Mikan, 1825) *sensu lato* including also the genera *Wittchelys gen. nov*. and *Lovelinaychelys gen. nov*. are separated from all other species within the Pleurodira and Chelydidae by the following suite of characters: Both fore and hind limbs have four claws, with entirely webbed digits; nuchal shield is behind the anterior marginals, simulating a sixth vertebral; the last pair of costals forms a suture;

a slender parieto-squamosal arch; neural plates are present and seven in number. Plastron is large, with moderately strong axillary and feeble inguinal buttresses, the latter just reaching the fourth costal plate. No dermal appendages on the chin. Neck longer than the dorsal vertebral column. A slender supraoccipital arch; jaws weak, without alveolar ridges; a strong fold at the angle of the mouth, connecting both jaws.

Gaffney (1977) found that the three genera (all as *Hydromedusa*) are separated from other known tortoises by the following three propertes (1) A relatively large bony apertura narium interna due to the reduction of the palatine ossification; (2) A midline contact of the prefrontal and the overlapping of the anterior frontal process; and (3) A wide and large cervical scute withdraws behind the first pair of marginal scutes.

**Distribution:** Argentina (Buenos Aires, Chaco, Córdoba, Corrientes, Entre Rios, Formosa, Misiones, Santa Fe, Santiago del Estero), Brazil (Minas Gerais, Paraná, Rio de Janeiro, Rio Grande do Sul, Santa Catarina, São Paulo), Paraguay, Uruguay (modified from Rhodin *et al.* 2017).

**Etymology:** Named in honour of world famous breeders of Great Dane dogs, Robin and Sue Witt of Heathcote, Victoria, Australia trading as Crystalquin Great Danes, in recognition of their contributions to the welfare of animals and humans over many decades.

They also provided us with two Great Danes named “Oxy” and “Slop” (or “Slopp”) as detailed elsewhere in this paper.

**Content:** *Wittchelys tectifera* (Cope, 1870) including all subspecies.

***WITTCHELYS TECTIFERA WITTORUM SUBSP. NOV.***

**LSIDurn:lsid:zoobank.org:act:74B52A12-F71F-45E9-9714-4E9F9BB4A18F**

**Holotype:** A preserved specimen at the Zoologische Staatssammlung München (Munich), Germany, specimen number ZSM 81/1928 collected at Porto Alegre, Brazil, Latitude -30.07 S., Longitude -51.18 W. This facility allows access to its holdings.

**Paratype:** A preserved specimen at the Zoologische Staatssammlung München (Munich), Germany, specimen number ZSM 224/25 collected at Porto Alegre, Brazil, Latitude -30.07 S., Longitude -51.18 W.

**Diagnosis:** *Wittchelys tectifera wittorum subsp. nov.* has until now been treated as a population of

Guaiba River *Wittchelys tectifera* Cope, 1870 with a type locality of “tributaries of the Parana or Uraguay rivers, either in the Argentine Confederation or the Banda Oriental”.

Six other synonym names apply to the same population (Rhodin *et al*. 2017).

The divergent population from Porto Algre, the Rio Guaiba and Jacui River drainage system has no available name, has no obvious connection with the Rio de la Plata drainage system population, even at times of lowered sea levels in recent glacial maxima and so is formally named for the first time as *Wittchelys tectifera wittorum subsp. nov..*

*W. tectifera wittorum subsp. nov.* is readily separated from nominate *W. tectifera tectifera* bythe following suite of characters: A blackish, rather than dark brown carapace in adults, blackish, rather than dark brown, yellowish-brown or greyish skin on the head, tiny pointed tubercles on the lower neck and upper surfaces of the limbs, orange tipped, rather than yellow-tipped under the feet and on the lower neck in *W. tectifera tectifera* and on the carapace a gular that either approaches or touches the pectoral, versus one that falls far short of it as well as an obvious narrowing immediately posterior to the abdominal, versus only slight narrowing in *W. tectifera tectifera.*

*Wittchelys gen. nov.* are separated from species in *Hydromedusa* by having an olive coloured head and neck, with a broad, white, black-edged, lateral band and a very distinctive curved white streak on each side of the throat, (lacking in the other species).

Both extant *Hydromedusa* species, namely *H. maximiliani* and *H. meyeyouchelys sp. nov.* are further separated *Wittchelys tectifera* Cope, 1870, herein placed in the separate genus *Wittchelys gen. nov*. by the following suite of characters: Snout, short, obtusely pointed, slightly prominent; head covered above with undivided smooth skin ; sides of neck with conical erect tubercles. Interdigital web moderately developed; three or four large transverse lamellae on the upper surface of the fore limb.

*Lovelinaychelys gen. nov*., type species *Hydromedusa casamayorensis* De la Fuente and Bona, 2002 (fossil) from the middle Eocene of Patagonia (South America)

are separated from the two preceding genera by the following unique suite of characters: extension of the paraoccipital process of the opisthotic bone behind the occipital condyle, the presence of a pair of subtriangular tubercles on the anterolateral margin of the basioccipital, axillary buttresses extending medially over the first costal bone, a more extensive bridge with axillar buttresses between the third and fourth peripheral bones and an inguinal one between the seventh and eighth peripheral bones; a pentagonal shape of the suprapygal, a sulcus between the last vertebral scute and the twelfth marginal scutes not crossing the suprapygal bone; an almost straight hypo-xiphiplastral sutural contact.

*Lovelinaychelys gen. nov*. differs from *Hydromedusa maximiliani* and *H. meyeyouchelys sp. nov.* by the moderate shell size, strong decoration, the nuchal bone forming the anterior margin of the carapace, the proportion of the first pair of peripheral bones, iliac scars on visceral surfaces of the seventh and eighth costals and the anterolateral margin on the suprapygal.

*Lovelinaychelys gen. nov*. differs from *Wittchelys gen. nov*. by having a neural series with eight neural bones, the absence of the particular tuberosities in the posterior part of the carapace, the trapezoidal shape of the pygal bone and the first vertebral scute wider than the second one (modified from Maniel *et al*. 2018).

Species within the genus *Hydromedusa* Wagler, 1830, (type species *Emys maximiliani* Mikan, 1825) *sensu lato* including also the genera *Wittchelys gen. nov*. and *Lovelinaychelys gen. nov*. are separated from all other species within the Pleurodira and Chelydidae by the following suite of characters: Both fore and hind limbs have four claws, with entirely webbed digits; nuchal shield is behind the anterior marginals, simulating a sixth vertebral; the last pair of costals forms a suture;

a slender parieto-squamosal arch; neural plates are present and seven in number. Plastron is large, with moderately strong axillary and feeble inguinal buttresses, the latter just reaching the fourth costal plate. No dermal appendages on the chin. Neck longer than the dorsal vertebral column. A slender supraoccipital arch; jaws weak, without alveolar ridges; a strong fold at the angle of the mouth, connecting both jaws.

Gaffney (1977) found that the three genera (all as *Hydromedusa*) are separated from other known tortoises by the following three propertes (1) A relatively large bony apertura narium interna due to the reduction of the palatine ossification; (2) A midline contact of the prefrontal and the overlapping of the anterior frontal process; and (3) A wide and large cervical scute withdraws behind the first pair of marginal scutes.

Photos of *Wittchelys tectifera wittorum subsp. nov.* in life can be found online at:
https://www.inaturalist.org/observations/66855510
and
https://www.inaturalist.org/observations/20308815
Photos of nominate *Wittchelys tectifera tectifera* in life can be found online at:
https://www.inaturalist.org/observations/17438809
and
https://www.inaturalist.org/observations/39211003

**Distribution:** *Wittchelys tectifera wittorum subsp. nov.*.is found in the region of Porto Algre, the Rio Guaiba and Jacui River drainage systems in Brazil.

Nominate *Wittchelys tectifera tectifera* occurs in all river drainages associated with the Rio de la Plata drainage system, including Parana, Uruguay and Solada River systems.

**Etymology:** Named in honour of world famous breeders of Great Dane dogs, Robin and Sue Witt of Heathcote, Victoria, Australia trading as Crystalquin Great Danes, in recognition of their contributions to the welfare of animals and humans over many decades.

They also provided us with two Great Danes named “Oxy” and “Slop” (or “Slopp”) as detailed elsewhere in this paper.

***LOVELINAYCHELYS GEN. NOV.***

**LSIDurn:lsid:zoobank.org:act:49D5F504-A751-4E41-8070-518657A2C6A4**

**Type species:** *Hydromedusa casamayorensis* De la Fuente and Bona, 2002.

**Diagnosis:** A species identified as *Hydromedusa casamayorensis* De la Fuente and Bona, 2002 from a fossil from the middle Eocene of Patagonia (South America) was placed by those authors in the genus *Hydromedusa* Wagler, 1830, type species *Emys maximiliani* Mikan, 1825.

However it is significantly divergent morphologically and by date divergence and so is herein placed in the new genus *Lovelinaychelys gen. nov*.

*Lovelinaychelys gen. nov*., type species *Hydromedusa casamayorensis* De la Fuente and Bona, 2002 (fossil) from the middle Eocene of Patagonia (South America) are separated from *Hydromedusa* Wagler, 1830 and the newly erected genus *Wittchelys gen. nov*., with a type species of *Hydromedusa tectifera* Cope, 1870 by the following unique suite of characters: extension of the paraoccipital process of the opisthotic bone behind the occipital condyle, the presence of a pair of subtriangular tubercles on the anterolateral margin of the basioccipital, axillary buttresses extending medially over the first costal bone, a more extensive bridge with axillar buttresses between the third and fourth peripheral bones and an inguinal one between the seventh and eighth peripheral bones; a pentagonal shape of the suprapygal, a sulcus between the last vertebral scute and the twelfth marginal scutes not crossing the suprapygal bone; an almost straight hypo-xiphiplastral sutural contact.

*Lovelinaychelys gen. nov*. differs from *Hydromedusa maximiliani* and *H. meyeyouchelys sp. nov.* by the moderate shell size, strong decoration, the nuchal bone forming the anterior margin of the carapace, the proportion of the first pair of peripheral bones, iliac scars on visceral surfaces of the seventh and eighth costals and the anterolateral margin on the suprapygal.

*Lovelinaychelys gen. nov*. differs from *Wittchelys gen.*

*nov*. by having a neural series with eight neural bones, the absence of the particular tuberosities in the posterior part of the carapace, the trapezoidal shape of the pygal bone and the first vertebral scute wider than the second one (modified from Maniel *et al*. 2018).

Until now, the putative taxon *Hydromedusa tectifera* Cope, 1870 has been assigned by all authors to the genus *Hydromedusa* Wagler, 1830, type species *Emys maximiliani* Mikan, 1825. However the putative taxon, *Hydromedusa tectifera* Cope, 1870 is morphologically divergent and Pereira *et al*. (2017) wrote:

"*Hydromedusa tectifera* and *H. maximiliani* failed to be recovered as a monophyletic group in our analysis."

They also found a divergence between the two putative taxa in the Cretaceous period, meaning it is not tenable for the two putative taxa to be placed in a single genus.

Therefore *H. tectifera*, including a newly identified and named subspecies *H. tectifera wittorum subsp. nov.* are herein placed in a newly named genus *Wittchelys gen. nov*..

*Wittchelys gen. nov.* are separated from species in *Hydromedusa* by having an olive coloured head and neck, with a broad, white, black-edged, lateral band and a very distinctive curved white streak on each side of the throat, (lacking in the other species).

Both extant *Hydromedusa* species, namely *H. maximiliani* and *H. meyeyouchelys sp. nov.* are further separated *Wittchelys tectifera* Cope, 1870, herein placed in the separate genus *Wittchelys gen. nov*. by the following suite of characters: Snout, short, obtusely pointed, slightly prominent; head covered above with undivided smooth skin ; sides of neck with conical erect tubercles. Interdigital web moderately developed; three or four large transverse lamellae on the upper surface of the fore limb.

Species within the genus *Hydromedusa* Wagler, 1830, (type species *Emys maximiliani* Mikan, 1825) *sensu lato* including also the genera *Wittchelys gen. nov*. and *Lovelinaychelys gen. nov*. are separated from all other species within the Pleurodira and Chelydidae by the following suite of characters: Both fore and hind limbs have four claws, with entirely webbed digits; nuchal shield is behind the anterior marginals, simulating a sixth vertebral; the last pair of costals forms a suture;

a slender parieto-squamosal arch; neural plates are present and seven in number. Plastron is large, with moderately strong axillary and feeble inguinal buttresses, the latter just reaching the fourth costal plate. No dermal appendages on the chin. Neck longer than the dorsal vertebral column. A slender supraoccipital arch; jaws weak, without alveolar ridges; a strong fold at the angle of the mouth, connecting both jaws.

Gaffney (1977) found that the three genera (all as *Hydromedusa*) are separated from other known tortoises by the following three propertes (1) A relatively large bony apertura narium interna due to the reduction of the palatine ossification; (2) A midline contact of the prefrontal and the overlapping of the anterior frontal process; and (3) A wide and large cervical scute withdraws behind the first pair of marginal scutes.

**Distribution:** Currently known only from southern Chubut, Argentina.

**Etymology:** Named in honour of Tony Love-Linay of Taylors Lakes, Victoria, Australia, owner of Reconnect Communications, Australia, for services to telecommunications and herpetology in Australia including the most insane and amazing repairs to motor vehicles used in important fieldwork at the most demanding of times.

**_CHELYDERA_ THOMSON AND GEORGES, 2020 IS A SUBJECTIVE SYNONYM OF _SUPREMECHELYS_ HOSER, 2014.**

In an online publication, Shea, Thomson and Georges (2020), published a long-winded ramble on their views obout the taxonomy of Australia's long-necked terrapins of the genus *Chelodina* Fitzinger, 1826.

At the conclusion of their paper, they erected a new subgenus that they called "*Chelydera* Thomson and Georges, 2020", with a type species of "*Chelodina parkeri* Rhodin & Mittermeier 1976."

Their concept of the genus included the following: "Assigned Species: *C. parkeri* Rhodin & Mittermeier 1976; *C. burrungandjii* Thomson, Kennett & Georges 2000; *C. expansa* Gray 1857; *C. kuchlingi* Cann 1997; *C. rugosa* Ogilby 1890; † *C. insculpta* De Vis 1897; † *C. alanrixi* Lapparent de Broin & Molnar 2001."

Six years earlier, Hoser (2014), erected the subgenus *Supremechelys* Hoser, 2014, with a type species of *Chelodina expansa* Gray, 1857.

Because *Chelodina expansa* Gray, 1857 is included in the list of species assigned to the more recently erected subgenus *Chelydera* it is therefore a subjective synonym of the earlier name *Supremechelys.*

In other words, if one accepts the taxonomy of Shea, Thomson and Georges (2020), the name *Supremechelys* is the one that should be used and not the later coined name.

Thomson and Georges were both key advocates for the case against myself (Hoser) at the ICZN, via their various pproposals such as Kaiser *et al.* (2013) as amended and then Rhodin *et al.* (2015), which they both signed on as "co authors", which they adopted in a form that explicitly superseded all their earlier claims.

In any event, their claims had no merit and so it was a formality that the ICZN refused their application to have my (Hoser's) works formally erased from the scientific record.

In other words, at all materially relevant times, the name *Supremechelys* has been available in the sense of the ICZN Code and has at all times identified a previously unnamed lineage.

Following publication of Shea, Thomson and Georges (2020), I contacted Glenn Shea, listed as the senior author and he stated he had innocently overlooked the name *Supremechelys* Hoser, 2014, which raised even more issues.

Shea justified this omission on his part on the fact that Thomson and Georges had allegedly (by him) written the paper, Shea's name was tacked on at the end after

he read over the draft and Shea made a point of noting that the name *Chelydera* was formally attributed to Thomson and Georges only and not Shea.

In other words, Shea admitted to the error of omission and to that extent was "sorry".

However the online paper, while ignoring the earlier papers of myself (including Hoser, 2014), did make a point of citing Rhodin *et al.* (2017), which they cited as: "Rhodin, A.G.J., Iverson, J.B., Bour, R., Fritz, U., Georges, A., Shaffer, H.B. & van Dijk, P.P. (2017) Turtles of the World. Annotated Checklist and Atlas of Taxonomy, Synonymy, Distribution, and Conservation Status (8th Edition). Chelonian Research Monographs, 7, 1-292. [Turtle Taxonomy Working Group] https://doi.org/10.3854/crm.7.checklist.atlas.v8.2017"

On page 187 of that publication under the relevant heading:

"*Chelodina* Fitzinger 1826"

was written:

"*Chelodina* (*Supremechelys*) Hoser 2014b:8 (unavailable name pending ICZN decision; Rhodin *et al*. 2015)"

The Hoser paper of 2014, was also cited on page 272 as follows:

"Hoser, R.T. 2014b. A taxonomic revision of the Giant Long-necked Terrapin, *Chelodina expansa* Gray, 1857 species complex and related matters of taxonomy and nomenclature. *Australasian Journal of Herpetology* 24:3-11."

One would expect that if an author cites a paper, they had in fact read it!

Clearly, Glen Shea at least had not!

That Shea (and quite possibly Thomson and Georges) had not read a paper they had cited, immediately calls into question the integrity of their entire work.

Because Shea has been upfront and stated he was unaware of *Supremechelys* and had not read the references cited, he has in effect admitted to engaging in substandard science.

In terms of Thomson and Georges, far more serious ethical issues arise.

Both have repeatedly deliberately overwritten older ICZN names in acts of taxonomic vandalism as defined by Hoser (2015a-f) (e.g. their illegal name *Myuchelys*, which overwrote the legitimate ICZN name *Wollumbinia* Wells, 2007) and it appears almost certain that they had ignored and overwritten *Supremechelys* in anticipation of the Rhodin *et al.* (2015) application to the ICZN to succeed.

In any event, it was highly unethical of the pair to write a so-called paper on the taxonomy of a genus of tortoises and not to cite a work they were in effect copying!

A read of the taxonomy parts of Shea, Thomson and Georges (2020) reads remarkably similar to the text of Hoser (2014) and to such an extent, that it could not possibly be a mere conincidence.

Plagiarisation is another dishonest tactic of fake scientists and combined with taxonomic vandalism, make for the most ethically repugnant combination of actions possible by any scientist or person pretending to be one could ever do.

A proper scientist and a person with even the most miniscule amount of ethics wouild cite professionally all relevant materials, even if written by a person that is disliked or disagreed with.

Another issue also arises in terms of the subgenus *Chelydera*.

This relates to the concept of the subgenus, or perhaps ultimately genus if divergence is deemed archaic enough.

The concept of *Chelydera* did not match that of *Supemechelys* which was in 2014 confined to the type species *C. expansa* and the closely related *C. duboisi* Hoser, 2014.

Significantly, the most recent molecular phylogeny published by Robert C. Thomson (no relation to Scott Thomson), Phillip Q. Spinks and H. Bradley Shaffer, (Thomson *et al*., 2014), showed that there were just three clades in *Chelodina*, being in line with the named subgenera *Chelodina*, *Macrochelodina* and *Supremechelys* only, when using correct ICZN nomenclature.

To remove any element of doubt, I note that the *Chelodina* (type species *C. longicollis*) clade includes the species *Chelodina steindachneri* Siebenrock, 1914, the type species of *Hesperochelodina* Wells and Wellington, 1985, making the latter name a subjective synonym of the former, the *Macrochelodina* Wells and Wellington, 1985 clade appears monotypic for the divergent south-west Australian species *C. oblonga* Gray, 1841, with all the larger flat headed, narrow plastron species being within *Supremechelys* Hoser, 2014, including of course *Chelodina parkeri* Rhodin and Mittermeier, 1976.

For completeness I should mention that *Hydraspis* Bell, 1828 is an objective synonym of *Chelodina* with the same type species and so should never be used. Same applies for *Macrodiremys* McCord and Joseph-Ouni, 2007 with the same type species as *Macrochelodina.*

The Thomson *et al*. (2021) phylogeny is robust and in terms of *Chelodina sensu lato*, can be reasonably expected to have settled the subgeneric taxonomy for the group.

Combining the preceding with the fact that the petition by Rhodin *et al*. (2015) to have the works of myself (Hoser) erased from the scientific record failed, this means that the only three subgeneric names that should be used for the Australasian Long-necked Terrapins are 1/ *Chelodina* for the smaller long-necked species with broad plastrons, 2/ *Macrochelodina* for the divergent south-west Australian species *C. oblonga*, and 3/ *Supremechelys* for all the larger flat headed, narrow plastron species.

**TAXONOMIC VANDALISM, THE ONLINE PRINO "JOURNAL" AND THE WORLD WIDE WEB**

Finally it should be noted that the online blogging site that published the taxonomic vandalism of Shea, Thomson and Georges (2020) was that notorious PRINO (peer reviewed in name only) "journal" *Zootaxa.*

Marketed as a “mega journal” the only thing “Mega” about *Zootaxa* is the scale of taxonomic vandalism that is allowed in its pages.

In case anyone reading this paper is unfamiliar with sheer scale of taxonomic vandalism put through *Zootaxa*, I refer you to Hoser (2015a-f) for a summary of numerous such acts in *Zootaxa* prior to 2015, but note that the issue of non-science being published in that online “journal” has got worse since then.

More recently in 2018, *Zootaxa* lost their “Impact Factor” (IF) as in it was scrapped, because an audit found that authors were running self-citation scams (as in gaming the system), with lead perpetrators including the Wolfgang Wüster gang of thieves who use *Zooataxa* as their online publishing vehicle of choice (Pinto *et al*. 2018).

The same authors, Wolfgang Wüster, Scott Thomson, Arthur Georges and the like also aggressively engage in so-called “Seach Engine Optimisation” or SEO on the internet generally to peddle their non-ICZN names for species and genera online, in a method that often makes it nearly impossible for third party users to locate and use the correct ICZN names for taxa.

All aggressively control and edit Wikipedia hate pages, taxonomic vandalism sites and the like, as well as running thousands of fake accounts online (see Hoser 2015a-f and sources cited therein) and so it is important to herein issue a warning that what one finds online in search via “Google” with respect to taxonomy and nomenclature on reptiles may well be wholly incorrect.

**REFERENCES CITED**


Abdala, V., Manzano, A. S. and Herrel, A. 2008. The distal forelimb musculature in aquatic and terrestrial turtles: Phylogeny or environmental constraints? *J. Anat.* 213:159172.

Adil, S., Ijaz, S., Aslam, H., Kanwal, R. and Afsheen, S. 2020. Diversity of amphibians and reptiles in Daphar Forest Sanctuary, district Mandi Bahauddin, Pakistan. *Journal of Wildlife and Ecology* 4(1)15-26.

Agassiz, L. 1857. *Contributions to the Natural History of the United States of America. First Monograph. Vol. I. Part I. Essay on Classification. Part II. North American Testudinata*. Little, Brown and Co., Boston, USA, 1:1-452.

Ahmad, N., Ahmad, E., Ratag, M., Sinon, E. A. A., Don, B., Francis, F., Mahmod, M. R., Agimin, A. and Belabut, D. 2019. Amphibians and Reptiles of Imbak Canyon Study Centre and Batu Timbang Camp. *Journal of Tropical Biology and Conservation* 16:25-33.

Ahmed, M. F. and Das, A. 2010. Tortoises and Turtles of Northeast India: Saving them from Extinction! (Draft). Technical Report, Aaranyak, HRCP: 01/2010. 86 pp. Online at:

https://www.conservationleadershipprogramme.org/media/2014/11/100206_India_FR_Tortoisesturtles.pdf

Akeret, B. 2009. Unter und über Wasser durch die Karstgewässer Floridas. *Draco* 10(37):24-29.

Alderton, D. 1988. *Turtles and tortoises of the world*. Facts on File, New York, USA.

Allen, M. J. 1932. A survey of the Amphibians and reptiles of Harrison County, Mississippi. *American Museum Novitates* (542):1-20.

Allerstorfer, M. 2017. Die unglaublichen und faszinierenden Sinnesleistungen der Reptilien. *Reptilia* (Münster) 22(125):44-54.

Ali, W., Javid, A., Hussain, A. and Bukhari, S. M. 2018. Diversity and conservation of freshwater turtles in Pakistan: A review. *Biodiversity* 19(1-2):62-71.

Anderson, J. 1871. On *Testudo phayrei*, Theob. & Dr. Gray. *Annals and Magazine of Natural History* (4)8:324-330.

Anderson, J. 1872. On *Trionyx gangeticus* Cuvier, *Trionyx hurum* B. H. and Dr. Gray. *Annals and Magazine of Natural History* (4)10:219-222.

Andersson, L. G. 1900. Catalogue of Linnean type-specimens of Linnaeus’s Reptilia in the Royal Museum in Stockholm. (type catalogue). *Bihang till Konglika Svenska Vetenskaps-Akademiens*. Handlingar. Stockholm. (4)26(1):1-29.

Angielczyk, K. D. and Feldman, C. R. 2013. Are diminutive turtles miniaturized? The ontogeny of plastron shape in emydine turtles. *Biological Journal of the Linnean Society* 108(4):727-755.

Angley, J. R. and Buhlmann, K. A. 2017. *Graptemys geographica* (Northern Map Turtle) Colonization. *Herpetological Review* 48(1):175-177.

Anthonysamy, W. J. B., Dreslik, M. J., Mauger, D. and Phillips, C. A. 2014. A Preliminary Assessment of Habitat Partitioning in a Freshwater Turtle Community at an Isolated Preserve. *Copeia* 2014(2):269-278.

Appukuttan, K. S. 1991. *A survey report of cane turtle and Travancore tortoise*. Kerala: Kerala Forest Department, India:21 pp.

Archer, W. H. 1967. The angulated tortoise. *African Wildlife* 21:137-143.

Archer, W. H. 1968. More notes on the angulated tortoise. *African Wildlife* 22:141-146.

Artner, H. 2007. Observations in the natural habitat in Paraguay and their implications for the first successful breeding of the Pantanal Swamp turtle *Acanthochelys macrocephala* (Rhodin, Mittermeier and McMorris, 1984). *Emys* 14(3):4-25.

Atkinson, C. L. 2012. *Sternotherus carinatus* (razor-backed musk turtle) reproduction. *Herpetological Review* 43:639-640.

Atkinson, C. L. 2013. Razor-backed Musk Turtle (*Sternotherus carinatus*): Diet across a gradient of invasion. *Herp. Cons. Biol*. 8(3):561-570.

Auer, M. 2011. Beobachtungen zu Vorkommen und Handel von Schildkröten in Nordlaos. *Sauria*, Berlin 33(1):3-11.

Auerbach, R. D. 1987. *The Amphibians and Reptiles of Botswana*. Mokwepa Consultants, Botswana, 295 pp.

Auliya, M. 2000. A colour pattern of the softshell turtle *Amyda cartilaginea* observed in West Kalimantan (Indonesian Borneo). *Hamadryad* 25(2):210-214.

Auliya, M. 2006. *Taxonomy, Life History, and conservation of giant reptiles in west Kalimantan*. Natur

und Tier Verlag, Münster:432 pp.

Auliya, M., van Dijk, P. P., Moll, E. O. and Meylan, P. A. 2016. *Amyda cartilaginea* (Boddaert 1770) - Asiatic Softshell Turtle, Southeast Asian Softshell Turtle. in: Rhodin, A. G. J., Pritchard, P. C. H., van

Dijk, P. P., Saumure, R. A., Buhlmann, K. A., Iverson, J. B. and Mittermeier, R. A. (eds.). Conservation Biology of Freshwater Turtles and Tortoises: A Compilation Project of the IUCN/SSC Tortoise and Freshwater Turtle Specialist Group. *Chelonian Research Monographs* 5(9):092.1-17, (online).

Ávila, R. W., Souza, F. L., Landgref-Filho, P. and Campos, A. L. C. 2006. Reptilia, Chelidae, *Acanthochelys macrocephala*: distribution, habitat and geographical distribution map. *Check List* 2 (2):35-37 (retraction published in later issue of *Check List* 2 (2)).

Avise, J. C., Bowen, B. W., Lamb, T., Me]dan, A. B. and Bermingham, E. 1992. Mitochondrlal DNA evolution at a turtle's pace: evidence for low genetic variability and reduced microevolutionary rate in the Testudines. *Molecular Biology and Evolution* 9(3):457-473.

Baard, E. H. W. 1996. Inter- and Intra-Individual Variation in the measurement of southern Padloper *Homopus areolatus. African Herp News* (25):22-25.

Bager, A. and Rosado, J. L. O. 2010. Estimation of Core Terrestrial Habitats for Freshwater Turtles in Southern Brazil Based on Nesting Areas. *Journal of Herpetology* 44(4):658-662.

Bain, R. H. and Hurley, M. M. 2011. A biogeographic synthesis of the amphibians and reptiles of

Indochina. *Bulletin of the American Museum of Natural History* 360:1-138.

Baird, S. F. and Girard, C. 1852. Descriptions of new species of reptiles collected by the U. S. Exploring Expedition under the command of Capt. Charles Wilkes, U. S. N. *Proc. Acad. Nat. Sci. Philadelphia* 6:174-177.

Baker, P. J., Diagne, T. and Luiselli, L. 2015. *Cyclanorbis elegans* (Gray 1869) - Nubian Flapshell Turtle. pp. 89.1-89.7 in: Rhodin, A. G. J., Pritchard, P. C. H. , van Dijk, P. P., Saumure, R. A., Buhlmann, K. A., Iverson, J. B. and Mittermeier, R. A. *Conservation Biology of Freshwater Turtles and Tortoises: A Compilation Project of the IUCN/SSC Tortoise and Freshwater Turtle Specialist Group*. Chelonian Research Monographs 5. Chelonian Research Foundation, Lunenburg, Massachusetts, USA:1,288 pp.

Barela, K. and Olson, D. H. 2014. Mapping the Western Pond Turtle (*Actinemys marmorata*) and Painted Turtle (*Chrysemys picta*) in Western North America. *Northwestern Naturalist* 95(1):1-12.

Barley, A. J., Spinks, P. Q., Thomson, R. C. and Shaffer, H. B. 2010. Fourteen nuclear genes provide phylogenetic resolution for difficult nodes in the turtle tree of life. *Mol. Phyl. Evol.* 55:1189-1194.

Barnett, L. K. and Emms, C. 2005. *Common reptiles of The Gambia*. Rare Repro, Hailsham, East Sussex, UK:24 pp.

Barnwell, M. E., Meylan, P. A. and Walsh, T. 1997. The spotted turtle (*Clemmys guttata*) in central Florida. *Chelonian Conservation Biology* 2(3):405-408.

Bartlett, R. D. and Bartlett, P. 1999. *A Field Guide to Texas Reptiles and Amphibians*. Gulf Publishing Co., Houston, Texas:331 pp.

Basumatary, R. and Sharma, D. K. 2013. The turtle fauna of Kaziranga National Park, Assam, India with notes on natural history and conservation status. *Herpetology Notes* 6:59-72.

Bates, M. F., Branch, W. R., Bauer, A. M., Burger, M., Marais, J., Alexander, G. J. and de Villliers, M. S. (eds.) 2014. *Atlas and Red List of the Reptiles of South Africa, Lesotho, and Swaziland.* Suricata 1. South African National Biodiversity Institute, Pretoria, RSA:512 pp.

Basiita, R. K., Zenger, K. R., Mwanja, M. T. and Jerry, D. R. 2018. Gene flow and genetic structure in Nile perch, *Lates niloticus*, from African freshwater rivers and lakes. *PLoS ONE* 13(7): e0200001.

Bauer, A. M. and Branch, W. R. 2003. The herpetofauna of the Richtersveld National Park, Northern Cape Province, Republic of South Africa. *Herpetological Natural History* 8:111-160 (Dated 2001).

Baur, G. 1890. Two New Species of Tortoises from the South. *Science*, (Ser. 1) 16:262-263.

Baur, G. 1893a. Notes on the classification and taxonomy of the Testudinata. *Proceedings of the American Philosophical Society* 31:210-225.

Baur, G. 1893b. Notes on the classification of the Cryptodira. *American Naturalist* 27:672-674.

Baur, G. 1893c. Two new species of North American Testudinata. *American Naturalist* 27:675-677.

Bayoff, N. 1995. Observations and morphometric data on the Namaqualand speckled tortoise, *Homopus signatus signatus* (Gmelin, 1789), in South Africa. *Chelonian Conservation Biology* 1(3):215-220.

Beaudry, F., deMaynadier, P. G. and Hunter, M. L. Jr. 2009. Seasonally Dynamic Habitat Use by Spotted (*Clemmys guttata*) and Blanding's Turtles (*Emydoidea blandingii*) in Maine. *Journal of Herpetology* 43(4):636-645.

Becker, H. 1992. Beobachtungen bei der Haltung und Nachzucht von *Sternotherus carinatus* (GRAY, 1856). *Salamandra* 28(1):9-15.

Becker, H. 1994. Bemerkungen zur Aufzucht und Haltung der Stachel-Erdschildkröte *Heosemys spinosa* (Gray,1831). *Herpetofauna* (Münster) 16(91):6-10.

Becker, H. 1995. Schlupf im Terrarium - Nachzucht von *Sternotherus carinatus* (Gray, 1856). *Sauria* 17(3):29-33.

Becker, H. 1999. Ergänzende Bemerkungen zur Haltung und zur Nachzucht von *Cuora flavomarginata* (GRAY, 1863). *Elaphe* 7(3):2-10.

Becker, H. 2012. Bemerkungen zum Erreichen der Geschlechtsreife einer weiblichen Indischen Dornschildkröte *Pyxidea mouhotii mouhotii* (Gray, 1862). *Testudo* (SIGS) 21(4):18-24.

Becker, H. and Müller, A. 1997. Bemerkenswerte Beobachtungen bei der Aufzucht der Gekielten Moschusschildkröte (*Kinosternon carinatum*) (Gray, 1856). *Elaphe* 5(3):10-15.

Bell, T. 1825a. (*Sternotherus*). in: Gray, J. E. A synopsis of the genera of reptiles and amphibia, with a description of some new species. *Annals of Philosophy* (2)10:211.

Bell, T. 1825b. A monograph of the tortoises having a moveable sternum, with remarks on their arrangement and affinities. *Zoological Journal* 2:299-310.

Bell, T. 1827. On two new genera of land tortoises. *Transactions of the Linnean Society of London* 15:392-401.

Bell, T. 1834. A freshwater tortoise described as the type of a new genus, *Cyclemys. Proceedings of the Zoological Society of London* 1834:17.

Bell, T. 1836. *A monograph of the Testudinata*. London, 1836-1842.

Belmore, R. E. 2004. *The Spotted Turtle*, Clemmys guttata. Gainesville, Florida, USA.

Bennett, A. M., Keevil, M. G. and Litzgus, J. D. 2015. *Sternotherus odoratus* (Eastern Musk Turtle) home range. *Herpetological Review* 46(2):245-246.

Bentley, C. C. and Knight, J. L. 1993. The oldest spotted turtle: *Clemmys guttata* (Testudines: Emydidae) from the Late Pleistocene (Rancholabrean) Ardis Local Fauna, Dorchester County, South Carolina. *South Carolina Geology* 36:59-63.

Beolens, B., Watkins, M. and Grayson, M. 2011. *The Eponym Dictionary of Reptiles*. Johns Hopkins University Press, Baltimore, USA.

Bernhardt, K. 1995. *Pyxidea mouhotii* (Gray, 1862). *J. AG Schildkr. Panzerechsen* 2/95:7-18.

Berry, J. F. and Iverson, J. 1980. *Kinosternon herrerai. Catalogue of American Amphibians and Reptiles* 239:1-2.

Bettelheim, M. P. 2005a. *The Western Pond Turtle,* Clemmys marmorata. Privately published:28 pp.

Bettelheim, M. P. 2005b. Marmorata: the famed mud turtle of the San Francisco market. *California History* 82(4):26-42.

Beukema, W. 2011. Herpetofauna of disturbed forest fragments on the lower Mt. Kitanglad Range, Mindanao Isand, Philippines. *Salamandra* 47(2):90-98.

Bickham, J. W., Lamb, T., Minx, P. and Patton, J. C. 1996. Molecular systematics of the genus *Clemmys* and the intergeneric relationships of Emydid turtles. *Herpetologica* 52(1):89-97.

Bidmon, H. 2015. Drohgebärden vom ersten bis zum letzten Tag: Die Kleine Moschusschildkröte, *Sternotherus minor minor. Schildkröten im Fokus.* 12(3):3-23.

Bishop, S. C. 1921. The Map Turtle, *Graptemys geographica* (Le Suer) in New York. *Copeia* 100:80-81.

Blanck, T. 2013. Zu Besuch bei *Cuora galbinifrons* auf Hainan, China. *Reptilia* (Münster) 18(99):100-109.

Blumenbach, J. F. 1779. *Handbuch der Naturgeschichte. Ed. 1. Part 1*. J. C. Dieterich, Göttingen:448 pp.

Blyth, E. 1854. Notices and descriptions of various reptiles, new or little-known. Part I. *J. Asiat. Soc. Bengal* 22(1853):639-655.

Bocourt, F. 1876. Note sur quelques reptiles de l'Isthme de Tehuantepec (Mexique) donnés par M. Sumichrast au museum. *Journal de Zoologie*. Paris. 5(5-6):386-411.

Bocourt, M. -F. 1868. Description de quelques chéloniens nouveaux appurtenant à la faune Mexicaine. *Annales des Sciences Naturelles, Zoologie et Paléontologie*, Paris, France (5)10:121-122.

Boddaert, P. 1770. *Brief van de kraakbeenige schildpad. Epistola de* testudines cartilaginea. Kornelis van Tongerlo, Amsterdam:39 pp.

Bonaparte, C. L. 1836. *Cheloniorum Tabula Analytica*. Rome:1-9.

Bondi, C. A. and Marks, S. B. 2013. Differences in Flow Regime Influence the Seasonal Migrations, Body Size, and Body Condition of Western Pond Turtles (*Actinemys marmorata*) that Inhabit Perennial and Intermittent Riverine Sites in Northern California. *Copeia* 2013(1):142-153.

Bonin, F., Devaux, B. and Dupré, A. 2006. *Turtles of the World. English translation by P.C.H. Pritchard*. Johns Hopkins University Press:416 pp.

Bons, J. and Geniez, P. 1996. *Amphibiens et reptiles du Maroc* (Sahara Occidental compris). Atlas biogéographique. Barcelona: AHE.

Boulenger, G. A. 1885. Second list of reptiles and batrachians from the province Rio Grande do Sul, sent to the Natural History Museum by Dr. H. van Ihering. *Annals and Magazine of Natural History* (5)16:85-88.

Boulenger, G. A. 1886. A synopsis of the reptiles and batrachians of the province Rio Grande do Sul, Brazil. *Annals and Magazine of Natural History* (5)18:423-445.

Boulenger, G. A. 1888. Description of a new land-tortoise from South Africa, from a specimen living in the Society's Gardens. *Proceedings of the Zoological Society of London* 1888:251.

Boulenger, G. A. 1889. *Catalogue of the Chelonians, Rhynchocephalians, and Crocodiles in the British Museum* (Natural History). Trustees of the Museum, London:311 pp.

Boulenger, G. A. 1897. Description of a new genus and species of Tortoises from Borneo. *Annals and Magazine of Natural History* (6)19:468-469.

Boulenger, G. A. 1902a. On the southern snapping turtle (*C. rossignoni*). *Annals and Magazine of Natural History* (7)9:(69):49-51.

Boulenger, G. A. 1902b. Descriptions of new batrachians and reptiles from north-western Ecuador. *Annals and Magazine of Natural History* (7)9(69):51-57.

Boulenger, G. A. 1903. Report on the batrachians and reptiles. *Fasciculi Malayensis, Zool.*, 1:130-176.

Boulenger, G. A. 1913. On a collection of batrachians and reptiles made by Dr. H. G. Spurrell, F.Z. S. in the Choco, Colombia. *Proceedings of the Zoological Society of London* 1913:1019-1038.

Bour, R. H. 1980. Essai sur la taxinomie des Testudinidae actuels (Reptilia, Chelonii). *Bull. Mus. natl. Hist. nat. Paris* (4)2(2):541-546.

Bour, R. H. 1983. Trois populations endémiques de

genre *Pelusios* (Reptilia, Chelonii, Pelomedusidae) aux îles Seychelles; relations avec les espèces africaines et malagaches. *Bull. Mus. Natl. Hist. Nat.* Paris (4)5:343-382.

Bour, R. H. 1988. Taxonomic and Nomenclatural Status of *Homopus signatus. Journal of the Herpetological Association of Africa* (35):1-6.

Bour, R. H. 1998. Histoire du genre *Manouria* Gray, 1854, et des espèces actuelles incluses. *Manouria* 1(1):1-9.

Bour, R. H. 2007. The holotype of *Testudo cartilaginea* Boddaert, 1770 and the lectotype of *Trionyx javanicus* Geoffroy Saint-Hilaire, 1809. *Emys* 14(3):26-32.

Bour, R. H. 2008a. The type specimens of *Testudo angulata* Schweigger, 1812 and *Testudo bellii* Gray, 1828. *Emys* 15(1):28-34.

Bour, R. H. 2008b. Global diversity of turtles (Chelonii; Reptilia) in freshwater. *Hydrobiologia* 595:593-598.

Bour, R. H. 2008c. The holotypes of *Pentonyx gabonensis* A. Duméril, 1856 and *Cryptopodus aubryi* A. Duméril, 1856. *Emys* 15(3):41-44.

Bour, R. H. and Dubois, A. 1983. Statut nomenclatural et specimens-types d'*Emys pseudogeographica* Gray, 1831 et d'*Emys lesueuri*. *Bulletin Mensuel de la Société Linnéenne de Lyon* 52(2):42-46.

Bourret, R. 1941. *Les tortues de l'Indochine*. Institut Océanographique l'Indochine 38:1-235.

Boycott, R. 1987. A review of *Homopus signata* (Schoepff) with notes on related species (Cryptodira: Testudinidae). *Journal of the Herpetological Association of Africa* 32:10-16 (1986).

Boycott, R. C. and Bourquin, O. 2008. *Pelomedusa subrufa* (Lacépède, 1788), helmeted turtle, helmeted terrapin. in: Rhodin, A. G. J., Pritchard, P. C. H., van Dijk, P. P., Saumure, R. A., Buhlmann, K. A. and Iverson, J. B. (eds.), *Conservation Biology of Freshwater Turtles and Tortoises: A Compilation Project of the IUCN/SSC Tortoise and Freshwater Turtle Specialist Group*. Chelonian Research Monographs, No. 5. Chelonian Research Foundation, Lunenburg, MA, pp. 007.1-007.6 (online).

Branch, W. R. 1984. Preliminary observations on the ecology of the angulate tortoise (*Chersina angulata*) in the eastern Cape Province, South Africa. *Amphibia-Reptilia* 5:43-55.

Branch, W. R. 1989. *Chersina angulata* - species report. P. 68-71. in Swingland, I. R. and

Klemens, M. W. (eds.), The conservation biology of tortoises. Occasional papers of the MCN/SSC Volume 5, MCN, Gland, Switzerland.

Branch, W. R. 1993. *A Photographic Guide to Snakes and Other Reptiles of Southern Africa.* Cape Town: Struik Publishers, RSA, 144 S.

Branch, W. R. 2008. *Tortoises, Terrapins and Turtles of Africa*. Struik Publishers, Cape Town, South Africa. 128 pp.

Branch, W. R. 2014. Post on Facebook, 9 January.

Branch, W. R. and Rau, R. 1991. Life History Note: *Homopus femoralis. Journal of the Herpetological Association of Africa* (39):27-27.

Branch, W. R., Baard, E. H. W. and De Villiers, A. 1990. Some exceptionally large Southern African chelonians. *Journal of the Herpetological Association of Africa*, 37:53-54.

Branch, W. R., Rödel, M. -O. and Marais, J. 2005. Herpetological survey of the Niassa Game Reserve, northern Mozambique - Part I: Reptiles. *Salamandra* 41(4):195-214.

Brandao, R. A., Zerbini, G. J., Sebben, A. and Molina, F. de B. 2002. Notes on distribution and Habitats of *Acanthochelys spixii* and *Phrynops vanderhaegei* (Testudines, Chelidae) in central Brazil. *Bol. Asoc. Herpetol. Esp.* 13(1-2):11-15.

Brandt, J. F. 1857. Observationes quaedam ad generis *Trionychum* species duas novas spectantes auctore J. F. Brandt. *Bulletin de la Classe physico-mathématique de l'Académie impériale des Sciences de Saint Pétersbourg* 16:110-111.

Braulik, G. T., Barnett, R., Odon, V., Islas-Villanueva, V., Hoelzel, A. R., and Graves, J. A. 2015. One species or two? Vicariance, lineage divergence and low mtDNA Diversity in geographically isolated populations of South Asian river dolphin. *J. Mamm. Evol.* 22:111-120.

Braulik, G. T. I., Archer, F., Khan, U., Imran, M., Sinha, R. K., Jefferson, T. A., Donovan, C. and Graves, J. A. 2021. Taxonomic revision of the South Asian River dolphins (*Platanista*): Indus and Ganges River dolphins are separate species. *Marine Mammal Science* 2021:1-38.

Braun, A. P. and Phelps, Q. E. 2016. Habitat Use by Five Turtle Species in the Middle Mississippi River. *Chelonian Conservation and Biology* 15(1):62-68.

Broadley, D. G. 1962. On some reptile collections from the North-Western and North-Eastern Districts of Southern Rhodesia 1958-1961, with descriptions of four new lizards. *Occ. Pap. Nat. Mus. South. Rhodesia* 26(B):787-843.

Broadley, D. G. 1981. A review of the genus *Pelusios* Wagler in southern Africa (Pleurodira: Pelomedusidae). *Occasional Papers of the National Museum of Rhodesia*, *B, Natural Science.* 6(9):633-686.

Broadley, D. G. 1997. Osteological characters of the shell and humerus in hinged tortoises of the African genus *Kinixys. Chelonian Conservation Biology* 2(4):526-531.

Broadley, D. G. and Howell, K. M. 1991. A check list of the reptiles of Tanzania, with synoptic keys. *Syntarsus* 1:1-70.

Broadley, D. G. and Sachsse, W. 2011. *Cycloderma frenatum* Peters 1854 - Zambezi Flapshell Turtle, Nkhasi. in: Rhodin, A. G. J., Pritchard, P. C. H., van Dijk, P. P., Saumure, R. A., Buhlmann, K. A., Iverson, J. B. and Mittermeier, R. A. (eds.). Conservation Biology of Freshwater Turtles and Tortoises: A Compilation Project of the IUCN/SSC Tortoise and Freshwater Turtle Specialist Group. *Chelonian Research Monographs* No. 5, pp. 055.1-055.5 (online).

Broschell, S. 2000. Leben und Fortpflanzung der Areolen-Flachschildkröte *Homopus areolatus*

(Thunberg, 1787). *Sauria* 22(3):3-9.

Brown, R. M., Oliveros, C. H., Siler, C. D., Fernandez, J. B., Welton, L. J., Buenavente, P. A. C., Diesmos, M. L. L. and Diesmos, A. C. 2012. Amphibians and Reptiles of Luzon Island (Philippines), VII: Herpetofauna of Ilocos Norte Province, Northern Cordillera Mountain Range. *Check List* 8(3):469-490.

Brown, R. M., McGuire, J. A., Ferner, J. W., Icarangal Jr., N. and Kennedy, R. S. 2000. Amphibians and reptiles of Luzon Island, II: preliminary report on the herptofauna of Aurora Memorial national Park, Philippines. *Hamadryad* 25(2):175-195.

Brown, R. M., Ferner, J. W., Sison, R. V., Gonzales, P. C. and Kennedy, R. S. 1996. Amphibians and reptiles of the Zambales Mountains of Luzon Island, Republic of the Philippines. *Herpetological Natural History* 4(1):1-22.

Brown, R., Siler, C., Oliveros, C., Welton, L., Rock, A., Swab, C., Weerd, M. V., van Beijnen, J., Rodriguez, D., Jose, E. and Diesmos, A. 2013. The amphibians and reptiles of Luzon Island, Philippines, VIII: the herpetofauna of Cagayan and Isabela Provinces, northern Sierra Madre Mountain Range. *ZooKeys* 266(2013) Special Issue:1-120.

Buchanan, S. W., Buffum, B. and Karraker, N. E. 2017. Responses of a Spotted Turtle (*Clemmys guttata*) Population to Creation of Early - successional Habitat. *Herpetological Conservation and Biology* 12(3):688-700.

Burke, R. L., Leuteritz, T. E. and Wolfe, A. J. 1996. Phylogenetic relationships of Emydine turtles. *Herpetologica* 52(4):572-584.

Bury, R. B. 1970. *Clemmys marmorata. Catalogue of American Amphibians and Reptiles* (100):1-3.

Bury, R. B. and Ernst, C. H. 1977. *Clemmys. Catalogue of American Amphibians and Reptiles* (203):1-2.

Bury, R. B., Germano, D. J. and Bury, G. W. 2010. Population Structure and Growth of the Turtle *Actinemys marmorata* from the Klamath-Siskiyou Ecoregion: Age, Not Size, Matters. *Copeia* 2010(3):443-451.

Buskirk, J. 2002. The Western Pond Turtle, *Emys marmorata. Radiata* 11(3):3-30.

Cabrera, M. R. and Böhm, S. 2015. The identity of a controversial neotropical turtle hatchling (Reptilia: Testudines: Chelidae). *Herpetological Review* 46(4):510-512.

Cacciali, P., Scott, N. J., Ortíz, A. L. A., Fitzgerald, L. A. and Smith, P. 2016. The Reptiles of Paraguay: Literature, Distribution and an Annotated Taxonomic Checklist. *Special publication of the Museum of Southwestern Biology*, 11:1-373.

Cagle, F. R. 1953. Two new subspecies of *Graptemys pseudogeographica. Occ. Pap. Mus. Zool. Univ. Michigan*, 546:1-17.

Cagle, F. R. 1954. Two new species of the genus *Graptemys. Tulane Studies in Zoology* 1(11):165-186.

Campbell, H. W. and Howell, T. R. 1965. Herpetological records from Nicaragua. *Herpetologica* 21:130-140.

Camper, J. D. 2019. *The Reptiles of South Carolina*. University of South Carolina Press:288 pp.

Campinhos, E. C., Monico, A. T., Lauvers, W. D. and Clemente-Carvalho, R. B. G. 2016. *Hydromedusa maximiliani* (Tartaruga Pescoco-de-serpente, Maximilian's Snake-necked Turtle) parasitism. *Herpetological Review* 47(3):448-449.

Cann, J. 1972. Notes on some tortoises collected in Northern Australia. *Victorian Naturalist* 89:165-168.

Cann, J. 1997a. Georges short-necked turtle. *Monitor: Journal of the Victorian Herpetological Society Incorporated*, 9:18-23, 31, 32.

Cann, J. 1997b. The Northern Yellow-faced Turtle. *Monitor: Journal of the Victorian Herpetological Society Incorporated*, 9(1), 24-29, 31-32, 34-35.

Cann, J. 1997c. Irwin's Turtle. *Monitor: Journal of the Victorian Herpetological Society Incorporated*, 9(1), 36-40, 31-32.

Cann, J. 1997d. Kuchling's Long-neck Turtle. *Monitor: Journal of the Victorian Herpetological Society Incorporated*, 9(1), 41-44, 31-32.

Cann, J. 1998. *Australian Freshwater Turtles.* Beaumont Publishing, Singapore: 292 pp.

Cann, J. and Sadlier, R. 2017. *Freshwater Turtles of Australia*. CSIRO Publishing, Clayton, Victoria, Australia:448 pp.

Cantor. T. E. 1847. Catalogue of reptiles inhabiting the Malayan Peninsula and Islands. *J. Asiat. Soc.*, Bengal, Calcutta. 16(2):607-656, 897-952, 1026-1078.

Carlino, D. 2010. Keeping and Breeding Home's Hingeback Tortoise *Kinixys homeana. Reptilia* (GB) (69):39-43.

Carr, A. F. 1952. *Handbook of turtles: The turtles of the United States, Canada, and Baja California.* Cornell University Press, Ithaca, New York, USA.

Carreira, S., Brazeiro, A., Camargo, A., da Rosa, I., Canavero, A. and Maneyro, M. 2012. Diversity of reptiles of Uruguay: Knowledge and information gaps. *Bol. Soc. Zool. Uruguay* (2a eìpoca) 21(1-2):9-29.

Carrière, M. -A., Bulté, G. and Blouin-Demers, G. 2009. Spatial Ecology of Northern Map Turtles (*Graptemys geographica*) in a Lotic and a Lentic Habitat. *Journal of Herpetology* 43(4):597-604.

Carvajal-Cogollo, J. E., Rojas-Murcia, L. E. and Cárdenas-Arévalo, G. 2020. *Reptiles del Caribe colombiano/ Reptiles of the Colombian Caribbean*. Tunja: Editorial UPTC:268 pp.

Castañeda, F. E. and Mora, J. M. 2015. *Kinosternon leucostomum*. Sexual Dimorphism. *Mesoamerican Herpetology* 2(2):204-205.

Castaño-Mora, O. V. and Lugo Rugeles, M. 1981. Estudio comparativo del comportamiento de dos especies de morrocoy: *Geochelone carbonaria* y *Geochelone denticulata* y aspectos comparables de su morfología esterna. *Cespedesia* 10:55-122.

Castro, T. M. and Teixeira, R. L. 2007. Straßenverkehr als Bedrohung für die Amphibien und Reptilien des Atlantischen Regenwalds in Südost-Brasilien. Eine Fallstudie. *Sauria* 29(2):35-42

Castro-Herrera, F. and Vargas-Salinas, F. 2008. Anfibios y reptiles en el departamento del Valle del Cauca, Colombia. *Biota Colombiana* 9(2):251-277.

Catenazzi, A., Lehr, E. and Von May, R. 2013. The amphibians and reptiles of Manu National Park and its buffer zone, Amazon basin and eastern slopes of the Andes, Peru. *Biota Neotrop*. 13(4):269-283.

Censky, E. J. 1988. *Geochelone carbonaria* (Reptilia: Testudines) in the West Indies. *Florida Scientist* 50(2):108-114.

Chan-ard, T., Thong-aree, S., Cota, M. and Makchai, S. 2011. *Cyclemys* of the Peat Swamp of Southernmost Thailand. *The Thailand Natural History Museum Journal* 5(2):107-112.

Chan-ard, T., Parr, J. W. K. and Nabhitabhata, J. 2015. *A field guide to the reptiles of Thailand*. Oxford University Press, NY:352 pp.

Chan-ard, T., Grossmann, W., Gumprecht, A. and Schulz, K. D. 1999. *Amphibians and reptiles of peninsular Malaysia and Thailand - an illustrated checklist*. Bushmaster Publications, Würselen, Gemany:240 pp.

Chandler, H. C., Stegenga, B. S. and Stevenson, D. J. 2020. Thermal Ecology of Spotted Turtles (*Clemmys guttata*) in Two Southern Populations. *Copeia* 108(4):737-745.

Chao, W. J., Shi-ping, G., Hai-tao, S., Yu-xiang, L. and Zhao, E. 2011. Reproduction and Nesting of the Endangered Keeled Box Turtle (*Cuora mouhotii*) on Hainan Island, China. *Chelonian Conservation and Biology* 10(2):159-164.

Chirio, L. and Ineich, I 2006. Biogeography of the reptiles of the Central African Republic. *African Journal of Herpetology* 55(1):23-59.

Chirio, L. and Lebreton, M. 2007. *Atlas des reptiles du Cameroun*. MNHN, IRD, Paris:688 pp.

Chkhikvadze, V. M. 1987. On systematic position of the USSR Far East soft-shelled turtle. *Bulletin of the Academy of Sciences of the Georgian Soviet Socialist Republic* 128:609-611. (In Russian with Georgian and English summary).

Choudhury, A. U. 1996. Taxonomy of the brown hill tortoise *Manouria emys* (Schlegel and Muller) and its distribution in Indian subcontinent. *Cheetal* 35(3-4):36-39.

Choudhury, A. U. 2001. Some chelonian records from Mizoram. *J. Bombay Nat. Hist. Soc*. 92(2):184-190.

Clark, V. R., Barker, N. P. and Mucina, L. 2011. A phytogeographic assessment of the Nuweveldberge, South Africa. *South African Journal of Botany* 77:147-159.

Cogger, H. G. 2000. *Reptiles and Amphibians of Australia*, 6th ed. Ralph Curtis Publishing, Sanibel Island, USA:808 pp.

Cogger, H. G. 2014. *Reptiles and Amphibians of Australia*, 7th ed. CSIRO Publishing, Australia:xxx + 1033 pp.

Cogger, H. G., Cameron, E. E. and Cogger, H. M. 1983. *Zoological Catalogue of Australia, Volume 1: Amphibia and Reptilia*. Australian Government Publishing Service, Canberra, Australia:313 pp.

Conradie, W., Reeves, B., Brown, N. and Venter, J. A. 2016. Herpetofauna of the Oviston, Commando Drift and Tsolwana nature reserves in the arid interior of the Eastern Cape Province, South Africa. *Indago* 32:81-98.

Conant, R. 1938. The Reptiles of Ohio. *American Midland Naturalist* 20(1):1-200.

Conant, R. and Berry, J. F. 1978. Turtles of the family Kinosternidae in the Southwestern United States and adjacent Mexico: Identification and distribution. *American Museum Novitates* (2642):1-18.

Conant, R. and Collins, J. T. 1991. *A Field Guide to Reptiles and Amphibians of Eastern/Central North America*, 3rd ed. Houghton Mifflin (Boston/New York), xx + 450 pp.

Conant, R., Trautman, M. B. and McLean, E. B. 1964. The false map turtle, *Graptemys pseudogeographica* (Gray). *Copeia* 1964(1):212-213.

Cope, E. D. 1870. Seventh contribution to the herpetology of tropical America. *Proceedings of the American Philosophical Society* 11(1869):147-169.

Cope, E. D. 1872. Synopsis of the species of the Chelydrinae. *Proc. Acad. Nat. Sci. Philadelphia* (ser. 3) 24:22-29.

Cope, E. D. 1876. On the Batrachia and Reptilia of Costa Rica. In: Cope, E. D. (Ed.). On the Batrachia and Reptilia of Costa Rica with notes on the Herpetology and Ichthyology of Nicaragua and Peru. *Journal of the Academy of Natural Sciences, Philadelphia* (2)8(4)1875:93-154.

Cordero, G. A. 2017. Quick guide: The turtle's shell. *Biology* 27:R163-R171.

Costa, H. C., de Rezende, D. T., Molina, F. B., Nascimento, L. B., Leite, F. S. F. and Fernandes, A. P. B. 2015. New Distribution Records and Potentially Suitable Areas for the Threatened Snake-Necked Turtle *Hydromedusa maximiliani* (Testudines: Chelidae). *Chelonian Conservation and Biology* 14(1):88-94.

Cox, M. J., Van Dijk, P. P. Nabhitabhata, J. and Thirakhupt, K. 1998. A Photographic Guide to Snakes and Other Reptiles of Peninsular Malaysia, Singapore and Thailand. *Ralph Curtis Publishing*:144 pp.

Cozer, J. S., Pereira-Ribeiro, J., Linause, T. M., Ferreguetti, A. C., de Godoy Bergallo, H. and da Rocha, C. F. D. 2020. Reptile diversity in the Duas Bocas Biological Reserve, Espírito Santo, southeastern Brazil. *Papéis Avulsos De Zoologia*, 60, e20206040-e20206040 (online).

Cross, M. D. and Bekker, K. 2017. *Clemmys guttata* (Spotted Turtle) Fire scarring. *Herpetological Review* 48(1):175.

Cross, M. D. and Bekker, K. A. 2018. *Clemmys guttata* (Spotted Turtle) Fire scar healing. *Herpetological Review* 49(1):106.

Crother, B. I. (ed.) 2012. Standard Common and Current Scientific Names for North American Amphibians, Turtles, Reptiles, and Crocodilians, Seventh Edition. *SSAR Herpetological Circular* 39:1-92.

Crother, B. I. (ed.). 2017. Scientific and Standard English Names of Amphibians and Reptiles of North America North of Mexico, with Comments Regarding

Confidence in Our Understanding. Eighth edition. *SSAR Herpetological Circular* 43:1-104.

Cuvier, G. 1831. *The Animal Kingdom arranged in conformity with its organization, by the Baron Cuvier, ... with additional descriptions of all the species hitherto named, and of many not before noticed, by Edward Griffith... and others.* Vol. 9. Whittaker, Treacher and Co., London, UK:481 pp.

Daniels, R. J. R. 2001. The Cochin forest cane turtle (*Geoemyda silvatica*) in Kanyakumari District, Tamil Nadu. *Cobra* 43:18-20.

Daniels, S. R., Hofmeyr, M. D., Henen, B. T. and Crandall, K. A. 2007. Living with the genetic signature of Miocene induced change: Evidence from the phylogeographic structure of the endemic angulate tortoise *Chersina angulata*. *Molecular Phylogenetics and Evolution* 45(3):915-926.

Das, A., Uttam Saikia, B. H., Murthy, C. B., Dey S. and Dutta, S. K. 2009. A herpetofaunal inventory of Barail Wildlife Sanctuary and adjacent regions, Assam, north-eastern India. *Hamadryad* 34(1):117-134.

Das, B., Das, A. and Gupta, A. K. 2016. Testudines - Turtles. *Herpetological Review* 47(1):78-79.

Das, I. 1995. *Turtles and Tortoises of India*. World Wide Fund for Nature / Oxford University Press, Bombay, India:176 pp.

Das, I. 1996. First record of *Heosemys spinosa* from the Philippines, with biogeographic notes. *Chelonian Conservation Biology* 2(1):80-82.

Das, I. and Das, A. 2017. *A Naturalist's Guide to the Reptiles of India, Bangladesh, Bhutan, Nepal, Pakistan and Sri Lanka*. John Beaufoy Publishing Ltd., Oxford, UK:176 pp.

Das, I. and Singh, S. 2009. *Chitra indica* (Gray 1830) - Narrow-Headed Softshell Turtle. *Chelonian Research Monographs*, 5:1-7.

Das, I., McCormack, T. E. M., van Dijk, P. P., Hoang, H. V. and Struijk, R. P. J. H. 2016. *Cuora mouhotii* (Gray, 1862) - Keeled Box Turtle. *Chelonian Research Monographs* 5(9):099:1-12.

Das, K. C. and Gupta, A. 2017. An ecological note on the new record of *Cuora amboinensis* (Riche in Daudin, 1801) (Reptilia: Testudines: Geoemydidae) in northeastern India. *Journal of Threatened Taxa* 9(7):10459-10462.

Daudin, F. M. 1801. *Histoire Naturelle, Générale et Particulière des Reptiles; ouvrage faisant suit à l'Histoire naturell générale et particulière, composée par Leclerc de Buffon; et rédigee par C.S. Sonnini, membre de plusieurs sociétés savantes.* Vol. 2. F. Dufart, Paris, France:432 pp.

Daudin, E. M. 1802. *Histoire Naturelle des Rainettes, des Grenouilles et des Crapauds*. Paris, 108 S.

de Bruyn, M., Rüber, L., Nylinder, S., Stelbrink, B., Lovejoy, N. R., Lavoué, S., Tan, H. H., Nugroho, E., Wowor, D., Ng, P. K. L., Azizah, M. N. S., von Rintelen, T., Hall, R. and Carvalho, G. R. 2013. Paleo-drainage basin connectivity predicts evolutionary relationships across three southeast Asian biodiversity hotspots. *Systematic Biology*, 62:398-410.

Deepak, V. and Vasudevan, K. 2010. Note on defensive behaviour of Cochin forest cane turtle (*Vijayachelys silvatica*). *Reptile Rap - Newsletter of the South Asian Reptile Network* 9:1-2.

Deepak, V. and Vasudevan, K. 2013. Aggressive interactions among male cane turtles *Vijayachelys silvatica* (Henderson, 1912). *Herpetozoa* 25(3/4):159-163.

Deepak, V., Vasudevan, K. and Pandav, B. 2009. Preliminary observation on the diet of cane turtle (*Vijayachelys silvatica*). *Hamadryad* 34(1):166-168.

Deepak, V., Praschag, P. and Vasudevan, K. 2014. *Vijayachelys silvatica* (Henderson, 1912) - Cochin Forest Cane Turtle. in: Rhodin, A. G. J., Pritchard, P. C. H., van Dijk, P. P., Saumure, R. A.,

Buhlmann, K. A., Iverson, J. B. and Mittermeier, R. A. (eds.). *Conservation Biology of Freshwater Turtles and Tortoises: A Compilation Project of the IUCN/SSC Tortoise and Freshwater Turtle Specialist Group*. Chelonian Research Monographs No. 5, pp. 078.1-7 (online).

De La Fuente, M. 2003. Two new pleurodiran turtles from the Portezuelo Formation (Upper Cretaceous) of northern Patagonia, Argentina. *Journal of Paleontology*, 77:559-575.

De La Fuente, M. and Bona, P. 2002. Una nueva especie de *Hydromedusa* Wagler, 1830 (Pleurodira, Chelidae) del Paleogeno de Patagonia. *Ameghiniana*, 39:77-83.

de Rooij, N. 1915. *The Reptiles of the Indo-Australian Archipelago. I. Lacertilia, Chelonia, Emydosauria*. Leiden (E. J. Brill), xiv + 384 pp.

de Souza, F. L. 1995. *Hydromedusa maximiliani.* Juvenile morphology. *Herpetological Review* 26(1):34.

de Souza, F. L. and Martins, F. I. 2009. *Hydromedusa maximiliani* (Mikan, 1825) - Maximilian's Snake-Necked Turtle, Brazilian Snake-Necked Turtle. *Chelonian Research Monographs*, 5:1-6.

Diesmos, A., Parham, J. F., Stuart, B. L. and Brown, R. M. 2005. The phylogenetic position of the recently rediscovered Philippine forest turtle (Bataguridae: *Heosemys leytensis*). *Proc. Cal. Acad. Sci.* 56(3):31-41.

Diesmos, A. C., Brown, R. M., Alcala, A. C. and Sison, R. V. 2008. Status and Distribution of Nonmarine Turtles of the Philippines. *Chelonian Conservation and Biology* 7(2):157-177.

Dijk, P. P. v., Iverson, J. B., Bradley Schaffer, H., Bour, R. and Rhodin, A. G. J. (Calling themselves the "turtle taxonomy working group") 2011. Turtles of the World, 2011 Update: Annotated Checklist of Taxonomy, Synonymy, Distribution, and Conservation Status. Chelonian Research Monographs No. 5:78 pp.; doi:10.3854/crm.5.000.checklist.v4.2011.

di Pietro, D., Alcalde, L., Williams, J. D. and Cabrera, M. R. 2012. Geographic distribution: *Hydromedusa tectifera* (South American snake-necked turtle). *Herpetological Review* 43:303.

Dixon, J. R. 2000. *Amphibians and reptiles of Texas*,

Second Edition. Texas A and M University Press:421 pp.

Dobiey, M. 2006. Gesägte Flachschildkröte - *Homopus signatus signatus* (GMELIN, 1789). *Reptilia* (Münster) 11 (61):51-54.

Dos Reis Martins, A., de Carvalho Garbin, R. and Bruno, S. F.. 2011. Geographic Distribution: *Hydromedusa tectifera* (South American snake-necked turtle). *Herpetological Review* 42(3):389.

Duerden, J. E. 1906. South African tortoises of the genus *Homopus*, with description of a new species. *Records of the Albany Museum* 1:405-411.

Duméril, A. M. C. 1805 ("1806"). *Zoologie Analytique, ou Méthode Naturelle de*

*Classification des Animaux*. Perronneau, Paris:344 pp. (Published Nov 1805).

Duméril, A. H. A. 1856. Note sur les reptiles du Gabon. *Revue et Magasin de Zoologie Pure et Appliquée*, Paris (2)8:369-377, 417-424, 460-470, 553-562.

Duméril, A. H. A. 1861. Reptiles et poissons de l'Afrique occidentale. Étude précédée de considérations générales sur leur distribution géographique. *Archives du Muséum d'Histoire Naturelle*, Paris 10:138-268.

Duméril, A. M. C. and Bibron, G. 1834. *Erpétologie Générale ou Histoire Naturelle Complète des Reptiles.* Tome Premier. Roret, Paris:439 pp.

Duméril, A. M. C. and Bibron, G. 1835. *Erpétologie Générale ou Histoire Naturelle Complète des Reptiles*, Vol. 2. Librairie Encyclopédique de Roret, Paris, iv + 680 p.

Duméril, A. M. C. and Duméril, A. H. A. 1851. *Catalogue Méthodique de la Collection des Reptiles* (Muséum d'Histoire Naturelle de Paris). Gide and Baudry, Paris, France:224 pp.

Duméril, A. M. C., Bibron, G. and Duméril, A. 1854. *Erpétologie générale ou Histoire Naturelle complète des Reptiles*. Vol. 9. Paris, XX + 440 pp.

Dundee, H. A. 1974. Evidence for specific status of *Graptemys kohni* and *Graptemys pseudogeographica. Copeia* 1974(2):540-542.

Dundee, H. A. and Rossman, D. A. 1989. *The amphibians and reptiles of Louisiana*. Louisiana Sth. Univ. Press, Baton Rouge:300 pp.

Dunn, E. R. 1930. A new *Geoemyda* from Costa Rica. *Proc. New England Zool. Club* 12:31-34.

Dunn, E. R. 1945. Los generos de Anfibios y Reptiles de Colombia IV Cuarta y ultima parte: Reptiles, Ordenes Testudineos y Crocodilineos. *Caldasia* 3(13):307-335.

Duong, L. D., Ngo, C. D. and Nguyen, T. Q. 2014. New records of turtles from Binh Dinh Province, Vietnam. *Herpetology Notes* 7:737-744.

Eggenschwiler, U. 2003. *Manouria emys phayrei* - Success at keeping and breeding the little-known Burmese Brown Tortoise. *Reptilia* (UK) (29):43-50.

Eggenschwiler, U. 2005. Die Braune Landschildkröte *Manouria emys phayrei* (Blyth, 1853) - Haltung und Vermehrung einer recht wenig bekannten Schildkröte. *Reptilia* (Münster) 10(53):71-79.

Engstrom, T. N., Bradley Shaffer, H. and McCord, W. P. 2002. Phylogenetic Diversity of Endangered and Critically Endangered Southeast Asian Softshell Turtles (Trionychidae: *Chitra*). *Biological Conservation* 104(2):173-179.

Engstrom, T. N., Shaffer, H. B. and McCord, W. P. 2004. Multiple data sets, high homoplasy and the phylogeny of softshell turtles (Testudines: Trionychidae). *Systematic Biology* 53:693-710.

Entiauspe-Neto, O. M., Perleberg, T. D. and de Freitas, M. A. 2016. Herpetofauna from an urban Pampa fragment in southern Brazil: composition, structure and conservation. *Check List* 12(5):1-15.

Ernst, C. H. 1967. A mating aggregation of the turtle *Clemmys guttata. Copeia* 1967(2):473-474.

Ernst, C. H. 1968. Homing ability in the spotted turtle, *Clemmys guttata* (Schneider). *Herpetologica* 24(1):77-78.

Ernst, C. H. 1970a. Home range of the spotted turtle, *Clemmys guttata* (Schneider). *Copeia* 1970(2):391-393.

Ernst, C. H. 1970b. Reproduction in *Clemmys guttata. Herpetologica* 26(2):228-232.

Ernst, C. H. 1972. *Clemmys guttata. Catalogue of American Amphibians and Reptiles* (124):1-2.

Ernst, C. H. 1976. Ecology of the Spotted Turtle, *Clemmys guttata* (Reptilia, Testudines, Testudinidae), in Southeastern Pennsylvania. *Journal of Herpetology* 10(1):25-33.

Ernst, C. H. 1978. A revision of the neotropical turtle genus *Callopsis* (Testudines: Emydidae: Batagurinae). *Herpetologica* 34(2):113-134.

Ernst, C. H. 1982. Environmental Temperatures and Activities in Wild Spotted Turtles, *Clemmys guttata. Journal of Herpetology* 16(2):112-120.

Ernst, C. H. 1983a. *Platemys pallidipectoris* Freiberg. Chaco sideneck turtle. *Catalogue of American Amphibians and Reptiles* (325):1-2.

Ernst, C. H. 1983b. *Platemys spixii* Dumeril and Bibron. Black spiny-necked turtle. *Catalogue of American Amphibians and Reptiles* (326):1-2.

Ernst, C. H. 1983c. *Platemys radiolata* (Mikan). Radiated sideneck turtle. *Catalogue of American Amphibians and Reptiles* (339):1-2.

Ernst, C. H. 1987. *Platemys* Wagler. Twist-necked turtles. *Catalogue of American Amphibians and Reptiles* (405):1-4.

Ernst, C. H. 1988. *Cuora mccordi*, a new chines box turtle from Guangxi Province. *Proc. Biol. Soc. Washington* 101:466-470.

Ernst, C. H. 2001. An overview of the North American turtle genus *Clemmys* Ritgen, 1828. *Chelonian Conservation Biology* 4(1):211-216.

Ernst, C. H. and Barbour. R. W. 1972. *Turtles of the United States.* University Press of Kentucky, Lexington.

Ernst, C. H. and Barbour, R. W. 1989. *Turtles of the World.* Smithsonian Institution Press, Washington D.C., USA.

Ernst, C. H. and Lovich, J. E. 2009. *Turtles of the United States and Canada*, 2nd edition. Johns Hopkins

University Press:827 pp.

Ernst, C. H. and Zug, G. R. 1994. Observations on the Reproductive Biology of the Spotted Turtle, *Clemmys guttata*, in Southeastern Pennsylvania. *Journal of Herpetology* 28(1):99-102.

Ernst, C. H., Laemmerzahl, A. F. and Lovich, J. E. 2011. Does the “kamaroma”-plastron pattern morph occur in both Philippine subspecies of the turtle *Cuora amboinensis*? *Proceedings of the Biological Society of Washington* 124(4):259-269.

Ernst, C. H., Laemmerzahl, A. F. and Lovich, J. E. 2016. A morphological review of subspecies of the Asian box turtle, *Cuora amboinensis* (Testudines, Geomydidae). *Proceedings of the Biological Society of Washington* 129(1):144-156.

Evenhuis, N. 2014. Email to ICZN List server, 13 April.

Fabius, D. 2010. Die Argentinische Schlangenhalsschildkröte (*Hydromedusa tectifera*) - Beobachtungen in Biotop und Terrarium. *Reptilia* (Münster) 15(85):24-30.

Fabius, D. 2016. *Hydromedusa tectifera* - observations in the wild and under captive care. *The Batagur* 6:1-11

Fahd, S., El Marnisi, B., Mediani, M. and Fritz, U. 2009. Zur Verbreitung und zum Bedrohungsstatus der Europäischen Sumpfschildkröte (*Emys orbicularis*) in Marokko. *Elaphe*, 17:30-33.

Famelli, S., Pinheiro, S. C. P., Souza, F. L., Chiaravalloti, R. M. and Bertoluci, J. 2012. Population Viability Analysis of a Long-Lived Freshwater Turtle, *Hydromedusa maximiliani* (Testudines: Chelidae). *Chelonian Conservation and Biology* 11(2):162-169.

Famelli, S., Adriano, L. R., Pinheiro, S. C. P., Souza, F. L. and Bertoluci, J. 2014. Reproductive Biology of the Freshwater Turtle *Hydromedusa maximiliani* (Chelidae) from Southeastern Brazil. *Chelonian Conservation and Biology* 13(1):81-88.

Famelli, S., Souza, F. L., Georges, A. and Bertoluci, J. 2016. Movement patterns and activity of the Brazilian snake-necked turtle *Hydromedusa maximiliani* (Testudines: Chelidae) in southeastern Brazil. *Amphibia-Reptilia* 37(2):215-228.

Farkas, B. 1994. Notes on type and type locality of the narrow-headed softshell turtle, *Chitra indica* (Gray, 1831) (Testudines, Trionychidae). *Misc. Zool. Hungarica* 9:117-119.

Farkas, B. and McCormack, T. 2010. Le *Trionyx* de Chine *Pelodiscus sinensis* (Wiegmann, 1834)

(Ang: Chinese softshell turtle). *Chéloniens* 18:56-63.

Farkas, B., Ziegler, T., Pham, C. T., Ong, A. V. and Fritz, U. 2019. A new species of *Pelodiscus* from northeastern Indochina (Testudines, Trionychidae). *ZooKeys* 824:71-86.

Feldman, C. R. and Parham, J. F. 2002. Molecular Phylogenetics of Emydine Turtles: Taxonomic Revision and the Evolution of Shell Kinesis. *Molecular Phylogenetics and Evolution* 22(3):388-398.

Feng, C. Y., Mauger, D., Ross, J. P. and Dreslik, M. J. 2019. Size and Structure of Two Populations of Spotted Turtle (*Clemmys guttata*) at Its Western Range Limit. *Herp. Conserv. Biology* 14(3):648-658.

Ferner, J. W., Brown, R. M., Sison, R. V. and Kennedy, R. S. 2000. The amphibians and reptiles of Panay Island, Philippines. *Asiatic Herpetological Research* 9:1-37.

Ferreira, A. S. 2021. Rapid survey of the herpetofauna of Estac¸aÞo Ecoloìgica Alto Maueìs: a rarely accessed area in the Brazilian Amazonia. *Biota Amazônia* (Biote Amazonie, Biota Amazonia, Amazonian Biota), 11(1):22-28.

Ferronato, B., Molina, F. B., Molina, F. C., Espinosa, R. A. and Morales, V. R. 2011. New locality records for chelonians (Testudines: Chelidae, Podocnemididae, Testudinidae) from Departamento de Pasco, Peru. *Herpetology Notes* 4:219-224.

Feuer, R. C. 1966. Variation in snapping turtles. *Chelydra serpentine* Linnaeus: a study in quantitative systematics. PhD. dissertation. University of Utah, Salt Lake City, USA.

Feuer, R. C. 1971. Intergradation of the snapping turtles *Chelydra serpentina serpenrina* (Linnaeus, 1758) and *Chelydra serpentina Osceola* Stejneger, 1918. *Herpetologica* 27(4):379-384.

Filella, E. 1997. *Cuora amboinensis* la tortuga caja del sudeste asiático y sus subespecies. *Reptilia* (13):43-47.

Fitch, H. S. 1936. Amphibians and reptiles of the Rouge River Basin, Oregon. *American Midland Naturalist* 17:634-652.

Fitzinger, L. J. 1835. Entwurf einer systematischen Anordnung der Schildkröten nach den Grundsätzen der natürlichen Methode. *Annalen des Wiener Museums der Naturgeschichte* 1(1):105-128.

Fitzinger, L. J. 1843. *Systema Reptilium. Fasciculus Primus: Amblyglossae*. Vindobona [Vienna]: Braumüller und Seidel:106 pp.

Fleck, J. and Fleck, S. 2001. Erfolgreiche Nachzucht von *Chersina angulata* und *Homopus areolatus* über mehrere Jahre. *Elaphe* 9(3):5-14.

Folkerts, G. W. and Skorepa, A. C. 1967. A Spotted Turtle, *Clemmys guttata* (Schneider), from Southeastern Georgia. *Herpetologica* 23(1):63.

Fong, J. J. and Qiao, G. X. 2010. New localities of endangered Chinese turtles from museum specimens and the practical and ethical challenges using and reporting natural history collection data. *Zootaxa* (PRINO) 2393:59-68 (online).

Forth, G. 2017. Ethnographic reports of freshwater turtles on Flores Island, Indonesia: possibilities of an undocumented chelonian species. *Herpetological Review* 48(2):304-310.

Freiberg, M. A. 1945. Una nueva especie de Tortuga del genero *Platemys* Wagler. *Physis*. Buenos Aires 20:19-23.

Freiberg, M. A. 1967. Tortugas de la Argentina. *Ciencia e Investigacion* (Buenos Aires) 23(8):351-363.

Freitas, M. A., de, Abegg, A. D., Dias, I. R. and de Figueiredo Moraes, E. P. 2018. Herpetofauna from Serra da Jibóia, an Atlantic Rainforest remnant in the state of Bahia, northeastern Brazil. *Herpetology Notes*

11:59-72.

Freitas, M. A. de, Abegg, A. D., Silva, T. F. S., Fonseca, P. M., Hamdan, B. and Filadelfo, T. 2019. Herpetofauna of Serra do Timbó, an Atlantic Forest remnant in the State of Bahia, Northeastern Brazil. *Herpetology Notes* 12:245-260.

Fritz, U. 1989. Zur innerartlichen Variabilität von *Emys orbicularis* (Linnaeus, 1758). 1. Eine neue Unterart der Europäischen Sumpfschildkröte aus Kleinasien, *Emys orbicularis luteofusca subsp. nov*. *Salamandra* 25(3-4):143-168.

Fritz, U. 1993a. Zur innerartlichen Variabilität von *Emys orbicularis* (Linnaeus, 1758). 3. Zwei neue Unterarten von der Iberischen Halbinsel und aus Nordafrika, *Emys orbicularis fritzjuergenobsti subsp. nov.* und *E. o. occidentalis subsp. nov*. *Zoologische Abhandlungen des Staatlichen Museums für Tierkunde Dresden*, 47:131-155.

Fritz, U. 1993b. Weitere Mitteilung zur innerartlichen Variabilität, Chorologie und Zoogeographie von *Emys orbicularis* (Linnaeus, 1758) in Kleinasien. *Herpetozoa* 6.

Fritz, U. 1994a. Gibt es in Nordafrika zwei verschiedene Formen der Europäischen Sumpfschildkröte (*Emys orbicularis*)? *Salamandra*, 30:76-80.

Fritz, U. 1994b. Zur innerartlichen Variabilität von *Emys orbicularis* (Linnaeus, 1758). 4. Variabilität und Zoogeographie im pontokaspischen Gebiet mit Beschreibung von drei neuen Unterarten (Reptilia; Testudines: Emydidae). *Zoologische Abhandlungen des Staatlichen Museums für Tierkunde Dresden*, 48(4):53-93.

Fritz, U. 1995a. Zur innerartlichen Variabilität von *Emys orbicularis* (Linnaeus, 1758). 5a. Taxonomie in Mittel-Westeuropa , auf Korsika, Sardinien, der Apenninen-Halbinsel und Sizilien und Unterartengruppen von *Emys orbicularis* (Reptilia: Testudines: Emydidae). *Zoologische Abhandlungen des Staatlichen Museums für Tierkunde Dresden*, 48(3):185-242.

Fritz, U. 1995b. Kritische Übersicht der Fossilgeschichte der Sumpfschildkröten-Gattung *Emys* A. Duméril, 1806. *Zoologische Abhandlungen des Staatlichen Museums für Tierkunde Dresden*, 48(3): 243-264.

Fritz, U. 1995c. Die Sumpfschildkröte in Oberschwaben oder: Die Suche nach einem Phantom? *Elaphe* 3(4):57-61.

Fritz, U. 1996. Zur innerartlichen Variabilität von *Emys orbicularis* (Linnaeus, 1758). 5b. Innerartliche Hierarchie und Zoogeographie. *Zoologische Abhandlungen des Staatlichen Museums für Tierkunde Dresden*, 49:31-71.

Fritz, U. 1997. Zum Vorkommen von *Heosemys spinosa* (GRAY, 1831) auf den Philippinen (Reptilia: Testudines: Bataguridae). *Faun. Abh. Mus. Tierk. Dresden* 21(7):131-134.

Fritz, U. 1998. Introduction to zoogeography and subspecific differentiation in *Emys orbicularis* (Linnaeus, 1758). *Mertensiella*, 10:1-27.

Fritz, U. 2001a. *Emys orbicularis* (Linnaeus, 1758) - Europäische Sumpfschildkröte. in Fritz, U. (Ed.), Handbuch der Reptilien und Amphibien Europas. Band 3/IIIA: Schildkröten I (pp. 343-515). Wiebelsheim: Aula-Verlag.

Fritz, U. 2001b. *Handbuch der Reptilien und Amphibien Europas, Band 3/IIIA Schildkröten I*. Aula-Verlag, Wiebelsheim.

Fritz, U. 2003. Die Europäische Sumpfschildkröte (*Emys orbicularis*). Laurenti Verlag (Bielefeld), Zeitschrift für Feldherpetologie, Suppl. 1:224 pp.

Fritz, U. and Bininda-Emonds, O. R. P. 2007. When genes meet nomenclature: Tortoise phylogeny and the shifting generic concepts of *Testudo* and *Geochelone*. *Zoology* 110(4):298-307 (erratum in vol. 111(1):84).

Fritz, U. and Freitag, H. 2008. Geoemydid turtles of the Sulu Archipelago, Philippines, and a historical record of *Cyclemys dentata* (Gray, 1831) for Siasi Island. *Herpetology Notes* 1:11-12.

Fritz, U. and Havaš, P. 2007. Checklist of chelonians of the world. *Vertebrate Zoology*, 57:149-368.

Fritz, U, and Havaš, P. 2014. On the reclassification of box turtles (Terrapene): a response to Martin *et al.* (2014). *Zootaxa* (PRINO) 3835:295-298 (online).

Fritz, U. and Mendau, D. 2002. Ein Gattungsbastard zweier südostasiatischer Schildkröten: *Cuora amboinensis kamaroma* Rummler und Fritz, 1991 *x Mauremys annamensis* (Siebenrock, 1903). *Salamandra* 38(3):129-134.

Fritz, U. and Obst, F. J. 1995. Morphologische Variabilität in der Intergradationzonen von *Emys orbicularis orbicularis* und *E. o. hellenica*. *Salamandra* 31(3):157-180.

Fritz, U. and Obst, F. J. 1997. Zum taxonomischen Status von *Cuora galbinifrons serrata* Iverson and McCord, 1992 und *Pyxidea mouhotii* (Gray, 1862) (Reptilia: Testudines: Bataguridae). *Zool. Abh. Staatl. Mus. Tierk. Dresden* 49:261-279.

Fritz, U. and Obst, F. J. 1998. Neue Schildkröten aus Südostasien Teil I. Platysternidae und Bataguridae (*Cuora*). *Sauria* 20(4):9-22.

Fritz, U. and Obst, F. J. 1999. Neue Schildkröten aus Südostasien Teil II. Bataguridae (*Cyclemys*, *Heosemys*, *Mauremys*, *Ocadia*, *Pyxidea*, *Sacalia*) und Trionychidae. *Sauria* 21(1):11-26.

Fritz, U. and Pauler, I. 1992a. *Phrynops chacoensis spec. nov*. (Reptilia, Chelidae), eine neue Krötenkopfschildkröte. *Mitt. Zool. Mus. Berlin* 68(2):299-307.

Fritz, U. and Pauler, I. 1992b. Erstnachweis von *Acanthochelys pallidipectoris* (FREIBERG, 1945) für Paraguay. *Herpetozoa* 5(3/4):135-137.

Fritz, U. and Pauler, I. 1999. *Phrynops chacoensis* Fritz and Pauler, 1992, ein Juniorsynonym von *Platemys macrocephala* Rhodin, Mittermeier und McMorris, 1984. *Salamandra* 35(1):53-56.

Fritz, U., Obst, F. J. and Günther, R. 1994. Kritischer Typenkatalog der Schildkrötensammlung (Reptilia: Testudines) des Zoologischen Museums Berlin. (type catalogue). *Mitt. Zool. Mus. Berlin* 70:157-175.

Fritz, U., Kuzmin, S. L., Kolobajewa, O. W. and Orlowa, W. F. 1995. Zur Variabilität der Sumpfschildkröte (*Emys*

*orbicularis*) im Gebiet zwischen der Manytsch-Niederung und Don (Russland). *Salamandra* 31(4):231-236.

Fritz, U., Keller, C. and Budde, M. 1996. Eine neue Unterart der Europäischen Sumpfschildkröte aus Südwestspanien, *Emys orbicularis hispanica subsp. nov*. *Salamandra* 32(3):129-152.

Fritz, U., Gaulke, M. and Lehr, E. 1997. Revision der südostasiatischen Dornschildkröten-Gattung *Cyclemys* Bell, 1834, mit Beschreibung einer neuen Art. *Salamandra* 33(3):183-212.

Fritz, U., Andreas, B. and Lehr, E. 1998a. Eine neue Unterart der Dreikiel-Scharnierschildkröte, *Pyxidea mouhotti* (Gray, 1862) (Reptilia: Testudines: Bataguridae*). Zool. Abh. Mus. Tierkd*. Dresden. 50(3):33-43.

Fritz, U., Baran, I., Budak, A. and Amthauer, E. 1998b. Some notes on the morphology of *Emys orbicularis* in Anatolia, especially on *E. o. luteofusca* and *E. o. colchica*, with the description of a new subspecies from southeastern Turkey. *Mertensiella* 10:103-121.

Fritz, U., Guicking, D., Wink, M. and Lehr, E. 2001. Sind *Cyclemys atripons* Iverson and McCord, 1997 und *Cyclemys pulchristriata* Fritx, Gaulke and Lehr, 1997 identisch? *Sauria* 23(2):33-38.

Fritz, U., Ziegler, T., Herrmann, H. -W. and Lehr, E. 2002. Intergradation between subspecies of *Cuora galbinifrons* Bourret, 1939 and *Pyxidea mouhotii* (Gray, 1862) in southern North Vietnam (Reptilia: Testudines: Geoemydidae). *Faunistische Abhandlungen, Staatliches Museum für Tierkunde, Dresden* 23:59-74.

Fritz, U., Fattizzo, T., Guicking, D., Tripepi, S., Pennisi, M. G., Lenk, P., Joger, U. and Wink, M. 2005a. A new cryptic species of pond turtle from southern Italy, the hottest spot in the range of the genus *Emys* (Reptilia, Testudines, Emydidae). *Zoologica Scripta* 34(4):351-371.

Fritz, U., Cadi, A., Cheylan, M., Coïc, C., Détaint, M., Olivier, A., Rosecchi, E., Guicking, D., Lenk, P., Joger, U. and Wink, M. 2005b. Distribution of mtDNA haplotypes (cyt b) of *Emys orbicularis* in France and implications for postglacial recolonization. *Amphibia-Reptilia* 26(2):231-238.

Fritz, U., D'Angelo, S., Pennisi, M. G. and Valvo, M. L. 2006. Variation of Sicilian pond turtles, *Emys trinacris.* What makes a species cryptic? *Amphibia-Reptilia* 27(4):513-529.

Fritz, U., Guicking, D., Kami, H. G., Arakelyan, M., Auer, M., Ayaz, D., Fernández, C. A., Bakiev, A. G., Celani, A., Dzukic, G., Fahd, S., Havas, P., Joger, U., Khabibullin, V., Mazanaeva, L. and Si, P. 2007. Mitochondrial phylogeography of European pond turtles *Emys orbicularis, Emys trinacris* - an update. *Amphibia-Reptilia* 28(3):418-426.

Fritz, U.,Guicking, D., Auer, M., Sommer, R. S., Wink, M. and Hundsdörfer, A. K. 2008. Diversity of the Southeast Asian leaf turtle genus *Cyclemys*: how many leaves on its tree of life? *Zoologica Scripta* 37(4)367-390.

Fritz, U., Ayaz, D., Hundsdörfer, A. K., Kotenko, T., Guicking, D., Wink, M., Tok, C. V., Çiçek, K. and Buschbom, J. 2009. Mitochondrial diversity of European pond turtles (*Emys orbicularis*) in Anatolia and the Ponto-Caspian Region: Multiple old refuges, hotspot of extant diversification and critically endangered endemics. *Organisms Diversity and Evolution* 9(2):100-114.

Fritz, U., Gong, S., Auer, M., Kuchling, G., Schneeweiss, N. and Hundsdörfer, A. K. 2010. The world's economically most important chelonians represent a diverse species complex (Testudines: Trionychidae: *Pelodiscus*). *Organisms, Diversity and Evolution* 10:227-242.

Fritz, U., Gemel, R., Kehlmaier, C., Vamberger, M. and Praschag, P. 2014. Phylogeography of the Asian softshell turtle *Amyda cartilaginea* (Boddaert, 1770): evidence for a species complex. *Vertebrate Zoology* 64:229-243.

Fritz, U., Mazuch, T., Petzold, A. and Prokop, H. 2015a. Coloration and pattern of hatchlings of six *Pelomedusa* species. *Salamandra* 51(3):277-282.

Fritz, U., Kehlmaier, C., Mazuch, T., Hofmeyr, M. D., Du Preez, L., Vamberger, M. and Vörös, J. 2015b. Important new records of *Pelomedusa* species for South Africa and Ethiopia. *Vertebrate Zoology, Senckenberg Gesellschaft für Naturforschung*: 65(3):383-389.

Froom, B. 1976. *The turtles of Canada.* McClelland and Stewart, Toronto, Canada:120 pp.

Gad, J. 1987. Die Zucht von Sternotherus odoratus (Latrreille, 1801) und die dabei auftretenden Schildanomalien (Testudines: Kinostemidae). *Salamandra* 23(1):1-9.

Gad, J. 1989. Drehversuche an Schildkröteneiern im Hinblick auf Schildanomalien, hier bei *Sternotherus odoratus* (Latreille, 1801). *Salamandra* 25(2):109-111.

Gad, J. 1993. Untersuchungen zur Deckungswahl (Sichtschutz) der Schildkröten *Kinosternum subrubrum* und *Sternotherus odoratus. Salamandra* 29(1):1-5.

Gaffney, E. S. 1977. The side-necked turtle family Chelidae: a theory of relationships using shared derived characters. *American Museum Novitates* (2620):1-28.

Gaffney, E. S. 1979. Comparative cranial morphology of Recent and fossil turtles. *Bull. Amer. Mus. Nat. Hist.* 164(2):67-376.

Galgon, F. and Fritz, U. 2002. Captive bred hybrids between *Chinemys reevesii* (Gray, 1831) and *Cuora amboinensis kamaroma* Rummler and Fritz, 1991. *Herpetozoa* 15(3/4):137-148.

Garbin, R. C., Karlguth, D. T., Fernandes, D. S. and Pinto, R. R. 2016. Morphological variation in the Brazilian Radiated Swamp Turtle *Acanthochelys radiolata* (Mikan, 1820) (Testudines: Chelidae). *Zootaxa* (PRINO) 4105(1):45-64 (online).

Garcia-Passos, G. O., Soeiro, M. S. and Lira-da-Silva, R. M. 2018. Use of tomahawk traps in freshwater Testudines capture. *Herpetology Notes* 11:285-289.

Garman, H. 1890. The Differences Between the Geographic Turtles (*Malacoclemmys geographicus* and *M. lesueuri*). *Bull. Essex Institute* 22:70-83.

Garman, S. 1891. On a tortoise found in Florida and

Hoser 2021 - Australasian Journal of Herpetology 52-53:1-128.

Cuba, *Cinosternum baurii. Bulletin of the Essex Institute* 23:141-144.

Gasperetti, J., Stimson, A. F., Miller, J. D., Ross, J. P. and Gasperetti, P. R. 1993. Turtles of Arabia. *Fauna of Saudi Arabia,* 13:170-367.

Gaulke, M. 1995. On the distribution of Emydid turtles and the Anuran genus *Microhyla* in the Philippines. *Asiatic Herpetological Research* 6:49-52.

Gaulke, M. 2001. Die Herpetofauna von Sibaliw (Panay), einem der letzten Tieflandregenwaldgebiete der West-Visayas, Philippinen. Teil I: Amphibien und Anmerkungen zu einer Schildkrötenart. *Herpetofauna* (Münster) 23(130):5-14.

Gaulke, M. 2011. *The herpetofauna of Panay Island, Philippines.* Edition Chimaira, 390 pp.

Gaulke, M. 2017. Sibuyan - das Galapagos Asiens. *Reptilia* (Münster) 22(126):68-78.

Gaulke, M. and Fritz, U. 1998. Distribution patterns of batagurid turtles in the Philippines (Testudines: Bataguridae: *Cuora*, *Cyclemys*, *Heosemys*). *Herpetozoa* 11(1/2):3-12.

Geissler, P., Hartmann, T., Ihlow, F., Neang, T., Seng, R., Wagner, P. and Böhme, W. 2019. Herpetofauna of the Phnom Kulen National Park, northern Cambodia: An annotated checklist. *Cambodian Journal of Natural History* 2019(1)40-63.

Gemel, R. and Haring, E. 2011. On two shells of trionychid turtles in the collection of the "Zoologische Staatssammlung München" with remarks about morphological differences between *Chitra* GRAY, 1844 and *Pelochelys* GRAY, 1864. *Herpetozoa* 23(3/4):67-77.

Gemel, R., Gassner, G. and Schweiger, S. 2019. Katalog der Typen der Herpetologischen Sammlung des Naturhistorischen Museums Wien - 2018. *Ann. Naturhist. Mus. Wien*, B 121:33-248.

Gmelin, J. F. 1789. *Caroli a Linné Systema naturae.* 13. ed., Tom 1 Pars 3. G. E. Beer, Lipsiae. 1033-1516 pp.

Geoffroy Saint-Hilaire, E. 1809a. Mémoire sur les tortues molles. *Nouveau Bulletin des Sciences, par la Société Philomatique de Paris* 1(22):363-367.

Geoffroy Saint-Hilaire, E. 1809b. Mémoire sur les tortues molles, nouveau genre sous le nom de *Trionyx*, et sur la formation des carapaces. *Annales du Muséum d'Histoire Naturelle de Paris* 14:1-20.

Georges, A. and Adams, M. 1996. Electrophoretic delineation of species boundaries within the short-necked freshwater turtles of Australia (Testudines: Chelidae*). Zoological Journal of the Linnean Society*: 118:241-260.

Georges, A. and Adams, M. 1996. Electrophoretic delineation of species boundaries within the short-necked freshwater turtles of Australia (Testudines: Chelidae*). Zoological Journal of the Linnean Society*: 118:241-260.

Georges, A. and Thomson, S. 2006. Evolution and Zoogeography of Australian FreshwaterTurtles. pp. 291-308 in Merrick *et al.* (eds.) *Evolution and Biogeography of Australasian Vertebrates*. Auscipub Pty Ltd, Oatlands, NSW, Australia.

Georges, A. and Thomson, S. 2010. Diversity of Australasian freshwater turtles, with an annotated synonymy and keys to species. *Zootaxa* (PRINO):2496:1-37 (Online).

Georges, A., Birrell, J., Saint, K. M., McCord, W. and Donnellan, S. C. 1998. A phylogeny for side-necked turtles (Chelonia: Pleurodira) based on mitochondrial and nuclear gene sequence variation. *Biological Journal of the Linnean Society* 67:213-246 (1999).

Germano, D. J. 2000. Occurrence of a colonial protozoan on the Western Pond Turtle, *Clemmys marmorata. Herpetological Natural History* 7(1):67-71.

Germano, D. J. 2015. The Ecology of a Robust Population of *Actinemys marmorata* in the San Joaquin Desert of California. *Copeia* 2016(104)3:663-676.

Germano, D. J. and Bury, R. B. 1998. Age determination in turtles: evidence of annual deposition of scute rings. *Chelonian Conservation Biology* 3:123-132.

Germano, D. J. and Bury, R. B. 2001. Western pond turtles (*Clemmys marmorata*) in the Central Valley of California: status and population structure. *Transactions of the Western Section of The Wildlife Society* 37:22-36.

Germano, D. J. and Bury, R. B. 2009. Variation in Body Size, Growth, and Population Structure of *Actinemys marmorata* from Lentic and Lotic Habitats in Southern Oregon. *Journal of Herpetology* 43(3):510-520.

Germano, D. J. and Rathbun, G. B. 2008. Growth, Population Structure and Reproduction of Western Pond Turtles (*Actinemys marmorata*) on the Central Coast of California. *Chelonian Conservation and Biology* 7(2):188-194.

Germano, D. J. and Riedle, J. R. 2015. Population Structure, Growth, Survivorship, and Reproduction of *Actinemys marmorata* from a High Elevation Site in the Tehachapi Mountains, California. *Herpetologica* 71(2):102-109.

Gibbons, J. W., Novak, S. S. and Ernst, C. H. 1988. *Chelydra serpentina. Catalogue of American Amphibians and Reptiles* 420:1-4.

Giebel, C. 1866. Die Schildkro¨ten der Insel Banka. *Zeitschrift für die Gesammten Naturwissenschaften*, Berlin 27:11-21.

Giraudo, A. R. 1996. Geographic Distribution. *Acanthochelys pallidipectoris. Herpetological Review* 27(4):210.

Goetz, M. 2007. Husbandry and breeding of the Spiny Turtle *Heosemys spinosa* (Gray, 1931) at the Durrell Wildlife Conservation Trust. *Radiata* 16(2):2-15.

Gojo-Cruz, P. H. P. and Afuang, L. E. 2018. The Zoogeographic Significance of Caraballo Mountain Range, Luzon Island, Philippines With Focus on the Biogeography of Luzon's Herpetofauna. *Philippine Journal of Science* 147(3):393-409.

Gong, S., Vamberger, M., Auer, M., Praschag, P. and Fritz, U. 2018. Millennium-old farm breeding of Chinese softshell turtles (*Pelodiscus spp.*) results in massive erosion of biodiversity. *The Science of Nature* 105:34.

Goode, J. 1967. *Freshwater tortoises of Australia and New Guinea*. Lansdowne Press, Melbourne,

Australia:154 pp.

Goode, J. M. and Ewert, M. A. 2006. Reproductive trends in captive *Heosemys grandis* (Geoemydidae). *Chelonian Conservation Biology* 5(1):165-169.

Gorseman, P. 1980. Opmerkingen over biotoop en voortplanting van *Homopus areolatus. Lacerta* 38(10-11):107-111.

Gramentz, D. 1998. Zur Morphologie und Merkmalsvariation von *Cycloderma aubryi* (Duméril, 1856). *Salamandra* 34(4):333-348.

Gramentz, D. 1999. Zur Ökologie von *Cycloderma aubryi* (DUMÉRIL, 1856) in Gabun. *Salamandra* 35(3):147-164.

Gramentz, D. 2001a. Zum Wachstum und Verhalten von *Cycloderma aubryi* (DUMÉRIL, 1856). *Sauria* 23(1):17-22.

Gramentz, D. 2001b. Zur Ökologie und Ethologie von *Kinixys erosa* (Schweigger, 1812) in Gabun. *Sauria* 23(2):17-23.

Gramentz, D. 2008. African Flapshell Turtles, *Cyclanorbis* and *Cycloderma.* Edition Chimaira, Frankfurt am Main, Germany:191 pp.

Gray, J. E. 1825. A synopsis of the genera of reptiles and Amphibia, with a description of some new species. *Annals of Philosophy*, 10:193-217.

Gray, J. E. 1828. *Spicilegia Zoologica; or original figures and short systematic descriptions of new and unfigured animals*. Part I. Richard Taylor, London, UK:8 pp.

Gray, J. E. 1830. A Synopsis of the Species of the Class Reptilia. in: Griffith, E. and Pidgeon, E. (ed.). *The Animal Kingdom Arranged in Conformity with its Organization, by the Baron Cuvier, with Additional Descriptions of all the Species Hitherto Named, and of many not before Noticed*. Vol. 9. Reptilia. Supplement. London: Whittaker, Treacher, and Co. UK:110 pp. (Part 26, published Dec 1830).

Gray, J. E. 1831a. Synopsis Reptilium; or Short Descriptions of the Species of Reptiles. Part I.- Cataphracta. Tortoises, Crocodiles, and Enaliosaurians. Treuttel, Wurz and Co., London, UK:85 pp. (Published May 1831).

Gray, J. E. 1831b. A specimen of a tortoise regarded as the type of a new genus in the family Emydidae. *Proceedings of the Zoological Society of London* 1831(1):106-107. (Published May 1831).

Gray, J. E. 1834a. Characters of two new genera of reptiles (*Geoemyda* and *Gehyra*). *Proceedings of the Zoological Society of London* 1834(2):99-101.

Gray. J. E. 1834b. Illustrations of Indian Zoology, chiefly selected from the collection of Major - General Hardwicke. Vol. 2. London (1833-1834):263 pp. + 95 plates

Gray, J. E. 1841. Description of some new species of Reptiles, chiefly from the British Museum collection. *Zoological Miscellany* 2:57-59.

Gray, J. E. 1844. *Catalogue of Tortoises, Crocodilians, and Amphisbaenians in the Collection of the British Museum*. British Museum (Natural History), London. viii+80 p.

Gray, J. E. 1854. Description of a new genus and some new species of tortoises. *Proceedings of the Zoological Society of London* 1852 (1854):133-135.

Gray, J. E. 1855. Description of a new genus and some new species of tortoises. *Annals and Magazine of Natural History* (2)15:67-69.

Gray, J. E. 1856a. On some new species of freshwater tortoises from North America, Ceylon and Australia, in the collection of the British Museum. *Proceedings of the Zoological Society of London* 1855 (1856)(23):197-202.

Gray, J. E. 1856b. Catalogue of Shield Reptiles in the Collection of the British Museum. Part I. Testudinata (Tortoises). British Museum, London, UK:79 pp. (dated 1856, but published Mar 1857).

Gray, J. E. 1860a. Description of a new species of *Geoclemmys* from Ecuador. *Proceedings of the Zoological Society of London* 1860(28):231-232.

Gray, J. E. 1860b. Description of a soft tortoise (*Aspidochelys livingstonii*) from the Zambesi, sent to the British Museum by Dr. Livingstone. *Annals and Magazine of Natural History* (3)6:68-69.

Gray, J. E. 1860c. On some new species of mammalia and tortoises from Cambojia. *Annals and Magazine of Natural History* (3)6:217-218.

Gray, J. E. 1860d. On the African Trionyces with hidden feet (*Emyda*). *Annals and Magazine of Natural History* (3)6:440-441.

Gray, J. E. 1861a. Description of a soft tortoise from Camboja. *Proceedings of the Zoological Society of London* 1861:41-42.

Gray, J. E. 1861b. On a new species of water-tortoise (*Geoclemmys melanosterna*) from Darien. *Proceedings of the Zoological Society of London* 1861:204-205.

Gray, J. E. 1861c. On the genus *Manouria* and its affinities. *Annals and Magazine of Natural History* (3)7:215-217.

Gray, J. E. 1862. Notice of a new species of *Cyclemys* from the Lao Mountains, in Siam. *Annals and Magazine of Natural History* (3)10:157.

Gray, J. E. 1863a. Notes on American Emydidae, and Professor Agassiz's observations on my catalogue of them. *Annals and Magazine of Natural History* (3)12:176-183.

Gray, J. E. 1863b. Notice of a new species of *Pelomedusa* from Natal. *Annals and Magazine of Natural History*, 3(12):99-100.

Gray, J. E. 1863c. Observations on the box tortoises, with the descriptions of three new Asiatic species. *Proceedings of the Zoological Society of London* 1863:173-179.

Gray, J. E. 1864a. Revision of the species of Trionychidae found in Asia and Africa, with the descriptions of some new species. *Proceedings of the Zoological Society of London* 1864:76-98.

Gray,J. E. 1864b. Observations on the box tortoises, with the description of three new asiatic species. *Annals and Magazine of Natural History* (3)13:105-111.

Gray,J. E. 1864c. On the species of the genus *Sternothaerus*, with some observations on *Kinixys.*

*Annals and Magazine of Natural History* (3)13:165-170.

Gray, J. E. 1865a. Notice of a new genus and species of the family Trionychidae from Western Africa. *Annals and Magazine of Natural History* (3)16:204-206.

Gray, J. E. 1865b. On the development of the sternal callosities in *Cyclanosteus senegalensis* and on the synonyms of *Cyclanosteus* and its allied genera. *Proceedings of the Zoological Society of London* 1865:422-428.

Gray, J. E. 1866. Notes on some young specimens of tortoises (Testudo). *Proceedings of the Zoological Society of London* 1866:305-306.

Gray, J. E. 1867. Description of a new Australian tortoise (*Elseya latisternum*). *Annals and Magazine of Natural History* (3)20:43-45.

Gray, J. E. 1869. Notes on the families and genera of tortoises (Testudinata) and on the characters afforded by the study of their skulls. *Proceedings of the Zoological Society of London* 1869:165-225.

Gray, J. E. 1870. Supplement to the Catalogue of Shield Reptiles in the Collection of the British Museum. Part 1. Testudinata (Tortoises). Taylor and Francis, London, UK. 120 pp. + 40 figs.

Gray, J. E. 1871a. On *Testudo phayrei* and *Scapia Falconeri. Annals and Magazine of Natural History* (4)7:445-447.

Gray, J. E. 1871b. On *Euchelymys*, a new genus and two new species of Australian freshwater tortoises. *Annals and Magazine of Natural History* (4)8:117-118.

Gray,J. E. 1871c. Notes on Australian freshwater tortoises. *Annals and Magazine of Natural History* (4)8:291-292.

Gray, J. E. 1872a. On a four-bearded water-terrapin from North Australia. *Annals and Magazine of Natural History* (4)9:303.

Gray, J. E. 1872b. On *Emys nigra* from Upper California. *Annals and Magazine of Natural History* (4)10:54-55.

Gray, J. E. 1872c. On the genera *Manouria* and *Scapia. Annals and Magazine of Natural History* (4)10:218-219.

Gray,J. E. 1873a. On a new freshwater tortoise from Borneo (*Orlitia borneensis*). *Annals and Magazine of Natural History* (4)11:156-157.

Gray, J. E. 1873b. Observations on chelonians, with descriptions of new genera and species. *Annals and Magazine of Natural History* (4)11:289-308.

Gray, J. E. 1873c. Additional notes on the form of the bones in the sternum of very young tortoises, and their development. *Annals and Magazine of Natural History* (4)12:319-323.

Graziano, M. 2019. *Clemmys guttata* (Spotted Turtle) male combat. *Herpetological Review* 50(2):349-350.

Green, N. B. and Pauley, T. K. 1987. *Amphibians and reptiles in West Virginia*. Univ. of Pittsburgh Press, Pittsburgh:241 pp.

Grieg, J. C. and Burdett, P. D. 1976. Patterns in the distribution of Southern African terrestrial tortoises (Cryptodira: Testudinidae). *Zool. Afr.* 11:249-273.

Grismer, L. L., Neang, T., Chav, T. and Grismer, J. L. 2008. Checklist of the amphibians and reptiles of the Cardamom region of Southwestern Cambodia. *Cambodian Journal of Natural History* 2008(1):12-28.

Grismer, L. L., Onn, C. K., Grismer, J. L., Wood, P. L. Jr. and Norhayati, A. 2010. A Checklist of the herpetofauna of the Banjaran Binjaran Bintang, Peninsula Malaysia. *Russian Journal Herpetology* 17(2):147-160.

Groombridge, B., Moll, E. O. and Vijaya, J. 1983. Rediscovery of a rare Indian turtle. *Oryx* 17:30-34.

Grossmann, W. 1994. *Manouria impressa* (GÜNTHER, 1882). *Sauria* 16(4):1-2.

Grossmann, W. and Tillack, F. 2001. Bemerkungen zur Herpetofauna des Khao Lak, Phang Nga, thailändische Halbinsel. Teil III: Ergebnisse der Jahre 1999 und 2000. *Sauria* 23(3):21-34.

Grytchta, U. 1988. *Cuora amboinensis* (Daudin, 1802) - Die Amboina - Scharnierschildkröte - Ein Bericht über Haltung, Paarungsverhalten, Eiablage und gelungener Nachzucht. *Sauria* 10(4):27-29.

Guicking, D., Fritz, U., Wink, M. and Lehr, E. 2002. New data on the diversity of the Southeast Asian leaf turtle genus *Cyclemys* Bell, 1834. Molecular results (Reptilia: Testudines: Geoemydidae). *Faun. Abh. Mus. Tierk. Dresden* 23(4):75-86.

Gustafson, A. W. 2006. *Acanthochelys macrocephala* (Rhodin, Mittermeier and McMorris, 1984) au Paraguay. *Manouria* 33:24-25.

Günther, A. C. L. G. 1882. Description of a new species of tortoise (*Geoemyda impressa*) from Siam. *Proceedings of the Zoological Society of London* 1882:343-346.

Günther, A. 1884. Contribution to our knowledge of *Hydromedusa*, a genus of South-American freshwater turtles. *Annals and Magazine of Natural History* (5)14:421-425.

Günther, A. C. L. G. 1885. Reptilia and Batrachia. Biologia Centrali-Américana. Taylor and Francis, London, 326 pp. (published in parts from 1885-1902; reprint by the SSAR 1987).

Günther, A. C. L. G. 1896. Report on a collection of reptiles and fishes made by Miss M. H. Kingsley during her travels on the Ogowe river and in Old Calabar. *Annals and Magazine of Natural History* (6)17:261-267.

Haagner, G. V. and Morgan, D. R. 1991. Life History Note: *Cycloderma frenatum*: Reproduction. *J. Herp. Assoc. Africa* (39):26-27.

Hallowell, E. 1854. Description of new reptiles from California. *Proc. Acad. Nat. Sci. Philad.* 7(1854): 91-97.

Hallowell, E. 1856. A large collection of living specimens of *Sternothaerus odoratus. Proc. Acad. Nat. Sci. Philadelphia* 8:106-108.

Haman, K., Hallock, L., Schmidt, T., Holman, E. and Murphie, B. 2019. Shell disease in Northwestern Pond Turtles (*Actinemys marmorata*) in Washington State, USA. *Herpetological Review* 50(3):495-502.

Hamann, M., Schauble, C. S., Emerick, S. P., Limpus, D. J. and Limpus, C. J. 2008. Freshwater turtle populations in the Burnett River. *Memoirs of the Queensland Museum* 52(2):221-232.

Harper, F. 1940. Some works of Bartram, Daudin, Latreille, and Sonnini, and their bearing upon North American herpetological nomenclature. *American Midland Naturalist* 23(3):692-723.

Harrison, K. 1991. The taxonomy of East African Nile perch, *Lates spp*. (Perciformes, Centropomidae). *Journal of Fish Biology* 199138(2):175-86.

Hartmann, T., Ihlow, F., Edwards, S., Sovath, S., Handschuh, M. and Böhme, W. 2013. A Preliminary Annotated Checklist of the Amphibians and Reptiles of the Kulen Promtep Wildlife Sanctuary in Northern Cambodia. *Asian Herpetological Research* 4(1):36-55.

Hartweg, N. 1934. Description of a new kinosternid from Yucatan. *Occasional Papers of the Museum of Zoology, University of Michigan* 277:1-2.

Hartweg, N. 1938. *Kinosternon flavescens stejnegeri*, a new turtle from northern Mexico. *Occasional Papers of the Museum of Zoology, University of Michigan* 371:1-5.

Hartweg, N. 1939. A new American *Pseudemys*. *Occasional Papers of the Museum of Zoology, University of Michigan* 397:1-4.

Harvan, M. 2007. The genus *Kinixys*. *Radiata* 16(4):11-27.

Hawkeswood, T. J. 2021. Time to end taxonomic vandalism by Wolfgang Wuster *et al*.: The Snakeman, Raymond Hoser's publications are validly published and his names available according to the ICZN: Objective investigation finds Hoser's taxonomic works as scientific best practice and in every relevant case identifies valid entities. *Calodema*, 860:1-59.

Haynes, D. and McKown, R. R. 1974. A new species of map turtle (Genus *Graptemys*) from the Guadalupe River system in Texas. *Tulane Studies in Zoology and Botany* 18(4):143-152.

Haxton, T. and Berrill, M. 2001. Seasonal Activity of Spotted Turtles (*Clemmys guttata*) at the Northern Limit of Their Range. *Journal of Herpetology* 35(4):606-614.

Henderson, J. R. 1912. Preliminary note on a new tortoise from south India. *Records of the Indian Museum* 7:217-218.

Hennig, A. S. 2003. Keeping and breeding the Common Musk Turtle and the Razorback Musk Turtle. *Reptilia* (GB) (26):22-26.

Hennig, A. S. 2004. Haltung von Wasserschildkröten. *Natur und Tier Verlag* (Münster):125 pp.

Hennig, A. S. 2012. Aquaterrarien für Wasserschildkröten. *Terraria-Elaphe* 2012(1):14-19.

Hennig, A. S. 2015. Häufig gehaltene Wasserschildkrötenarten - eine Übersicht. *Reptilia* (Münster) 20 (116):18-25.

Herman, D. W. 1993. Reproduction and management of the southeast Asian spiny turtle (*Heosemys spinosa*) in captivity. *Herpetological Natural History* 1(1):97-100.

Herrmann, H. -W. and Branch, W. R. 2013. Fifty years of herpetological research in the Namib Desert and Namibia with an updated and annotated species checklist. *Journal of Arid Environments* 93:94-115.

Hewitt, J. 1927. Further descriptions of reptiles and batrachians from South Africa. *Records of the Albany Museum* 3:371-415.

Hewitt, J. 1931. Descriptions of some African tortoises. *Annals of the Natal Museum Pietermaritzburg* 6:461-506.

Hewitt, J. 1935. Some new forms of batrachians and reptiles from South Africa. *Rec. Albany Mus*. 4:283-357.

Hewitt, J. 1937. *S. Afr. J. Sci*. 33:791.

Hibbitts, T. D. and Hibbitts, T. L. 2016. *Texas Turtles and Crocodilians: A Field Guide*. University of Texas Press, Austin, Texas, USA:xvi + 276 pp.

Hmar, G. Z., Lalmuansanga, Lalbiakzuala, Lalremsanga, H. T. and Mawia, V. L. 2020. New geographical distribution of Asiatic Softshell Turtle from Mizoram, India. *Zoo's Print Journal* 35(5):107-110.

Hofmeyr, M. D. 2004. Egg Production in *Chersina angulata*: An Unusual Pattern in a Mediterranean Climate. *Journal of Herpetology* 38(2):172-179.

Hofmeyr, M. D. 2009. *Chersina angulata* (Schweigger 1812) - Angulate Tortoise, South African Bowsprit Tortoise. *Chelonian Research Monographs* (5):030.1-030.6 (online).

Hofmeyr, M. D. and Branch, W. R. 2018. The padloper's tortuous path (Chelonia: Testudinidae): Two genera, not one. *African Journal of Herpetology* 67(2):99-112.

Hofmeyr, M. D., Boycott, R. C. and Baard, E. H. W. 2014. Family Testudinidae. pp. 70-85 in: Bates, M. F., Branch, W. R., Bauer, A. M., Burger, M., Marais, J., Alexander, G. J., and De Villiers, M. (eds.). *Atlas and Red List of the Reptiles of South Africa, Lesotho and Swaziland*. South African Biodiversity Institute, Pretoria, RSA.

Hofmeyr, M. D., Vamberger, M., Branch , W., Schleicher, A. and Daniels, S. R. 2016. Tortoise (Reptilia, Testudinidae) radiations in Southern Africa from the Eocene to the present. *Zoologica Scripta* (online):12 pp.

Hoinsoude-Segniagbeto, G., Bour, R., Ohler, A., Dubois, A., Rödel, M., Trape, J. F., Fretey, J., Petrozzi, F. and Luiselli, L. 2014. Turtles and Tortoises of Togo: Historical Data, Distribution, Ecology, and Conservation. *Chelonian Conservation and Biology*, 13(2):152-165.

Holbrook, J. E. 1836. *North American Herpetology; or, a Description of the Reptiles Inhabiting the United States*. Ed. 1, Vol. 1. Philadelphia: J. Dobson:120 pp.

Holland, D. C. 1992. Level and pattern in morphological variation: a phylogeographic study of the western pond turtle (*Clemmys marmorata*). Ph.D. dissertation, University of Southwestern Louisiana, USA.

Holman, J. A. and Fritz, U. 2001. A new emydine species from the Middle Miocene (Barstovian) of Nebraska, USA with a new generic arrangement for the species of *Clemmys sensu* McDowell (1964). *Zoologische Abhandlungen* (Dresden) 51(2):331-353.

Hoogmoed, M. S. 1980. Herpetologische waarnemingen in Ghana (part 8). *Lacerta* 38(10-11):112-116.

Hoogmoed, M. S. and Gruber, U. 1983. Spix and Wagler type specimens of reptiles and amphibians in the Natural History Musea in Munich (Germany) and Leiden (The Netherlands). *Spixiana* Suppl. 9:319-415.

Hoser, R. T. 1989. *Australian Reptiles and Frogs*.

Pierson Publishing, Sydney:238 pp.

Hoser, R. T. 1991. *Endangered Animals of Australia*. Pierson Publishing, Sydney:240 pp.

Hoser, R. T. 1993. *Smuggled:The Underground Trade in Australia's Wildlife*, Apollo Books, Mosman, NSW:160 pp.

Hoser, R. T. 1996. *Smuggled-2: Wildlife Trafficking, Crime and Corruption in Australia*, Kotabi Publishing, Doncaster, Victoria:280 pp.

Hoser, R. T. 2007. Wells and Wellington - It's time to bury the hatchet. *Calodema* Supplementary Paper 1:1-9.

Hoser, R. T. 2009. Creationism and contrived science: A review of recent python systematics papers and the resolution of issues of taxonomy and nomenclature. *Australasian Journal of Herpetology* 2:1-34. (3 February).

Hoser, R. T. 2010. Sam the scam: Sam the Koala is an impostor! *Australasian Journal of Herpetology* 8:1-64.

Hoser, R. T. 2012a. Exposing a fraud! *Afronaja* Wallach, Wüster and Broadley 2009, is a junior synonym of *Spracklandus* Hoser 2009! *Australasian Journal of Herpetology* 9 (3 April 2012):1-64.

Hoser, R. T. 2012b. A review of the taxonomy of the living Crocodiles including the description of three new tribes, a new genus and two new species. *Australasian Journal of Herpetology* 14:9-16.

Hoser, R. T. 2012c. Robust taxonomy and nomenclature based on good science escapes harsh fact-based criticism, but remains unable to escape an attack of lies and deception. *Australasian Journal of Herpetology* 14:37-64.

Hoser, R. T. 2013a. A formal five-way division of the Gaboon Viper Species Complex: *Bitis* (*Macrocerastes*) *gabonica* (Duméril, Bibron and Duméril, 1854) and a two-way division of the Nose-horned Viper species complex *Bitis* (*Macrocerastes*) *nasicornis* (Shaw, 1802) (Serpentes:Viperidae:Bitisini). *Australasian Journal of Herpetology* 16:25-31.

Hoser, R. T. 2013b. An updated taxonomy of the living Alligator Snapping Turtles (*Macrochelys* Gray, 1856), with descriptions of a new tribe, new species and new subspecies. *Australasian Journal of Herpetology* 16:53-63.

Hoser, R. T. 2013c. The science of herpetology is built on evidence, ethics, quality publications and strict compliance with the rules of nomenclature. *Australasian Journal of Herpetology* 18:2-79.

Hoser, R. T. 2013d Case 3601. *Spracklandus* Hoser, 2009 (Reptilia, Serpentes, Elapidae): request for confirmation of the availability of the generic name and for the nomenclatural validation of the journal in which it was published. *Bulletin of Zoological Nomenclature* 70:234-237.

Hoser, R. T. 2014. A taxonomic revision of the Giant Long-necked Terrapin, *Chelodina expansa* Gray, 1857 species complex and related matters of taxonomy and nomenclature. *Australasian Journal of Herpetology* 24:3-11.

Hoser, R. T. 2015a. Dealing with the "truth haters" ... a summary! Introduction to Issues 25 and 26 of *Australasian Journal of Herpetology*. Including "A timeline of relevant key publishing and other events relevant to Wolfgang Wüster and his gang of thieves." and a "Synonyms list". *Australasian Journal of Herpetology* 25:3-13.

Hoser, R. T. 2015b. The Wüster gang and their proposed "Taxon Filter": How they are knowingly publishing false information, recklessly engaging in taxonomic vandalism and directly attacking the rules and stability of zoological nomenclature. *Australasian Journal of Herpetology* 25:14-38.

Hoser, R. T. 2015c. Best Practices in herpetology: Hinrich Kaiser's claims are unsubstantiated.

*Australasian Journal of Herpetology* 25:39-52.

Hoser, R. T. 2015d. Comments on *Spracklandus* Hoser, 2009 (Reptilia, Serpentes, ELAPIDAE): request for confirmation of the availability of the generic name and for the nomenclatural validation of the journal in which it was published (Case 3601; see *BZN* 70: 234-237; comments *BZN* 71:30-38, 133-135). *Australasian Journal of Herpetology* 25:53-64.

Hoser, R. T. 2015e. PRINO (Peer reviewed in name only) journals: When quality control in scientific publications fails. *Australasian Journal of Herpetology* 26:3-64.

Hoser, R. T. 2015f. Rhodin *et al.* 2015, Yet more lies, misrepresentations and falsehoods by a band of thieves intent on stealing credit for the scientific works of others. *Australasian Journal of Herpetology* 27:3-36.

Hoser, R. T. 2015g. Comment on *Spracklandus* Hoser, 2009 (Reptilia, Serpentes, Elapidae): request for confirmation of the availability of the generic name and for the nomenclatural validation of the journal in which it was published. *Bulletin of Zoological Nomenclature* 72:61-64.

Hoser, R. T. 2018. A new species of Freshwater Crocodile from the Bird's head region of New Guinea. *Australasian Journal of Herpetology* 37:11-13.

Hoser, R. T. 2020. 3 new tribes, 3 new subtribes, 5 new genera, 3 new subgenera, 39 new species and 11 new subspecies of mainly small ground-dwelling frogs from Australia. *Australasian Journal of Herpetology*, 50-51:1-128.

Howell, H. J. and Seigel, R. A. 2018. An Examination of the Accuracy of Using Plastral Scute Rings to Age Spotted Turtles (*Clemmys guttata*). *Chelonian Conservation and Biology* 17(1):104-108.

Howell, H. J. and Seigel, R. A. 2019. The Effects of Road Mortality on Small, Isolated Turtle Populations. *Journal of Herpetology* 53(1):39-46.

Howell, H. J., McKnight, D. G. and Seigel, R. A. 2016. A novel method of collecting Spotted Turtles (*Clemmys guttata*). *Herpetological Review* 47(2):202-205.

Howell, H. J., Legere, R. H., Holland, D. S. and Seigel, R. A. 2019. Long-Term Turtle Declines: Protected is a verb, not an outcome. *Copeia* 107(3):493-501.

Huebinger, R. M., Bickham, J. W., Rhodin, A. G. J. and Mittermeier, R. A. 2013. Mitochondrial DNA corroborates taxonomy of the South American Chelid Turtles of the

Genera *Platemys* and *Acanthochelys. Chelonian Conservation and Biology* 12(1):168-171.

Hughes, B. 1979. Occurrence of the freshwater trionychid turtles *Cyclanorbis elegans* and *C. senegalensis* in Ghana. *Bulletin de l'I.F.A.N.* 41:193-205.

Hughes, B. 1986. Longevity Records of African Captive Amphibians and Reptiles: Part 1: Introduction and Species List 1 - Amphibians and Chelonians. *Journal of the Herpetological Association of Africa* (32):1-5.

Humair, R. 2013a. Scutellation anomalies in a Yellow-footed Tortoise, *Chelonoidis denticulata. Radiata* 22(4):35.

Humair, R. 2013. Dimensions and weights of South American Yellow-footed Tortoises, *Chelonoidis denticulata* (Linnaeus, 1766), in nature and human care. *Radiata* 22(4):21-30.

Huckembeck, S. and Quintela, F. M. 2013. *Hydromedusa tectifera* (snake-necked turtle): Epizoic and ectoparasitic fauna. *Herpetological Bulletin* (123):26-30.

International Commission on Zoological Nomenclature (ICZN) 2021. Opinion 2468 (Case 3601) - *Spracklandus* Hoser, 2009 (Reptilia, Serpentes, Elapidae) and *Australasian Journal of Herpetology* issues 1-24: confirmation of availability declined; Appendix A (Code of Ethics): not adopted as a formal criterion for ruling on Cases. *Bulletin of Zoological Nomenclature* 78 (30 April 2021):42-45.

Iverson, J. B. 1977a. Geographic variation in the musk turtle, *Sternotherus minor. Copeia* 1977(3):502-517.

Iverson, J. B. 1977b. *Sternotherus minor. Catalogue of American Amphibians and Reptiles* (195):1-2.

Iverson, J. B. 1978. Reproductive cycle of female loggerhead musk turtles (*Sternotherus minor minor*) in Florida. *Herpetologica* 34(1):33-39.

Iverson, J. B. 1983. *Kinosternon creaseri* Hartweg. *Catalogue of American Amphibians and Reptiles* 312:1-2.

Iverson, J. B. 1986. *A Checklist with Distribution Maps of the Turtles of the World*. Paust Printing, Richmond, Indiana, USA:viii + 282 pp.

Iverson, J. B. 1988. Distribution and status of Crease's mud turtle, *Kinosternon creaseri. The Herpetological Journal* 1:285-291.

Iverson, J. B. 1998. Molecules, morphology, and mud turtle phylogenetics (Family Kinosternidae). *Chelonian Conservation Biology* 3(1):113-117.

Iverson, J. B. and Berry, J. F. 1979. The mud turtle genus *Kinosternon* in northeastern Mexico. *Herpetologica* 35(4):318-324.

Iverson, J. B. and McCord, W. P. 1997. A new species of *Cyclemys* (Testudines: Bataguridae). *Proc. Biol. Soc. Washington* 110(4):629-639.

Iverson, J. B. and McCord, W. P. 2006. Intraspecific variation in the Giant Asian Pond Turtle, *Heosemys grandis* (Gray, 1860). *Hamadryad* 30:124-130.

Iverson, J. B., Le, M. and Ingram, C. 2013. Molecular phylogenetics of the mud and musk turtle family Kinosternidae. *Molecular Phylogenetics and Evolution* 69(3):929-939.

Ives, I. E., Platt, S. G., Tasirin, J. S., Hunowu, I., Siwu, S. and Rainwater, T. R. 2008. Field Surveys, Natural History Observations, and Comments on the Exploitation and Conservation of *Indotestudo forstenii*, *Leucocephalon yuwonoi* and *Cuora amboinensis* in Sulawesi, Indonesia. *Chelonian Conservation and Biology* 7(2):240-248.

Ivie, M. A. 2014. Email to taxacom list server, 16 April.

Jackson, K. and Blackburn, D. C. 2007. The amphibians and reptiles of Nouabale-Ndoki National Park, Republic of Congo (Brazzaville). *Salamandra* 43(3):149-164.

Jaekel, O. 1911. Die fossilen Schildkrötenreste von Trinil. In: Selenka, M. L. and Blanckenhorn, M. (eds.). *Die Pithecanthropus-Schichten auf Java. Geologische und Paläontologische Ergebnisse der Trinil-Expedition* (1907 und 1908). Wilhelm Engelmann, Leipzig:75-81.

Jamniczky, H. A. and Russell, A. P. 2004. A geometric morphometric assessment of the 'batagurine process' of testudinoid turtles. *Amphibia-Reptilia* 25(4):369-379.

Janzen, F. J., Hoover, S. L. and Bradley Shaffer, H. 1997. Molecular phylogeography of the Western Pond Turtle (*Clemmys marmorata*): preliminary results. *Chelonian Conservation Biology* 2(4):623-626.

Jensen, J. B., Camp, C. D., Gibbons, W. and Elliott, M. J. 2008. *Amphibians and reptiles of Georgia.* University of Georgia Press:575 pp.

Joger, U., Fritz, U., Guicking, D., Kalyabina-Hauf, S., Nagy, Z. T. and Wink, M. 2007. Phylogeography of western Palaearctic reptiles - Spatial and temporal speciation patterns. *Zoologischer Anzeiger* 246:293-313.

Jose, J., Ramachandran, K. K. and Nair, P. V. 2007. Occurrence of the forest cane turtle *Geoemyda silvatica* (Reptilia, Testudines, Bataguridae) from a Myristica swamp of Kulathupuzha forest range, Southern Kerala. *SACON, ENVIS Newsletter* 3(1):3-4.

Joshua, Q. I., Hofmeyr, M. D. and Henen, B. T. 2010. Seasonal and Site Variation in Angulate Tortoise diet and activity. *Journal of Herpetology* 44(1):124-134.

Joyce, W. G. and Bourque, J. R. 2016. A review of the fossil record of turtles of the clade Pan-Kinosternoidea. *Bull. Peabody Mus. Nat. Hist.* 57:57-95.

Joyce, W. G., Parham, J. F., Lyson, T. R., Warnock, R. C. M. and Donoghue, P. C. J. 2013. A Divergence Dating Analysis of Turtles Using Fossil Calibrations: An Example of Best Practices. *Journal of Paleontology*, 87(4):612-634.

Jungnickel, J. 1987. Die Gattung *Chelydra* - Ein Überblick. *Sauria* 9(2):15-18.

Kabir, M., Ahsan, T. M. F., Das, B. K. and Khatoon, A. 2015. Range extension of the Asiatic softshell turtle, *Amyda cartilaginea* (Boddaert, 1770) in Bangladesh. *Hamadryad* 37(1-2):111-113.

Kacoliris, F. P., Berkunsky, I. and Williams, J. 2006. Herpetofauna of Impenetrable, Argentinean Great Chaco. *Phyllomedusa* 5(2):149-158.

Kaiser, H., Crother, B. L., Kelly, C. M. R., Luiselli, L., O'Shea, M., Ota, H., Passos, P., Schleip, W. D. and

Wüster, W. 2013. Best practices: In the 21st Century, Taxonomic Decisions in Herpetology are Acceptable Only When supported by a body of Evidence and Published via Peer-Review. *Herpetological Review* 44(1):8-23.

Kanagavel, A. and Raghavan, R. 2012. Local ecological knowledge of the threatened Cochin Forest Cane Turtle *Vijayachelys silvatica* and Travancore Tortoise *Indotestudo travancorica* from the Anamalai Hills of the Western Ghats, India. *Journal of Threatened Taxa* 4(13):3173-3182.

Kasper, K., Schweikhard, J., Lehmann, M., Ebert, C. L., Erbe, P., Wayakone, S., Nguyen, T. Q., Le, M. D. and Ziegler, T. 2020. The extent of the illegal trade with terrestrial vertebrates in markets and households in Khammouane Province, Lao PDR. *Nature Conservation* 41:25-45.

Ka¨stle, W., Rai, K. and Schleich, H. H. 2013. *Field Guide to Amphibians and Reptiles of Nepal*. ARCO-Nepal e.V.:625 pp.

Kehlmaier, C., Zhang, X., Georges, A., Campbell, P. D., Thomson, S. and Fritz, U. 2019. Mitogenomics of historical type specimens of Australasian turtles: clarification of taxonomic confusion and old mitochondrial introgression. *Scientific Reports*, 9(1):5841.

Khan, M. S. 2006. *Amphibians and reptiles of Pakistan*. Krieger, Malabar,USA:311 pp.

Khan, M. M. H. 2012. New records of wildlife from the Chittagong Hill tracts of Bangladesh. *J. Bombay Nat. Hist. Soc*. 109(3):229-232.

Kim, C. 2011. Population estimation and habitat selection of Oldham's leaf turtle *Cyclemys oldhamii* at the Kbal Spean river, Phnom Kulen National Park. Phnom Penh, Cambodia. MSc thesis, Royal

University of Phnom Penh, Cambodia.

Kindler, C., Branch, W. R., Hofmeyr, M. D., Maran, J., Siroky, P., Vences, M., Harvey, J., Hauswaldt, S., Schleicher, A., Stuckas, H. and Fritz, U. 2012. Molecular phylogeny of African hinge-back tortoises (*Kinixys*): implications for phylogeography and taxonomy (Testudines: Testudinidae). *J. Zool. Syst. Evol. Res*. 50(3):192-201.

Kindler, C., Moosig, M., Branch, W. R., Harvey, J., Kehlmaier, C., Nagy, Z. T., Prokop, H., Široký. P. and Fritz, U. 2015. Comparative phylogeographies of six species of hinged terrapins (*Pelusios spp*.) reveal discordant patterns and unexpected differentiation in the *P. castaneus*/*P. chapini* complex and *P. rhodesianus*. *Biological Journal of the Linnean Society* 117(2):305-321.

King, R. B., Oldham, M. J., Weller, W. F. and Wynn, D. 1997. Historic and current amphibian and reptile distributions in the Island Region of Western Lake Erie. *American Midland Naturalist* 138(1):153-173.

Kirkpatrick, D. 1993. Map turtles of the United States. *Reptile and Amphibian Magazine* (November/ December):7-17.

Kittleson, G. A., Allaback, M. L., Kittleson, K. and Steiner, C. 2020. *Actinemys marmorata* (Western Pond Turtle). Invasive Species Vector. *Herpetological Review* 51:573-574.

Koch, A. 2012. *Discovery, Diversity, and Distribution of the Amphibians and Reptiles of Sulawesi and its offshore islands*. Edition Chimaira, 374 pp.

Köhler, G. 2000. *Reptilien und Amphibien Mittelamerikas, Bd 1: Krokodile, Schildkröten, Echsen*. Herpeton Verlag, Offenbach:158 pp.

Köhler, G. 2008. *Reptiles of Central America*. 2nd Ed. Herpeton-Verlag:400 pp.

Kooijman, M. 2015. Constipation in a specimen of the Speckled Cape Tortoise, *Homopus signatus* (Gmelin, 1789). *Radiata* (English edition) 24(4):16-24.

Kowalski, T., Grossmann, W., Zilger, H. -J. and Zwanzig, B. -M. 2011. Herpetologische Beobachtungen im Sultanat Oman: Das Saiq - Plateau im Jebel al - Akhdar. *Sauria* 33(1):29-50.

Krolak, M. and Bidmon, H. 2016. Klärung von Gesundheitsproblemen im Internet: Hilfegesuch bei der Haltung einer Tropfenschilkröte *Clemmys guttata*. *Schildkröten im Fokus* 13(2):22-25.

Krolak, M. and Krolak, R. 2015. Schwarzgoldene Juwelen im Garten: Ganzjährige geschützte Freilandgruppenhaltung der Tropfenschildkröte, *Clemmys guttata*. *Schildkröten im Fokus* 12(1):3-18.

Kuchling, G. 1995. Turtles at a market in western Yunnan: Possible range extensions for some southern Asiatic chelonians in China and Myanmar. *Chelonian Conservation Biology* 1(3):223-226.

Kundu, S., Das, K. C. and Ghosh, S. K. 2013. Taxonomic rank of Indian tortoise: revisit with DNA barcoding perspective. *DNA Barcodes* 1:39-45.

Kundu, S., Kumar, V., Laskar, B. A., Chandra, K. and Tyagi, K. 2016. Mitochondrial DNA effectively detects non-native Testudines: Invisible wildlife trade in northeast India. *Gene Reports* 4:10-15.

Kunz, K. 2003. Schützen wir Hybriden? *Reptilia* (Münster) 8(42):8.

Kuperus, S. and Loehr, V. 2009. *Homopus femoralis* Boulenger, 1888 - Nesting. *African Herp News* (49):10-11.

Kwet, A. 2010. *Reptilien und Amphibien Europas*. Kosmos-Verlag, Stuttgart:252 pp.

Kwet, A. and Trapp, B. 2014a. Reptilien in Europa - eine aktuelle Übersicht. *Draco* 15(60):6-25.

Kwet, A. and Trapp, B. 2014b. Liste der Reptilien Europas. *Draco* 15(60):72-79.

Lacépède, B. G. E. 1788. *Histoire Naturelle des Quadrupe des Ovipares et des Serpens*. Vol.1. Imprimerie du Roi, Hôtel de Thou, Paris, xvii + 651 pp.

Lamb, T. and Lovich, J. E. 1990. Morphometric validation of the striped mud turtle (*Kinosternon baurii*) in the Carolinas and Virginia. *Copeia*. 1990:613-618.

Lambert, M. R., Nielsen, S. N., Wright, A. N., Thomson, R. C. and Bradley Shaffer, H. 2013. Habitat Features Determine the Basking Distribution of Introduced Red-Eared Sliders and Native Western Pond Turtles. *Chelonian Conservation and Biology* 12(1):192-199.

Lambert, M. R., McKenzie, J. M., Screen, R. M., Clause, A. G., Johnson, B. B., Mount, G. G., Bradley Shaffer, H. and Pauly, G. B. 2019. Experimental removal of introduced slider turtles offers new insight into competition with a native, threatened turtle. *PeerJ* 7:e7444 (online).

Lambertz, H. and Lambertz, K. 2002. Langjährige Zuchterfolge von *Clemmys guttata. Elaphe* 10(1):37-41.

Largen, M. and Spawls, S. 2010. *The Amphibians and Reptiles of Ethiopia and Eritrea*. Edition Chimaira, Frankfurt am Main, Germany:693 pp.

Latreille, P. A. 1802. Histoire Naturelle des Reptiles. In: Sonnini, C. S. and Latreille, P. A. *Histoire Naturelle des Reptiles, avec figures dessinées d'après nature. Tome Premier. Première Partie. Quadrupèdes et Bipèdes Ovipares*. Imprimerie de Crapelet, Paris, France:280 pp.

Lawson, D. P. 2006. Habitat use, home range and activity patterns of Hingeback Tortoises, *Kinixys erosa* and *K. homeana* in Southwestern Cameroon. *Chelonian Conservation Biology* 5(1):48-56.

Lechowicz, C. 2008. Tour d'horizon de l'histoire naturelle, la taxonomie, la préservation et les problémes actuels des tortues géographiques du genre *Graptemys* (Agassiz, 1857). *Chéloniens* 11:30-45.

Le, M., Raxworthy, C. J., McCord, W. P. and Mertz, L. 2006. A molecular phylogeny of tortoises (Testudines: Testudinidae) based on mitochondrial and nuclear genes. *Mol. Phylogenet Evol.* 40:517-531.

Le, M., Duong, H. T., Dinh, L. D., Nguyen, T. Q., Pritchard, P. C. H. and McCormack, T. 2014. A phylogeny of softshell turtles (Testudines: Trionychidae) with reference to the taxonomic status of the critically endangered, giant softshell turtle, *Rafetus swinhoei*. *Organisms Diversity and Evolution* 14(3):279-293.

Lee, J. C. 2000. *A field guide to the amphibians and reptiles of the Maya world*. Cornell University Press, Ithaca, USA:416 pp.

Lee, J. C. I., Tsai, L. C., Liao, S. P., Linacre, A. and Hsieh, H. M. 2009. Species identi?cation using the cytochrome b gene of commercial turtle shells. *Forensic Science International: Genetics* 3:67-73.

Legler, J. M. 1963. Tortoises (*Geochelone carbonaria*) in Panamá: distribution and variation. *American Midland Naturalist* 70:490-503.

Legler, J. M. and Vogt, R. C. 2013. *The Turtles of Mexico: Land and Freshwater Forms*. University of California Press:416 pp.

Lehmann, H. 1984. Ein Zwillirtgsschlupf bei *Sternotherus minor minor* (Agassiz, 1857) (Testudines : Kinosternidae). *Salamandra* 20(4):192-196.

Lehr, E. 2001. New records for amphibians and reptiles from Departamentos Pasco and Ucayali, Peru. *Herpetological Review* 32(2):130-132

Lehr, E. 2002. *Amphibien und Reptilien in Peru.* Natur und Tier-Verlag (Münster):208 pp.

Lehr, E. and Holloway, R. 2003. Turtle trade in Cambodia. *Reptilia* (UK) (30):64-71.

Leidy, R. A., Bogan, M. T., Neuhaus, L., Rosetti, L. and Carlson, S. M. 2016. Summer die-off of western pond turtle (*Actinemys marmorata*) along an intermittent coast range stream in central California. *Southwestern Naturalist* 61(1):71-74.

Lemos-Espinal, J. A. and Dixon, J. R. 2013. *Amphibians and Reptiles of San Luis Potosí.* Eagle Mountain Publishing, xii + 300 pp.

Lemos-Espinal, J. A. and Smith, G. R. 2015. Amphibians and reptiles of the state of Hidalgo, Mexico. *Check List* 11(3):1642.

Lemos-Espinal, J. A., Smith, G. R. and Woolrich-Piña, G. A. 2018. Amphibians and reptiles of the state of San Luis Potosí, Mexico, with comparisons with adjoining states. *ZooKeys* 753:83-106.

Lenglet, G. L. and Colyn, M. M. 1989. Note on the maximum length of *Kinixys erosa* (Schweigger, 1812) (Chelonia, Testudinidae). *Bull. Inst. r. Sci. nat. Belg., Biol.* 59:159-162.

Lenk, P., Fritz, U., Joger, U. and Wink, M. 1999. Mitochondrial phylogeography of the European pond turtle, *Emys orbicularis* (Linnaeus 1758). *Molecular Ecology*, 8:1911-1922.

Lenz, N. 2012. *Von Schmetterlingen und Donnerdrachen - Natur und Kultur in Bhutan*. Karlsruher Naturhefte 4, Naturkundemuseum Karlsruhe:124 pp.

Lesueur, C. A. 1817. An account of an American species of tortoise, not noticed in the systems. *Journal of the Academy of Natural Sciences*, (Philadelphia) 1:86-88.

Li, H., Liu, J., Xiong, L., Zhang, H., Zhou, H., Yin, H., Jing, W., Li, J., Shi, Q., Wang, Y., Liu, J. and Nie, L. 2017. Phylogenetic relationships and divergence dates of softshell turtles (Testudines: Trionychidae) inferred from complete mitochondrial genomes. *J. Evol. Biol.* 30(5):1011-1023 (online).

Lindeman, P. V. 2003. Diagnostic characteristics in lower Tennessee River populations of the map turtles *Graptemys pseudogeographica* and *Graptemys ouachitensis. Chelonian Conservation Biology* 4(3):564-568.

Lindeman, P. V. 2009. On the type locality and type specimen of *Testudo geographica* Lesueur, 1817.

*Chelonian Conservation and Biology* 8(1):95-98.

Lindeman, P. V. 2019. *Graptemys geographica* (Northern Map Turtle) Coloration. *Herpetological Review* 50(1):124.

Lindeman, P. V., Louque, I., Huntzinger, C. C., Lyons, E., Shively, S. and Selman, W. 2015. Eye color and chin pattern in the turtle *Graptemys pseudogeographica* in the Calcasieu River Drainage of Louisiana, with comparison to adjacent drainages. *Herpetological Review* 46(2):179-185.

Lindholm, W. A. 1929. Revidiertes Verzeichnis der Gattungen der rezenten Schildkröten nebst Notizen zur Nomenklatur einiger Arten. *Zoologischer Anzeiger* 81:275-295.

Linnaeus, C. (Linné, C. von). 1758. *Systema Naturae, per Regna Tria Naturae, secundum Classes, Ordines, Genera, Species, cum Characteribus, Differentiis, Synonymis, Locis. Tomus I. Editio Decima, Reformata.*

(10th Ed.). Holmia (Stockholm): Laurentii Salvii:824 pp.

Linnaeus, C. (Linné, C. von). 1766. *Systema Naturae. Editio Duodecima, Reformata. Tomus I, Pars I, Regnum Animale*. (12th Ed.). Holmia (Stockholm): Laurentii Salvii, 532 pp.

Litzgus, J. D. 2006. Sex Differences in Longevity in the Spotted Turtle (*Clemmys guttata*). *Copeia* 2006(2):281-288.

Litzgus, J. D. and Brooks, R. J. 1998. Reproduction in a Northern Population of *Clemmys guttata*. *Journal of Herpetology* 32(2):252-259.

Litzgus, J. D. and Brooks, R. J. 1998. Testing the validity of counts of plastral scute rings in spotted turtles, *Clemmys guttata*. *Copeia* 1998(1):222-225.

Litzgus, J. D. and Brooks, R. J. 2000. Habitat and Temperature Selection of *Clemmys guttata* in a Northern Population. *Journal of Herpetology* 34(2):178-185.

Litzgus, J. D. and Mousseau, T. A. 2003. Multiple Clutching in Southern Spotted Turtles, *Clemmys guttata*. *Journal of Herpetology* 37(1):17-23.

Litzgus, J. D. and Mousseau, T. A. 2004. Home range and seasonal activity of Southern Spotted Turtles (*Clemmys guttata*): Implications for management. *Copeia* 2004(4):804-817.

Litzgus, J. D. and Mousseau, T. A. 2006. Geographic variation in reproduction in a freshwater turtle (*Clemmys guttata*). *Herpetologica* 62(2):132-140.

Litzgus, J. D., Bolton, F. and Schulte-Hostedde, A. I. 2008. Reproductive output depends on body condition in spotted turtles, *Clemmys guttata*. *Copeia* 2008(1):86-92.

Loc-Barragán, J. A., Reyes-Velasco, J., Woolrich-Piña, G. A., Grünwald, C. I., Venegas de Anaya, M., Rangel-Mendoza, J. A. and López-Luna, M. A. 2020. A new species of mud turtle of genus *Kinosternon* (Testudines: Kinosternidae) from the Pacific Coastal Plain of northwestern Mexico. *Zootaxa* (PRINO) 4885(4):509-529 (online).

Loehr, V. J. T. 2006. Natural diet of the Namaqualand Speckled Padloper *Homopus signatus signatus*. *Chelonian Conservation Biology* 5(1):149-152.

Loehr, V.J .T. 2008. *Homopus s. signatus* (Gmelin, 1789). Natural oviposition and incubation. *African Herp News* (44):9.

Loehr, V. J. T. 2012a. *Homopus femoralis* Boulenger, 1888 Diet. *African Herp News* (57):9.

Loehr, V. J. T. 2012b. Road Mortality in the Greater Padloper, *Homopus femoralis* (Testudinidae). *Chelonian Conservation and Biology* Dec 2012, 11(2):226-229.

Loehr, V. J. T. 2013. *Homopus femoralis* (greater padloper) reproduction. *Herpetological Review* 44(2):304-305.

Loehr, V. J. T. 2013. Activity of the Greater Padloper, *Homopus femoralis* (Testudinidae), in Relation to Rainfall. *African Zoology* (Oct 2012), 47(2):294-300.

Loehr, V. J. T. 2015. Small Vernal Home Ranges in the Namaqualand Speckled Tortoise, *Homopus signatus*. *Journal of Herpetology* 49(3):447-451.

Loehr, V. J. T. 2016. Wide variation in carapacial scute patterns in a natural population of speckled tortoises, *Homopus signatus*. *African Journal of Herpetology* 65(1):47-54.

Loehr, V. J. T. 2019. *Homopus femoralis* (Greater Padloper) Reproduction and growth. *Herpetological Review* 50(3):517-518.

Loehr, V. J. T., Henen, B. T. and Hofmeyr, M. D. 2004. Reproduction of the smallest tortoise, the Namaqualand Speckled Padloper, *Homopus signatus signatus*. *Herpetologica* 60(4):444-454.

Loehr, V. J. T., Henen, B. T. and Hofmeyr, M. D. 2006. Shell characteristics and sexual dimorphism in the Namaqualand Speckled Padloper, *Homopus signatus signatus*. *African Journal of Herpetology* 55(1):1-11.

Loehr, V. J. T., Henen, B. T. and Hofmeyr, M. D. 2011. Reproductive Responses to Rainfall in the Namaqualand Speckled Tortoise. *Copeia* 2011(2):278-284.

Loehr, V. J. T., Stark, T., Weterings, M. and Kuipers, H. 2015. Overcoming low environmental temperatures in the primary feeding season: low-level activity and long basking in the tortoise *Homopus signatus*. *Amphibia-Reptilia* 36(3):207-214.

Loehr, V. J. T., Carlos, G. P. and Voogdt, D. N. 2019. Ultrastructure of Eggshells from Wild and Captive Speckled Dwarf Tortoises, *Chersobius signatus*. *Herpetologica* 75(1):63-68.

Loftin, H. 1965. On unusual distributional records from the Panama Canal Zone region. *Carib. J. Sci*. 5(1-2):83-86.

Loon, F. H. A. V. 2018. *Homopus signatus* - Gmelin, 1789. Two-egg clutching. *African Herp News* (67):25.

Lorenz, W. 1984. Die asiatischen Schildkroten der Familie Emydidae. 2. Die Gattung *Cyclemys* Bell, 1834 und *Notochelys* Gray, 1863. *Die Schildkrote* 6(1):4-20.

Lourenço, J. M., Claude, J., Galtier, N. and Chiari, Y. 2011. Dating cryptodiran nodes: Origin and diversification of the turtle superfamily Testudinoidea. *Molecular Phylogenetics and Evolution* 62(1):496-507 (online).

Loveridge, A. and Williams, E. E. 1957. Revision of the African tortoises and turtles of the sub-order Cryptodira. *Bull. Mus. Comp. Zool. Harv.* 115:342-352.

Lovich, J. E. 1988. Geographic Variation in the Seasonal Activity Cycle of Spotted Turtles, *Clemmys guttata*. *Journal of Herpetology* 22(4):482-485.

Lovich, J. E. and Jaworski, T. R. 1988. Annotated checklist of Amphibians and Reptiles reported from Cedar Bog, Ohio. *Ohio J. Sci.* 88(4):139-143.

Lovich, J. and Meyer, K. 2002. The western pond turtle (*Clemmys marmorata*) in the Mojave River, California, U. S. A.: highly adapted survivor or tenuous relict? *Journal of Zoology* 256:537-545.

Lovich, J. E., Ernst, C. H., Ernst, E. M. and Riley, J. L. 2014. A 21-Year Study of Seasonal and Interspecific Variation of Hatchling Emergence in a Nearctic Freshwater Turtle Community: To Overwinter or Not To Overwinter? *Herpetological Monographs*, 28:93-109.

Lovich, R. E., Mahrdt, C. R. and Downer, B. 2005. Geographic Distribution: *Actinemys marmorata* (Pacific

Pond Turtle). *Herpetological Review* 36(2):200-201.

Lovich, R. E., Akre, T. S., Blackburn, J., Robinson, T. and Mahrdt, C. 2007. *Actinemys marmorata* (Pacific pond turtle). Mexico: Baja California Norte. *Herpetological Review* 38:216-217.

Lubcke, G. M. and Wilson, D. S. 2006. *Actinemys marmorata* (Pacific Pond Turtle). Size. *Herpetological Review* 37(3):339.

Ludwig, M., Auer, M. and Fritz, U. 2007. Phalangeal formulae of geoemydid terrapins (*Batagur*, *Callagur*, *Hardella*, *Heosemys*, *Kachuga*, *Orlitia*, *Pangshura*, *Rhinoclemmys*) reflect distinct modes of life. *Amphibia-Reptilia* 28(4):574-576.

Luiselli, L. 2006. Espéces de *Cinixyx* sympatriques au sud du Nigeria. *Chéloniens* 3:40-41.

Lüling, K. -H. 1984. Die Schlangenhalsschildkröte *Hydromedusa tectifera* in ihrer Heimat. *Herpetofauna* (Münster) 6(33):28-31.

Ly, T., Hoang, H. D. and Stuart, B. L. 2013. Occurrence of the Endangered Keeled Box Turtle, *Cuora mouhotii*, in Southern Vietnam. *Chelonian Conservation and Biology* Jul 2013, 12(1):184-187.

Malkmus, R. 1982. Beitrag zur Verbreitung der Amphibien und Reptilien in Portugal. *Salamandra* 18(3-4):218-299.

Malkmus, R. 1995. *Die Amphibien und Reptilien Portugals, Madeiras und der Azoren*. Die Neue Brehm-Bücherei, Bd. 621. Westarp Wissenschaften (Magdeburg)/Spektrum Akademischer Verlag (Heidelberg).

Malkmus, R., Manthey, U., Vogel, G., Hoffmann, P. and Kosuch, J. 2002. *Amphibians and reptiles of Mount Kinabalu* (North Borneo). A. R. G. Ganther Verlag, Rugell:404 pp.

Maniel, I. J., De La Fuente, M. S., Sterli, J., Jannello, J. M. and Krause, M. O. 2018. New remains of the aquatic turtle *Hydromedusa casamayorensis* (Pleurodira, Chelidae) from the middle Eocene of Patagonia: Taxonomic validation and phylogenetic relationships. *Papers in Palaeontology*, 2018:1-30.

Manns, B. 1969. Notes on *Clemmys guttata* as a scavenger in a Parkville, Maryland pond. *Bulletin of the Maryland Herpetological Society* 5(2):57.

Manthey, U. and Grossmann, W. 1997. *Amphibien & Reptilien Südostasiens*. Natur und Tier Verlag (Münster):512 pp.

Marques, M. P., Cerìiaco, L. M. P., Blackburn, D. C. and Bauer, A. M. 2018. Diversity and Distribution of the Amphibians and Terrestrial Reptiles of Angola - Atlas of Historical and Bibliographic Records (1840-2017). *Proc. Cal. Acad. Sci.* (Ser. 4) 65:1-501 (Supplement II).

Martens, E. von 1876. *Die Preussische Expedition nach Ostasien. Zoologischer Teil*. Berlin: Decker Vol. 1:412 pp.

Martins, F. I. and Souza, F. L. 2008. Estimates of Growth of the Atlantic Rain Forest Freshwater Turtle *Hydromedusa maximiliani* (Chelidae). *Journal of Herpetology* 42(1):54-60.

Martins, F. I. and Souza, F. L. 2009. Demographic Parameters of the Neotropical Freshwater Turtle *Hydromedusa maximiliani* (Chelidae). *Herpetologica* 65(1):82-91.

Mashinini, P. L. and Mahlangu, L. M. 2014. An annotated catalogue of the types of chelonians (Reptilia: Testudines) in the Herpetology collection of the Ditsong National Museum of Natural History, South Africa. *Annals of the Ditsong National Museum of Natural History* 4 (online at https://journals.co.za/doi/10.10520/EJC149077).

Mata-Silva, V., Ramírez-Bautista, A., Paredes-Flores, M. and Espino-Ocampo, M. 2002. Geographic distribution. *Kinosternon herrerai. Herpetological Review* 33(2):147-148.

Mazuch, T. 2013. *Amphibians and Reptiles of Somaliland and Eastern Ethiopia*. Tomáš Mazuch Publishing:80 pp.

Mazuch, T., Trailin, V., Fritz, U. and Vamberger, M. 2016. Senegal Flapshell Turtle (*Cyclanorbis senegalensis*) in Ethiopia (Testudines: Trionychidae). *Amphibian and Reptile Conservation* 10(2) [Special Section]:1-5 (e125) (online).

McCord, W. P. and Philippen, H. 1998. A New Subspecies of Box Turtle, *Cuora amboinensis lineata*, from Northern Myanmar (Burma), with Remarks on the Distribution and Geographic Variation of the Species. *Reptile Hobbyist* (March issue):51-58.

McCord, W. P. and Pritchard, P. C. H. 2003. A review of the softshell turtles of the genus *Chitra*, with the description of new taxa from Myanmar and Indonesia (Java). *Hamadryad* 27(1):11-56 (2002).

McCord, W. P., Joseph-Ouni, M. and Cann, J. 2003. Chelonian Illustrations #7. Short-neck, Western Swamp, and Pig-Nose Turtles from Australia and New Guinea. *Reptilia* (UK) (27):64-68.

McCord, W. P., Joseph-Ouni, M. and Bour, R. 2004a. Chelonian Illustrations #15: Madagascan Big-Headed, African Helmeted, and West African Mud Turtles. *Reptilia* (UK) (35):63-67.

McCord, W. P., Joseph-Ouni, M. and Bour, R. 2004b. Chelonian Illustrations #17: Eastern and Southern African Mud Turtles. *Reptilia* (UK) (37):73-77.

McCranie, J. R. 2015. A checklist of the amphibians and reptiles of Honduras, with additions, comments on taxonomy, some recent taxonomic decisions, and areas of further studies needed. *Zootaxa* (PRINO) 3931(3):352-386 (online).

McCranie, J. R. 2018. The Lizards, Crocodiles, and Turtles of Honduras. Systematics, Distribution, and Conservation. *Bulletin of the Museum of Comparative Zoology*, *Special Publication Series* (2):1- 666.

McDowell, S. B. 1964. Partition of the Genus *Clemmys* and related problems in the taxonomy of the aquatic Testudinidae. *Proceedings of the Zoological Society of London* 143(2):239-279.

McLaughlin, C. J. and Tristan Stayton, C. 2016. Convergent Evolution Provides Evidence of Similar Radiations in Shell Shape in the Turtle Families Emydidae and Geoemydidae. *Herpetologica* 72(2):120-

129.
Medem, F. 1977. Contribucion al conocimiento sobre la taxonomia, distribucion geografica y ecologia de la tortuga “bache” (*Chelydra serpentina acutirostris*). *Caldasia* 12(56):41-98.

Meek, S. E. and Cory, C. B. 1910. Batrachians and reptiles from British East Africa. *Publications of the Field Museum of Natural history* 7(11):403-414.

Mehrtens, J. M. 1949. Copulation of *Clemmys guttata* and *Pseudemys troostii elegans. Herpetologica* 5(6):150.

Mell, R. 1938. Beiträge zur Fauna Sinica. VI. Aus der Biologie chinesischer Schildkröten. *Archiv für Naturgeschichte*, N. F., 7(3):390-475.

Merchán, M., Fidalgo, A. M. and Pérez, C. 1998. Biology, Distribution and conservation of the Redfoot tortoise, *Geochelone carbonaria. Reptilia* (UK) (2):30-38.

Merkle, D. A. 1975. A taxonomic analysis of the *Clemmys* complex (Reptilia: Testudines) utilizing starch gel electrophoresis. *Herpetologica* 31(2):162-166.

Mertens, R. 1930. Die Amphibien und Reptilien der Inseln Bali, Lombok, Sumbawa und Flores. *Senck. Naturf. Gesell., Frankfurt am Main, Abhandl*. 42(3):117-344.

Mertens, R. 1937. Bermerkungen über die Rassen von *Pelomedusa subrufa* (Lacépède). *Zool. Anz*. 117:139-142.

Mertens, R. 1954. Zur Kenntnis der Schildkrötenfauna Venezuelas. *Senckenbergiana Biologica* 35(1/2):3-7.

Mertens, R. 1967. Bemerkenswerte Süßwasserschildkröten aus Brasilien. *Senckenbergiana Biologica* 48(1):71-82.

Mertens, R. 1969. Bemerkungen über einige Halswender-Schildkröten. *Senckenbergiana biologica* 50:31-38.

Mertens, R. 1971. Die Stachelschildkröte (*Heosemys spinosa*) und ihre Verwandten. *Salamandra* 7(2):49-54.

Methner, K. 1989. Die Schildkröten des unteren Rio Magdalena (Kolumbien). *Sauria* 11(4):9-11.

Meylan, P. A. 1987. The phylogenetic relationships of soft-shelled turtles (family Trionychidae). *Bulletin of the American Museum of Natural History* 186:1-101.

Meylan, P. A., Weig, B. S. and Wood, R. C. 1990. Fossil soft-shelled turtles (family Trionychidae) of the Lake Turkana Basin, Africa. *Copeia* 1990:508-528.

Mikan, J. C. 1820. *Delectus Florae et Faunae Brasiliensis. Fasciculus Primus*. Vindobonae:6 pp. + 6 pls.

Mikan, J. C. 1825. *Delectus florae et faunae Brasiliensis : jussu et auspiciis Francisci I, Austriae imperatoris investigatae*. Fasciculus Quartus. Antonii Strauss. Wien.

Milam, J. C. and Melvin, S. M. 2001. Density, Habitat Use, Movements, and Conservation of Spotted Turtles (*Clemmys guttata*) in Massachusetts. *Journal of Herpetology* 35(3):418-427.

Mitchell, J. C. 1994. *The reptiles of Virginia*. Virginia Department of Game and Inland Fisheries:350 pp.

Mitchell, J. C. and Reay, K. K. 1999. *Atlas of amphibians and reptiles in Virginia*. Specialty Publication 1, VA Dept of Game and Fisheries:122 pp.

Mo, M. 2020. Only in captivity? An interaction between two threatened chelonians, an Asian Giant Tortoise (*Manouria emys*) and a Malaysian Giant Turtle (*Orlitia borneensis*). *IRCF Reptiles and Amphibians* 27(1):89-90.

Molengraaff, G. A. F. and Weber, M. 1921. On the relation between the Pleistocene glacial period and the origin of the Sunda Sea (Java- and South China-Sea), and its influence on the distribution of coral reefs and on the land and freshwater fauna. *Proceedings of the Section of Sciences*, 23:395-439 (English translation).

Moler, P. 2014a. Post on Facebook, 10 January.

Moler, P. 2014b. Email to Raymond Hoser and others, 11 April.

Moll, D. and Dodd, F. J. Jr. 1985. New records for *Chelydra serpentine rossignoni* in Belize. *Bulletin of the Maryland Herpetological Society* 21:34-37.

Moll, E. O. 1989. *Manouria emys*: Asian brown tortoise. in: Swingland, I. R. and Klemens, M. W. (eds) *The conservation biology of tortoises*. Occasional Papers of the IUCN Species Survival Commission (SSC) No. 5. Broadview (IL): Kelvyn Press, Inc; pp. 119-120.

Moll, E. O. and Williams, K. L. 1963. The musk turtle *Sternothaerus odoratus* from Mexico. *Copeia* 1963(1):157.

Moll, E. O., Groombridge, B. and Vijaya, J. 1986. Redescription of the cane turtle with notes on its natural history and classification. *Journal of the Bombay Natural History Society* 83:112-126.

Morato, S. A. A., Beìrnils, R. S. and de Moura-Leite, J. C. 2017. *Repteis de Curitoba: Coletanea de registros Hori Consultoria*. Curitiba, Paranaì, Brasil:99 pp.

Mosimann, J. E. and Rabb, G. B. 1953. A new subspecies of the turtle *Geoemyda rubida* (Cope) from western Mexico. *Occasional Papers of the Museum of Zoology, University of Michigan* 548:1-7.

Moski, H. C. 1957. Algal occurrence on the turtle *Clemmys guttata. Copeia* 1957(1):50-51.

Murthy, T. S. N. 2010. *The reptile fauna of India.* B. R. Publishing, New Delhi, India:332 pp.

Nagy, Z. T., Kielgast, J., Moosig, M., Vamberger, M. and Fritz, U. 2015. Another candidate species of *Pelomedusa* (Testudines: Pelomedusidae) from the Democratic Republic of the Congo? *Salamandra* 51:212-214.

Nath, A., Singha, H. and Deb, P. 2018. First report on the presence of *Amyda cartilaginea* (Boddaert, 1770) from Assam, India. *Hamadryad* 38 (1 and 2):39-43.

Netting, M. G. 1940. The spotted turtle, *Clemmys guttata* (Schneider) (an addition to the herpetofauna of West Virginia). *Proceedings, West Virginia Academy of Science* 14:146-147.

Nguyen, L. T., Lam, N. Q., Carney, J., Hoang, H. V., McCormack, T. E. M., Nguyen, T. T. and Nguyen, S. N. 2020. First record of Western Black-Bridged Leaf Turtle, *Cyclemys atripons* Iverson and McCord, 1997

(Testudines, Geoemydidae), in Vietnam. *Check List* 16(3):571-577.

Nguyen, S. V., Ho, C. T. and Nguyen, T. Q. 2009. *Herpetofauna of Vietnam*. Chimaira, Frankfurt:768 pp.

Nguyen, T. V., Brakels, P., Maury, N., Sudavanh, S., Pawangkhanant, P., Idiiatullina, S., Lorphengsy, S., Inkhavilay, K., Suwannapoom, C. and Poyarkov, N. A. 2020. New herpetofaunal observations from Laos based on photo records. *Amphibian and Reptile Conservation* 14(2):218-249.

Nieden, F. 1910. Die Reptilien (ausser der Schlangen) und Amphibien. in: *Die Fauna der deutschen Kolonien*. Reihe 1. Kamerun Heft 2. Berlin:75pp.

Niederberger, A. J. and Seidel, M. E. 1997. Geographic Distribution. *Clemmys guttata. Herpetological Review* 28(3):156.

Noleto, R. B., Kantek, D. L. Z., Swarca, A. C., Dias, A. L., Fenocchio, A. S. and Cestari, M. M. 2006. Karyotypic characterization of *Hydromedusa tectifera* (Testudines, Pleurodira) from the upper Iguac¸u River in the Brazilian state of Paranaì. *Genetics and Molecular Biology* 29(2):263-266.

Nowak-Kemp, M. B. 2009. 150 years of changing attitudes towards zoological collections in a university museum: the case of the Thomas Bell tortoise collection in the Oxford University Museum. *Archives of natural history* 36(2):299-315.

Novelli, I. A., Gomides, S. C., Brugiolo, S. S. S. and de Sousa, B. M. 2013. Alimentary habits of *Hydromedusa maximiliani* (Mikan, 1820) (Testudines, Chelidae) and its relation to prey availability in the environment. *Herpetology Notes* 6:503-511.

Nur-Amalina, M. I., Norshaqinah, A. M., Azarin, N., Shukor, M. N., Aisah, M. S., Amirrudin, A., Grismer, L. L. and Norhayati, I. 2017. Species composition of Amphibians and reptiles in Tembat Forest Reserve, Hulu Terengganu, Terengganu, Peninsular Malaysia. *Malays. Appl. Biol*. 46(4):119-129.

Nutaphand, W. 1979. *The Turtles of Thailand*. Siamfarm Zoological Garden, Bangkok:222 pp.

Nutaphand, W. 1990. (Softshelled turtles). *Thai Zoological Magazine* 5(56):93-104.

Obst, F.J. 2003. Sumpfschildkröten. *Draco* 4(13):4-18.

O'Dea, A., Lessios, H. A., Coates, A. G., Eytan, R. I., Restrepo-Moreno, S. A., Cione, A. L., Collins, L. S., de Queiroz, A., Farris, D. W., Norris, R. D., Stallard, R. F., Woodburne, M. O., Aguilera, O., Aubry, M. -P., Berggren, W. A., Budd, A. F., Cozzuol, M. A., Coppard, S. E., Duque-Caro, H., Finnegan, S., Gasparini, G. M., Grossman, E. L., Johnson, K. G., Keigwin, L. D., Knowlton, N., Leigh, E. G., Leonard-Pingel, J. S., Marko, S. B., Pyenson, N. D., Rachello-Dolmen, P. G., Soibelzon, E., Soibelzon, L., Todd, J. A., Vermeij, G. J. and Jackson, J. B. C. 2016. Formation of the

Isthmus of Panama. *Sci. Adv.* 2, e1600883 (2016) (online).

Oliveira, J. C. F., Gonzalez, R. C., Passos, P. Vrcibradic, D. and Rocha, C. F. D. 2020. Non-Avian Reptiles of the state of Rio de Janeiro, Brazil: status of knowledge and commented list. *Pap. Avulsos Zool*. 60: e20206024 (online).

Olson, S. L. and David, N. 2014. The gender of the tortoise genus *Chelonoidis* Fitzinger, 1835 (Testudines: Testudinidae). *Proceedings of the Biological Society of Washington* 126(4):393-394.

O'Malley, D. L. 2010. Geographic and Commercial Origins of the Red-Footed Tortoise. *Geochelone* (*Chelonoidis*) *carbonaria. Reptilia* (UK) (69):62-68.

Onn, C. K., Grismer, L. L., Sharma, D. S., Belabut, D. and Ahma, N. 2009. New herpetofaunal records for Perlis State Park and adjacent areas. *Malayan Nature Journal* 61(4):255-262.

Oudemans, J. T. 1895. Einige Bemerkungen über zwei südafrikanische Schildkröten. *Zool. Anz*. 18:321-324.

Ouellette, M. and Cardille, J. A. 2011. The Complex Linear Home Range Estimator: Representing the Home Range of River Turtles Moving in Multiple Channels. *Chelonian Conservation and Biology* 10(2):259-265.

Oxenrider, K. J., Heres, B. M. and Brown, D. J. 2018. *Clemmys guttata* (Spotted Turtle) Habitat use. *Herpetological Review* 49(3):525-526.

Oxenrider, K. J., Heres, B. M., Mota, J. L. and Brown, D. J. 2019. Influence of Bait Type on Capture Success of *Clemmys guttata* and *Chrysemys picta* Using Small Hoop Nets in Shallow Wetlands. *Herpetological Review* 50(3):490-492.

Pachmann, A. 2009. Endlich Urlaub. *Reptilia* (Münster) 14(79):10-12.

Palmer, W. M. and Braswell, A. L. 1995. *Reptiles of North Carolina.* Univ. North Carolina Press.

Palupcíková, K., Somerová, B., Protiva, T., Rehák, I., Velensky, P., Hulva, P., Gunalen, D. and Frynta, D. 2012. Genetic and shell-shape analyses of *Orlitia borneensis* (Testudines: Geoemydidae) reveal limited divergence among founders of the European zoo population. *Zootaxa* (PRINO) 3280:56-66 (online).

Paolillo, O. A. 1985. Description of a new subspecies of the turtle *Rhinoclemmys punctularia* (Daudin) (Testudines: Emydidae) from southern Venezuela. *Amphibia-Reptilia* 6(3):293-305.

Parham, J. F., Simison, W. B., Kozak, K. H., Feldman, C. R. and Shi, H. 2001. New Chinese turtles: endangered or invalid? A reassessment of two species using mitochondrial DNA, allozyme electrophoresis and known-locality specimens. *Animal Conservation* 4:357-367.

Parker, P. G. and Whiteman, H. H. 1993. Genetic diversity in fragmented populations of *Clemmys guttata* and *Chrysemys picta marginata* as shown by DNA fingerprinting. *Copeia* 1993(3):841-846.

Patch, C. L. 1925. *Graptemys geographica* in Canada. *Copeia* 149:95-96.

Pauler, I. 1980. Die Schildkrötengattung *Cuora. Herpetofauna* (Münster) 2(6):15-18.

Pauwels, O. S. G. and Vande Weghe, J. P. 2008. *Les reptiles du Gabon.* Smithsonian Institution, Washington:272 pp.

Pauwels, O. S. G., Laohawat, O. -A., David, P., Bour, R.,

Dangsee, P., Puangjit, C. and Chimsunchart, C. 2000. Herpetological investigations in Phang-Nga Province, southern Peninsular Thailand, with a list of reptile species and notes on their biology. *Dumerilia*, Paris 4(2):123-154.

Pauwels, O. S. G., David, P., Chimsunchart, C. and Thirakhupt, K. 2003. Reptiles of Phetchaburi Province, Western Thailand: A list of species, with natural history notes and a discussion on the biogeography at the Isthmus of Kra. *Natural History Journal of Chulalongkorn University* 3(1):23-53.

Pawar, S. S. and Choudrey, B. C. 2000. An inventory of Chelonians from Mizoram, north-east India: New records and some observations on threats. *Hamadryad* 25(2):144-158.

Pedall, I., Schäfer, H., Fritz, U. and Wink, M. 2009. Isolation of microsatellite markers in the *Emys orbicularis* complex and development of multiplex PCR amplification. *Conservation Genetics*, 10:725-727.

Pedall, I., Fritz, U., Stuckas, H., Valdéon, A. and Wink, M. 2011. Gene flow across secondary contact zones of the *Emys orbicularis* complex in the Western Mediterranean and evidence for extinction and re-introduction of pond turtles on Corsica and Sardinia (Testudines: Emydidae). *Journal of Zoological Systematics and Evolutionary Research*, 49:44-57.

Pereira, A. G., Sterli, J., Moreira, F. R. R. and Schrago, C. G. 2017. Multilocus phylogeny and statistical biogeography clarify the evolutionary history of major lineages of turtles. *Molecular Phylogenetics and Evolution*, 113:59-66.

Pereira, P., Teixeira, J. and Velo-Antón, G. 2018. Allele surfing shaped the genetic structure of the European pond turtle via colonization and population expansion across the Iberian Peninsula from Africa. *J. Biogeogr.* 45:2202-2215.

Perry, D. A. 2018. Herpetological Survey of Ware Creek Wildlife Management Area. *Catesbeiana* 38(2):93-103.

Peters, W. C. H. 1839. Zur Osteologie der *Hydromedusa maximiliani*. *Müller's Arch. f. Anat. u. Physiol*. 1839:280-289 + 1 plate.

Peters, W. C. H. 1854. Übersicht der auf seiner Reise nach Mossambique beobachteten Schildkröten. *Monatsberichte der Akademie der Wissenschaften zu Berlin* 1854:215-216.

Peters, W. C. H. 1862. Über einen neuen *Phyllodactylus* aus Guayaquil. *Monatsber. königl. Akad. Wiss*. Berlin. 1862 (November):626-627.

Peters, W. C. H. 1868. Über eine neue Nagergattung, *Chiropodomys penicullatus*, sowie über einige neue oder weniger bekannte Amphibien und Fische. *M. Ber. k. preuss. Akad. Wiss. Berlin*, 1868:448-461.

Peters, W. C. H. 1874. Über neue Amphibien (*Gymnopis*, *Siphonops*, *Polypedates*, *Rhacophorus*, *Hyla*, *Cyclodus*, *Euprepes*, *Clemmys*). *Monatsber. königl. Akad. Wiss.* Berlin. 1874 (October):616-624.

Petzold, A., Vargas-Ramirez, M., Kehlmaier, C., Vamberger, M., Branch, W. R., Du Preez, L., Hofmeyr, M. D., Meyer, L., Schleicher, A., Siroky, P. and Fritz, U. 2014. A revision of African helmeted terrapins (Testudines: Pelomedusidae: *Pelomedusa*), with descriptions of six new species. *Zootaxa* (PRINO) 3795(5):523-548 (online).

Phillips, C. A., Dimmick, W. W. and Carr, J. L. 1996. Conservation Genetics of the Common Snapping Turtle (*Chelydra serpentina*). *Conservation Biology* 10(2):397-405.

Phillips, J. G. 2016. Updated Geographic Distributions of Michigan Herpetofauna: a Synthesis of Old and New Sources. *The Journal of North American Herpetology* 2016:45-69.

Pinto, A. P., Mejdalani, G., Mounce, R., Silvieri, L. F., Marinoni, L. and Rafael, J. A. 2021. Are publications on zoological taxonomy under attack? *R. Soc. Open Sci.* 8:201617 (online).

Platt, K., Platt, S. G. and Rainwater, T. R. 2014. First Record of the Spiny Turtle (*Heosemys spinosa*) in Myanmar. *Chelonian Conservation and Biology* 13(2):257-260.

Platt, S. G., Ko, K. W., Myo, M. K., Shwe, M., Khaing, L. L., Holstrom, W. and Rainwater, T. R. 2002. Recent distribution records and a significant range extension for *Manouria impressa* in Myanmar. *Hamadryad* 26(2):362-364.

Platt, S. G., Lwin, T. and Rainwater, T. R. 2018. Behavioural observations of the Burmese flapshell turtle (*Lissemys scutata*) with comments on the functional significance of Rathke's glands. *Hamadryad* 38(1 and 2):20-24.

Platt, S. G., Haislip, N., Haislip, E. E., McCaskill, L. D. and Rainwater, T. R. 2019. *Lissemys scutata* (Burmese Flapshell Turtle) Nesting behavior. *Herpetological Review* 50(1):126-127.

Pluto, T. G. and Bellis, E. D. 1986. Habitat utilization by the Turtle, *Graptemys geographica*, along a river. *Journal of Herpetology* 20(1):22-31.

Pluto, T. G. and Bellis, E. D. 1988. Seasonal and Annual Movements of Riverine Map Turtles, *Graptemys geographica. Journal of Herpetology* 22(2):152-158.

Pope, C. H. 1935. *The Reptiles of China - Natural History of Central Asia 10.* American Museum of Natural History, New York, USA:iii + 604 pp.

Praedicow, G. 1985. Langjährige Erfahrungen bei der Pflege von *Cuora amboinensis* (Daudin). *Herpetofauna* (Münster) 7(36):6-14.

Praschag , P., Schmidt, C., Fritzsch, G., Muller, A., Gemel, R. and Fritz, U. 2006. *Geoemyda silvatica*, an enigmatic turtle of the Geoemydidae (Reptilia: Testudines), represents a distinct genus. *Organism Diversity and Evolution* 6:151-162.

Praschag, P., Stuckas, H., Päckert, M., Maran, J. and Fritz, U. 2011. Mitochondrial DNA sequences suggest a revised taxonomy of Asian flapshell turtles (*Lissemys* Smith, 1931) and the validity of previously unrecognized taxa (Testudines: Trionychidae). *Vertebrate Zoology* 61:147-160.

Praschag, P., Ihlow, F., Flecks, M., Vamberger, M. and Fritz, U. 2017. Diversity of North American map and sawback turtles (Testudines: Emydidae: *Graptemys*).

*Zool Scripta* 46(6):675-682.

Prigioni, C., Borteiro, C. and Kolenc, F. 2011. Amphibia and Reptilia, Quebrada de los Cuervos, Departamento de Treinta y Tres, Uruguay. *Check List* 7(6):763-767.

Pritchard, P. C. H. 1979. *Encyclopedia of turtles*. T. F. H. Publications, Neptune, NJ, USA:895 pp.

Pritchard, P. C. H. 2001. Observations on body size, sympatry, and niche divergence in softshell turtles (Trionychidae). *Chelonian Conservation and Biology* 4:5-27.

Pritchard, P. C. H. and Trebbau, P. 1984. *The Turtles of Venezuela*. SSAR Contributions to Herpetology 2:viii+402 pp.

Prokop, H. 2010. Haltung und Nachzucht der Breitbrust-Schnappschildkröte, *Myuchelys* (*sic*) *latisternum* (*Elseya latisternum*). *Reptilia* (Münster) 15(85):31-37.

Prokop, H. and Hojay, L. 2007. Perspektiven bei der Haltung und Nachzucht der Birma-Klappenweichschildkröte (*Lissemys scutata*). *Reptilia* (Münster) 12(68):34-43.

Protiva, T., Gunalen, D., Bauerovaì, A., Palupc?iìkovaì, K., Somerovaì, B., Fryìdlovaì, P., Janc?uìchovaì-Laìskovaì, J., S?imkovaì, O., Frynta, D. and Rehaìk, I. 2016. Shell shape and genetic variability of Southeast Asian Box Turtles (*Cuora amboinensis*) from Borneo and Sumatra. *Vertebrate Zoology* 66(3):387-396.

Purkayastha, J., Hassan, A. M., Islam, H., Das, J., Sarma, M., Basumatary, M., Sarma, N., Chatterjee, N., Singha, S., Nair, V., Purkayastha, A., Dutta, J. and Das, M. 2013. Turtles of the Temple Pond of Kamakhya, Assam, India. *Reptile Rap* (15):11-15.

Rahman, S. C., Rashid, S. M. A., Datta, R., Mro, P. and Roy, C. J. 2015. Status, Exploitation, and Conservation of Freshwater Turtles and Tortoises in Chittagong Hill Tracts, Bangladesh. *Chelonian Conservation and Biology* 14(2):130-135.

Rai, K. R. 2004. Ecological Distribution Of *Cyclemys oldhamii* (Gray 1863) From Nepal. *Our Nature* 2:7-12.

Rasmussen, M. L. and Litzgus, J. D. 2010. Habitat Selection and Movement Patterns of Spotted Turtles (*Clemmys guttata*): Effects of Spatial and Temporal Scales of Analyses. *Copeia* 2010(1):86-96.

Rau, J. 2010. Die Zwerg-Moschusschildkröte *Sternotherus minor. Natur und Tier Verlag* (Münster):64 pp.

Raw, L. R. G. 1978. Taxonomic notes on the hinged terrapins, genus *Pelusios*, of Natal (Testudinata, Pelomedusidae). *Durban Museum Novitates* 11(17):287-294.

Reynolds, R. P., Gotte, S. W. and Ernst, C. H. 2007. Catalog of Type Specimens of Recent Crocodilia and Testudines in the National Museum of Natural History, Smithsonian Institution. *Smithsonian Contributions to Zoology* 626:1-49.

Reynolds, S. L. and Seidel, M. E. 1982. *Sternotherus odoratus. Catalogue of American Amphibians and Reptiles* (287):1-4.

Reynolds, S. and Seidel, M. E. 1983. Morphological homogenity in the turtle *Sternotherus odoratus* (Kinosternidae) throughout its range. *Journal of Herpetology* 17(2):113-120.

Rhoads, S. I. N. 1895. Contributions ot the zoology of Tennessee. No. 1, Amphibians and Reptiles. *Proc. Acad. Nat. Sci. Philadelphia* 1895:376-407.

Rhodin, A. G. J., da Roche e Silva, R. and Mittermeier, R. A. 1984a. Distribution of the South American chelid turtles *Platemys radiolata* and *P. spixii. Copeia* 1984(3):780-786.

Rhodin, A. G. J., Mittermeier, R. A. and McMorris, J. R. 1984b. *Platemys macrocephala*, a new species of chelid turtle from central Bolivia and the pantanal region of Brazil. *Herpetologica* 40(1):38-46.

Rhodin, A. G. J., Mittermeier, R. A. and Ernst, C. H. 1990. *Acanthochelys macrocephala* (Rhodin, Mittermeier and McMorris) big-headed Pantanal swamp turtle. *Catalogue of American Amphibians and Reptiles* 481:1-2.

Rhodin, A. G. J., Kaiser, H., van Dijk, P. P., Wüster, W., O'Shea, M., Archer, M., Auliya, M., Boitani, L., Bour, R., Clausnitzer, V., Contreras-Macbeath, T., Crother, B. I., Daza, J. M., Driscoll, C. A., Flores-Villela, O., Frazier, J., Fritz, U., Gardner, A., Gascon, C., Georges, A., Glaw, F., Grazziotin, F. G., Groves, C. P., Haszprunar, G., Havaš, P., Hero, J. M., Hoffmann, M., Hoogmoed, M. S., Horne, B. D., Iverson, J. B., Jäch , M., Jenkins, C. L., Jenkins, R. K. B., Kiester, A. R., Keogh, J. S., Lacher, T. E. Jr., Lovich, J. E., Luiselli, L., Mahler, D. L., Mallon, D., Mast, R., Mcdiarmid, R. W., Measey, J., Mittermeier, R. A., Molur, S., Mossbrugger, V., Murphy, R., Naish , D., Niekisch , M., Ota, H., Parham, J. F., Parr, M. J., Pilcher, N. J., Pine, R. H., Rylands, A. B., Sanderson, J. G., Savage, J., Schleip, W., Scrocch i, G. J., Shaffer, H. B., Smith, E. N., Sprackland, R., Stuart, S. N., Vetter, H., Vitt, L. J., Waller, T., Webb , G., Wilson, E. O., Zaher, H. and Thomson, S. 2015. Comment on *Spracklandus* Hoser, 2009 (Reptilia, Serpentes, ELAPIDAE): request for confirmation of the availability of the generic name and for the nomenclatural validation of the journal in which it was published. *Bulletin of Zoological Nomenclature* 72(1):65-78.

(Note: Several listed authors (e.g. Wulf Schleip) later claimed they had not even read the paper that they had allegedly co-authored and stated that they had merely agreed with the general idea and had accepted the invitation by Wüster to list as co-authors, to give the application "more weight").

Rhodin, A. G. J., Iverson, J. B., Bour, R., Fritz, U., Georges, A., Bradley Shaffer, H. and van Dijk, P. P. (Calling themselves the "Turtle Taxonomy Working Group" or "TTWG". 2017. *Turtles of the World: Annotated Checklist and Atlas of Taxonomy, Synonymy, Distribution, and Conservation Status* (8th Ed.). 292 pp. ISBN: 978-1-5323-5026-9 (privately published) (online).

Ribas, E. R., Filho, M. and de Araujo, E. L. 2002. Distribution and Habitat of the Freshwater Turtles (Testudines, Chelidae) from State of Paraná - Brasil. *Biociências* (Porto Alegre) 10(2):15-32.

Richmond, N. D. 1958. The status of the Florida snapping turtle, *Chelydra osceola* Stejneger. *Copeia*

1958:41-43.

Ride, W. D. L. (*ed.*) *et al.* (on behalf of the International Commission on Zoological Nomenclature) 1999. *International code of Zoological Nomenclature*. The Natural History Museum - Cromwell Road, London SW7 5BD, UK (also commonly cited as “The Rules”, “Zoological Rules” or “ICZN 1999”).

Ritgen, F. A. 1828. Versuch einer natürlichen Eintheilung der Vögel. *Nova Acta physico-medica Academiae Caesareae Leopoldino-Carolinae Naturae Curiosorum*, 14:245-284.

Rocha, C. F., Bergallo, H. G., Pombal Jnr, J. P., Geise, L., Van Sluys, M., Fernandes, R. and Caramaschi, U. 2004. Fauna de anfibios, repteis e mamiferos do estado do Rio De Janeiro, Sudeste Do Brasil. *Publ. Avul. Mus. Nac.*, Rio de Janeiro (104):3-23.

Rochebrune, A. T. de. 1884. *Faune de la Sénégambie. Reptiles*. O. Dom, Paris, France::221 pp.

Rodriguez-Bayona, L. O. and Rylander, M. K. 1984. Notes on the Biology of the Tortoise *Geochelone denticulate* L. in Peru. *Amphibia-Reptilia* 5(3-4):323-327.

Roe, J. H. and Nacy, J. P. 2017. *Terrapene carolina carolina* (Eastern Box Turtle) and *Clemmys guttata* (Spotted Turtle) Interspecific interaction. *Herpetological Review* 48(1):181-182.

Rojas-Padilla, O., Menezes, V. Q., Dias, I. R., Argôlo, A. J. S., Solé, M. and Orrico, V. G. D. 2020. Amphibians and reptiles of Parque Nacional da Serra das Lontras: an important center of endemism within the Atlantic Forest in southern Bahia, Brazil. *ZooKeys* 1002:159-185.

Rosenberg, D. K. and Swift, R. 2012. Post-Emergence Behavior of Hatchling Western Pond Turtles (*Actinemys marmorata*) in Western Oregon. *The American Midland Naturalist* 2013, 169(1):111-121.

Rowe, J. W., Gradel, J. R. and Bunce, C. F. 2012. Effects of Weather Conditions and Drought on Activity of Spotted Turtles (*Clemmys guttata*) in a Southwestern Michigan Wetland. *The American Midland Naturalist* 169(1):97-110.

Rudolphi, M. and Weser, R. 2000. Zucht der F2-Generation bei der Riesenerdschildkröte *Heosemys grandis* (Gray, 1860). *Sauria* 22(3):17-24.

Rummler, H. -J. and Fritz, U. 1991. Geographische Variabilität der Amboina-Scharnierschildkröte *Cuora amboinensis* (Daudin, 1802), mit Beschreibung einer neuen Unterart, *C. a. kamaroma subsp. nov.*. *Salamandra* 27(1):17-45.

Ruso, G. E., Meyer, E. and Das, A. J. 2017. Seasonal and Diel Environmental Conditions Predict Western Pond Turtle (*Emys marmorata*) Behavior at a Perennial and an Ephemeral Stream in Sequoia National Park, California. *Chelonian Conservation and Biology* 16(1):20-28.

Ruther, E., Degregorio, B., Sperry, J. and Sekscienski, S. 2017. *Clemmys guttata* (Spotted Turtle) Longevity. *Herpetological Review* 48(4):834.

Sachsse, W. 1973. *Pyxidea mouhotii*, eine landbewohnende Emydide Südostasiens (Testudines). *Salamandra* 9(2):49-53.

Sachu, K., Purkayastha, J. and Bhattacharjee, R. 2017. Geographic Distribution: *Cuora mouhotii* (Keeled Box Turtle). *Herpetological Review* 48(1):122.

Say, T. 1824. On the fresh water and land Tortoises of the United States. *J. Acad. Nat. Sci. Philadelphia* 4(2):203-219.

Schaffer, C. and Morgan, V. 2002. Behavioral Observations of Captive Juvenile *Manouria emys phayrei* with Notes on Degrees of Intergradation with *Manouria emys emys*. *TTN*. 5:2-6.

Schaefer, I. 1994. Haltung und Zucht der Tropfenschildkröte (*Clemmys guttata*). *Salamandra* 30(1):22-32.

Schaefer, I. 2005. *Zacken-Erdschildkröten - Die Gattung* Geoemyda. Natur und Tier Verlag, Münster, 143 pp.

Schilde, M. 2001. *Schlammschildkröten:* Kinosternon, Sternotherus, Claudius, Staurotypus. Natur und Tier Verlag (Münster):136 pp.

Schilde, M. 2003a. Family Kinosternidae. *Reptilia* (GB) (26):16-21.

Schilde, M. 2003b. Die Dornschildkröten der Gattung *Cyclemys* Bell, 1834. *Draco* 4(13):37-42.

Schilde, M. 2004a. Die Moschusschildkröte (*Sternotherus odoratus*). *Natur und Tier Verlag* (Münster):64 pp.

Schilde, M. 2004b. Asiatische Sumpfschildkröten - Die Familie Geoemydidae in Südostasien, China und Japan. *Natur und Tier Verlag* (Münster):192 pp.

Schilde, M., Barth, D. and Fritz, U. 2004. An *Ocadia sinensis* x *Cyclemys shanensis* hybrid (Testudines: Geoemydidae). *Asiatic Herpetological Research* 10:120-125.

Schlegel, H. and Müller, S. 1845. Over de Schildpadden van den Indischen Archipel. In: Temminck, V. (1839-1847) *Verhandelingen over de natuurlijke geschiedenis der Nederlandsche overzeesche bezittingen, door de leden der Natuurkundige Commisie in Oost-Indie en andere schrijvers*. Leijden folio. Afd. 1 Zoologie in 12 afleveringen, met.

Schleich, H. H., Kästle, W. and Kabisch, K. 1996. *Amphibians and Reptiles of North Africa*. Königstein: Koeltz Scientific Publishers.

Schleicher, A. 2005a. *Homopus areolatus* - The Parrot-Beaked Tortoise. *Reptilia* (UK) (43):26-30.

Schleicher, A. 2005b. Die Areolen-Flachschildkröte, *Homopus areolatus* (Thunberg, 1787). Beobachtungen und Erfahrungen: Lebensweise, Haltung, Nach- und Aufzucht. *Reptilia* (Münster) 10 (56):36-40.

Schmidt, K. P. 1919. Contributions to the Herpetology of the Belgian Congo based on the Collection of the American Congo Expedition, 1909-1915. Part I: turtles, crocodiles, lizards, and chamaeleons. *Bull. Amer. Mus. Nat. Hist.* 39(2):385-624.

Schmidt, K. P. 1927. The reptiles of Hainan. *Bull. Amer. Mus. Nat. Hist.* 54(3):395-466.

Schmidt, K. P. 1941. The amphibians and reptiles of British Honduras. *Field Mus. Nat. Hist. Zool.* 22(8):475-

510.

Schmidt, K. P. 1946. Turtles collected by the Smithsonian biological survey of the Panama Canal. *Smithsonian Miscellaneous Collections*, Smithsonian Institution, Washington, D. C., USA:106(8)1-9.

Schmidt, K. P. 1947. A new kinosternid turtle from Colombia. *Fieldiana Zoology* 31:109-112.

Schnee, P. 1900. Über eine Sammlung südbrasilianischer Reptilien und Amphibien, nebst Beschreibung einer neuen Schildkröte. *Zool. Anz.* 23:461-464.

Schneider, J. G. 1787. *Erster Beitrag zur Naturgeschichte der Schildkröten*. J.G. Müller, Leipzig:16 pp.

Schneider, J. G. 1792. Beschreibung und Abbildung einer neuen Art von Wasserschildkröte nebst Bestimmungen einiger bisher wenig bekannten fremden Arten. *Schriften der Gesellschaft Naturforschender Freunde zu Berlin* 10:259-283 (1791).

Schoepff, I. D. (J. D.). 1792. *Historia Testudinum Iconibus Illustrata*. Erlangae: Ioannis Iacobi Palm, 136 pp. (Fascicles I and II, pp. 1-32, pls. 1-10).

Schoepff, J. D. 1801. *Historia Testudinum Iconibus Illustrata*. Ioannis Iacobi Palm, Erlangae:136 pp.

Schoppe, S. and Das, I. 2011. *Cuora amboinensis* (Riche in Daudin, 1801) - Southeast Asian Box Turtle. Chelonian Research Foundation, 13 pp. online at: https://www.researchgate.net/publication/273767533_Conservation_Biology_of_Freshwater_Turtles_and_Tortoises_A_Compilation_Project_of_the_IUCNSSC_Tortoise_and_Freshwater_Turtle_Specialist_Group_Cuora_amboinensis_Riche_in_Daudin_1801_-_Southeast_Asian_B

Schweigger, A. F. 1812. Prodromus Monographia Cheloniorum auctore Schweigger. Königsberg. *Arch. Naturwiss. Mathem.*, 1:271-368, 406-462.

Scott, N. J., Rathbun, G. B., Murphey, T. G. and Harker, M. B. 2008. Reproduction of Pacific Pond Turtles (*Actinemys marmorata*) in coastal streams of central California. *Herp. Cons. Biol.* 3:143.

Scott, P. A., Glenn, T. C. and Rissler, L. J. 2017. Resolving taxonomic turbulence and uncovering cryptic diversity in the musk turtles (*Sternotherus*) using robust demographic modeling. *Molecular Phylogenetics and Evolution* 120(2542) (online).

Scott, P. A., Glenn, T. C. and Rissler, L. J. 2017. Resolving taxonomic turbulence and uncovering cryptic diversity in the musk turtles (*Sternotherus*) using robust demographic modeling. *Molecular Phylogenetics and Evolution* (online).

Seburn, D. C. 2012. Why didn't the Spotted Turtle (*Clemmys guttata*) cross the road? *Herpetology Notes* 6:527-530.

Seddon, J. M., Georges, A., Baverstock, P. R. and McCord, W. 1997. Phylogenetic relationships of chelid turtles (Pleurodira: Chelidae) based on mitochondrial 12S rRNA gene sequence variation. *Molecular Phylogentics and Evolution* 7(1):55-61.

Seeliger, L. M. 1945. Variation in the Pacific mud turtle. *Copeia* 1945(3):150-159.

Segniagbeto, G. H., Bour, R., Ohler, A., Dubois, A., Rödel, M. -O., Trape, J. -F., Fretey, J., Petrozzi, F. and Luiselli, L. 2014. Turtles and tortoises of Togo: historical data, distribution, ecology and

conservation. *Chelonian Conservation and Biology* 13:152-165.

Seidel, M. E. and Ernst, C. H. 2017. A Systematic Review of the Turtle Family Emydidae. *Vertebrate Zoology* 67(1):1-122.

Seidel, M. E. and Lucchino, R. V. 1981. Allozymic and morphological variation among the musk turtles *Sternotherus carinatus*, *S. depressus* and *S. minor* (Kinosternidae). *Copeia* 1981(1):119-128.

Seidel, M. E., Reynolds, S. L. and Lucchino, R. V. 1981. Phylogenetic relationships among musk turtles (Genus *Sternotherus*) and genetic variation in *Sternotherus odoratus*). *Herpetologica* 37(3):161-165.

Seidel, M. E., Iverson, J. B. and Adkins, M. D. 1986. Biochemical comparisons and phylogenetic relationships in the family Kinosternidae (Testudines). *Copeia* 1986(2):285-294.

Selman, W. and Lindeman, P. V. 2020. The Map Turtles and Sawbacks (Testudines: Emydidae: *Graptemys*): Two Centuries of Study and the Conservation Imperative. *Chelonian Conservation and Biology* 19(2):151-154.

Semeñiuk, M. B., Alcalde, L., Sánchez, R. M. and Cassano, M. J. 2017. An Easy, Cheap, and Versatile Method to Trap Turtles, with Calibrated Sampling Effort. *South American J. Herp.* 12(2):107-116.

Semeñiuk, M., Sánchez, R. M., Cassano, M. J., Palumbo, E. and Alcalde, L. 2019. Abundance and Population Structure of *Hydromedusa tectifera* Cope, 1869 in a Highly Anthropogenic Environment in Argentina. *Chelonian Conservation and Biology* 18(1):24-31.

Setiyabudi, E., Takahashi, A. and Kaifu, Y. 2016. First Certain Fossil Record of *Orlitia borneensis* (Testudines: Geoemydidae) from the Pleistocene of Central Java, Indonesia. *Current Herpetology* 35(2):75-82.

Shah, R. V. 1960. The mechanisms of carapacial and plastral hinges in Chelonians. *Breviora* (130):1-15.

Sharath, B. K. 1990. On the occurrence of the forest cane turtle (*Geoemyda silvatica*) in the Western Ghats of Karnataka, South India. *Hamadryad* 15(1):34.

Shea, G., Thomson, S. and Georges, A. 2020. The identity of *Chelodina oblonga* Gray, 1841 (Testudines: Chelidae) reassessed. *Zootaxa* (PRINO) 4779 (3):419-437 (online).

Shelley, J. J., Swearer, S. E., Dempster, T., Adams, M., Le Feuvre, M. C., Hammer, M. P. and Unmack, P. 2020. Plio-Pleistocene sea-level changes drive speciation of freshwater fishes in north-western Australia. *Journal of Biogeography* 2020:1-12.

Siebenrock, F. 1902a. Zur Systematik der Schildkrötenfamilie Trionychidae Bell, nebst der Beschreibung einer neuen *Cyclanorbis* Art.

*Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften in Wien* (Mathemathisch-Naturwissenschaftliche Klasse) 91:807-846.

Siebenrock, F. 1902b. Über zwei seltene Schildkroten der herpetologischen Sammlung des Wiener Museums. *Anzeiger der Kaiserlichen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Classe*, Wien 39:11-13.

Siebenrock, F. 1902c. *Brookeia baileyi* E. Bartlett und *Adelochelys crassa* Baur. *Zool. Anz*. 25: 671-673.

Siebenrock, F. 1904. Zur Systematik der Schilkröten-Gattung *Orlitia* Gray. *Zool. Anz*. 27:580-582.

Siebenrock, F. 1909. Synopsis der rezenten Schildkröten, mit Berücksichtigung der in historischer Zeit ausgestorbenen Arten. *Zoologische Jahrbücher*, Supplement 10:427-618.

Siebenrock, F. 1916. Schildkröten aus dem nördlichen Seengebiet und von Belgisch-Kongo. in: Wissenschaftliche Ergebnisse der Expedition R. Grauer nach Zentralafrika, Dezember 1909 bis Februar 1911. *Annalen des K.K. Naturhistorischen Hofmuseums Wien* 30:1-12.

Silva-Soares, T., Ferreira, R. B, Salles, R. O. L. and Rocha, C. F. D. 2011. Continental, insular and coastal marine reptiles from the municipality of Vitória, state of Espírito Santo, southeastern Brazil. *Check List* 7(3):290-298.

Singh, R. R. and Singh, K. J. 2012. Box turtles in and adjacent to Loktak Lake, Manipur - India. *Taprobanica* 4(2):103-104.

Smart, U. 2008. Microhabitat description, ethogram and time budget of *Vijayachelys silvatica* in Karian Shola National Park, Western Ghats, South India. M.Sc. Thesis, Pondicherry University, Pondicherry, India.

Smart, U., Deepak, V. and Vasudevan, K. 2014. Preliminary ethogram and in situ time-activity budget of the enigmatic Cane Turtle (*Vijayachelys silvatica*) from the Western Ghats, south India. *Herpetological Conservation and Biology* 9(1):116-122.

Smith, H. M. and Brandon, R. 1968. Data nova herpetologica Mexicana. *Transactions of the Kansas Academy of Science* 71:49-61.

Smith, H. M. and Glass, B. P. 1947. A new musk turtle from southeastern United States. *Journal of the Washington Academy of Sciences* 37:22-24.

Smith, H. M. and Smith, R. B. 1980. *Synopsis of the herpetofauna of Mexico. VI. Guide to Mexican turtles*. John Johnson, North Bennington, Vermont.

Smith, H. M. and Taylor, E. H. 1950. An annotated checklist and key to the reptiles of Mexico exclusive of the snakes. *Bull. US Natl. Mus*. 199:1-253.

Smith, M. A. 1931. *The Fauna of British India Including Ceylon and Burma. Reptilia and Amphibia Volume I.-Loricata, Testudines*. Taylor and Francis, London, UK:185 pp.

Sommer, R. S., Persson, A., Wieseke, N. and Fritz, U. 2007. Holocene recolonization and extinction of the pond turtle, *Emys orbicularis* (L., 1758), in Europe. *Quaternary Science Reviews*, 26:3099-3107.

Sonnini, C. S. and Latreille, P. A. 1801. *Histoire Naturelle des Reptiles, avec figures dessinées d'après nature.* Tome Premier. Première Partie. Quadrupèdes et Bipèdes Ovipares. Paris: Deterville:280 pp.

Sousa, B. M. and Novelli, I. A. 2009. Reptilia, Testudines, Chelidae: *Hydromedusa tectifera*: Distribution extension in Brazil. *Check List* 5(3):396-398.

Souza, F. L. 2004. Uma revisão sobre padrões de atividade, reprodução e alimentação de cágados brasileiros (Testudines, Chelidae) (A review on activity patterns, reproduction, and feeding habits in Brazilian chelid turtles (Testudines, Chelidae)). *Phyllomedusa* 3(1):15-28.

Souza, F. L. 2005. *Hydromedusa maximiliani* - The Brazilian Snake-Necked Turtle. *Reptilia* (UK) (40):47-51.

Souza, F. L. 2007. *Hydromedusa maximiliani* - die Brasilianische Schlangenhalsschildkröte. *Reptilia* (Münster) 12(64):75-79.

Souza, F. L. and Abe, A. S. 1998. Resource Partitioning by the Neotropical Freshwater Turtle, *Hydromedusa maximiliani. Journal of Herpetology* 32(1):106-112.

Souza, F. L. and Martins, F. I. 2006. Body temperature of free-living freshwater turtles, *Hydromedusa maximiliani* (Testudines, Chelidae). *Amphibia-Reptilia* 27(3):464-468.

Souza, F. L., Cunha, A. F., Oliveira, M. A., Pereira, G. A. G. and dos Reis, S. F. 2002. Estimating Dispersal and Gene Flow in the Neotropical Freshwater Turtle *Hydromedusa maximiliani* (Chelidae) by Combining Ecological and Genetic Methods. *Genetics and Molecular Biology* 25(2):151-155.

Souza, F. L., Cunha, A. F., Oliveira, M. A., Pereira, G. A. G. and dos Reis, S. F. 2003. Preliminary Phylogeographic Analysis of the Neotropical Freshwater Turtle *Hydromedusa maximiliani* (Chelidae). *Journal of Herpetology* 37(2):427-433.

Souza, F., Rodrigues, J., Olalla-Tárraga, M., Diniz-Filho, J., Martinez, P. and Sawaya, R. J. 2019. Niche divergence and diversification in South American freshwater turtles of the genus *Acanthochelys* (Chelidae). *Amphibia-Reptilia* 40(4):475-485.

Sowerby, J. and Lear, E. 1872. *Tortoises, terrapins, and turtles: drawn from life*. H. Sotheran, J. Baer and co., London, Paris, and Frankfort.

Spadola, F. and Insacco, G. 2009. Endoscopy of cloaca in 51 *Emys trinacris* (Fritz *et al*., 2005): morphological and diagnostic study. *Acta Herpetologica* 4(1):73-81.

Spawls, S., Howell, K., Drewes, R. C. and Ashe, J. 2002. *A field guide to the reptiles of East Africa*. Academic Press: 543 pp.

Spawls, S., Howell, K., Hinkel, H. and Menegon, M. 2018. *Field Guide to East African Reptiles*. Bloomsbury:624 pp.

Spinks, P. Q. and Bradley Shaffer, H. 2005. Range-wide molecular analysis of the western pond turtle (*Emys marmorata*): cryptic variation, isolation by distance, and their conservation implications. *Molecular Ecology* 14:2047-2064.

Spinks, P. Q. and Bradley Shaffer, H. 2007.

Conservation phylogenetics of the Asian box turtles (Geoemydidae, *Cuora*): mitochondrial introgression, numts, and inferences from multiple nuclear loci. *Conservation Genetics* 8(3):641-657.

Spinks, P. Q. and Bradley Shaffer, H. 2009. Conflicting mitochondrial and nuclear phylogenies for the widely disjunct *Emys* (Testinidae: Emydidae) species complex and what they tell us about biogeography and hybridisation. *Systematic Biology* 58(1):1-20.

Spinks, P. Q., Pauly, G. B., Crayon, J. J. and Shaffer, H. B. 2003. Survival of the western pond turtle (*Emys marmorata*) in an urban California environment. *Biological Conservation* 113:257-267.

Spinks, P. Q., Thomson, R. C., Hughes, B., Moxley, B., Brown, R., Diesmos, A. and Bradley Shaffer, H. 2012. Cryptic variation and the tragedy of unrecognized taxa: the case of international trade in the spiny turtle *Heosemys spinosa* (Testudines: Geoemydidae). *Zoological Journal of the Linnean Society* 164(4):811-824.

Spinks, P. Q., Thomson, R. C., Gidiº, M. and Bradley Shaffer, H. 2014. Multilocus phylogeny of the New-World mud turtles (Kinosternidae) supports the traditional classification of the group. *Molecular Phylogenetics and Evolution* 76:254-260 (online).

Spinks, P. Q., Thomson, R. C., McCartney-Melstad, E. and Bradley Shaffer, H. 2016. Phylogeny and temporal diversification of the New World pond turtles (Emydidae). *Molecular Phylogenetics and Evolution* 103:85-97.

Spitzweg, C., Vamberger, M., Ihlow, F., Fritz, U. and Hofmeyr, M. D. 2020. How many species of angulate tortoises occur in Southern Africa? (Testudines: Testudinidae: *Chersina*). *Zool Scr.* 49:412-426.

Spix, J. B. von. 1824. *Animalia nova; sive, Species novae Testudinum et Ranarum, quas in itinere per Brasiliam annis 1817-20 collegit et descripsit*. F.S. Hübschmann, München. iv + 53 pp.

Stark, T. 2013. *Homopus signatus* (Gmelin, 1789) Diet. *African Herp News* (59):19-21.

Stanford, C. B., Wanchai, P., Schaffer, C., Schaffer, R. and Thirakhupt, K. 2015. *Manouria emys* (Schlegel and Müller, 1840): Asian Giant Tortoise, Giant Asian Forest Tortoise. in: Rhodin, A. G. J., Pritchard, P. C. H., van Dijk, P. P., Saumure, R. A., Buhlmann, K. A., Iverson, J. B. and Mittermeier, R. A. (eds) *Conservation biology of freshwater turtles and tortoises: a compilation project of the IUCN/SSC Tortoise and Freshwater Turtle Specialist Group*. Chelonian Research Monographs, Number 5. New York: Chelonian Research Foundation and Turtle Conservancy; p. 086.1-9 (online).

Stebbins, R. C. 1985. *A Field Guide to Western Reptiles and Amphibians*, 2nd ed. Houghton Mifflin, Boston, USA.

Steen, D. A. 2013. *Clemmys guttata* (spotted turtle) reproduction. *Herpetological Review* 44(3):501.

Steiner, H. M. 1977. Lebensraumwahl seniler *Clemmys c. caspica* in der Osttürkei (Reptilia, Testudines, Emydidae). *Salamandra* 13(1):53-54.

Stejneger, L. H. 1893. Annotated list of the reptiles and batrachians collected by the Death Valley Expedition in 1891, with descriptions of new species. *North American Fauna*, (7):159-228 (+ 14 plates + 4 maps).

Stejneger, L. 1902. Some generic names of turtles. *Proceedings of the Biological Society of Washington* 15:235-238.

Stejneger, L. 1923. Rehabilitation of a hitherto overlooked species of musk turtle of the southern states. *Proc. US Natl. Mus.* 62(6):1-3.

Stejneger, L. 1925. New species and subspecies of American turtles. *Journal of the Washington Academy of Science* 15:462-463.

Stephens, P. R. and Wiens, J. J. 2003. Ecological diversification and phylogeny of emydid turtles. *Biol. J. Linn. Soc.* 79:577-610.

Stevenson, D. J., Mays, J. D. and Chandler, H. C. 2018. *Clemmys guttata* (Spotted Turtle) Coloration. *Herpetological Review* 49(2):317-318.

Stoliczka, F. 1871. Note on *Testudo Phayrei. Annals and Magazine of Natural History* (4)8:212.

Storer, T. I. 1930. Notes on the range and life history of the Pacific fresh-water turtle, *Clemmys marmorota. Univ. Calif. Publ. Zool.* 32:429-441.

Stuart, B. L. and Fritz, U. 2008. Historical DNA from museum type specimens clarifies diversity of Asian leaf turtles (*Cyclemys*). *Biological Journal of the Linnean Society* 94(1):131-141.

Struijk, R. P. J. H., McCormack, T. E. M., Nguyen, T. T., Pham, T. V., Stumpel, J. B. G., Wang, J. and Auer, M. 2016. Intergradation between *Cuora mouhotii mouhotii* (Gray, 1862) and *Cuora mouhotii obsti* Fritz, Andreas and Lehr, 1998 with notes on the species' geographical distribution and phenotypic variation. *Sauria* 38(1):48-53.

Struijk, R. P.J. H. and Blanck, T. E. G. 2015. *Cuora mouhotii mouhotii* (Northern keeled box turtle) and *C. bouretti* (Bourret's box turtle) Captive hybridization. *Herpetological Review* 46(2):206.

Struijk, R. P.J. H. and Blanck, T. E. G. 2016. A likely new natural hybrid form of "*Cuora serrata*" (*Cuora picturata* x *Cuora mouhotii obsti*) and its presence in the wild in Phu Yen province, Vietnam. *Herpetology Notes* 9:73-80.

Stuart, B. L. and Parham, J. F. 2004. Molecular phylogeny of the critically endangered Indochinese box turtle (*Cuora galbinifrons*). *Molecular Phylogenetics and Evolution* 31(1):164-177.

Stuckas, H., Velo-Antón, G., Fahd, S., Kalboussi, M., Rouag, R., Arculeo, M., Marrone, F., Sacco, F., Vamberger, M. and Fritz, U. 2014. Where are you from, stranger? The enigmatic biogeography of North African pond turtles (*Emys orbicularis*). *Organisms Diversity and Evolution*, 14:295-306.

Suckow, G. A. 1798. *Anfangsgründe der theoretischen und angewandten Naturgeschichte der Thiere. Dritter Theil. Von den Amphibien*. Weidmannischen Buchhandlung, Leipzig:298 pp.

Sumarli, A. X.,Grismer, L. L., Anuar, S., Muin, M. A. and Quah, E. S. H. 2015. First report on the amphibians and reptiles of a remote mountain, Gunung Tebu in

northeastern Peninsular Malaysia. *Check List* 11(4):1679

Swan, G., Sadlier, R. and Shea, G. 2017. *A field guide to reptiles of New South Wales*. Reed New Holland:328 pp.

Swan, L. W. and Leviton, A. E. 1962. The herpetology of Nepal: a history, check list, and zoogeographical analysis of the herpetofauna. *Proc. Cal. Acad. Sci.* 32(6)(4.s.):103-147.

Sweeney, R. C. H. 1960. The Chelonia of Nyasaland Protectorate. *The Nyasaland Journal* 13(1):35-50.

Taylor, E. H. 1970. Turtles and crocodilians of Thailand and adjacent waters, with a synoptic herpetological bibliography. *Univ. Kansas Sci. Bull.* 49:87-179.

Teo, R. C. H. and Rajathurai, S. 1997. Mammals, reptiles and amphibians in the Nature Reserves of Singapore - diversity, abundance and distribution. Proc. Nature Reserves Survey Seminar. *Gardens' Bulletin Singapore* 49:353-425.

Teynié, A., David, P. and Ohler, A. 2010. Note on a collection of Amphibians and Reptiles from Western Sumatra (Indonesia), with the description of a new species of the genus *Bufo*. *Zootaxa* (PRINO) 2416:1-43 (online).

Theobald, W., Jr. 1868a. *Catalogue of Reptiles in the Museum of the Asiatic Society of Bengal*. Journal of the Asiatic Society, extra edition:88 pp.

Theobald, W., Jr. 1868b. Catalogue of the reptiles of British Burma, embracing the provinces of Pegu, Martaban, and Tenasserim; with descriptions of new or little-known species. *Journal of the Linnean Society of Zoology* 10:4-67.

Theobald, W., Jr. 1874. Observations on some Indian and Burmese species of *Trionyx*. *Proceedings of the Asiatic Society of Bengal* 1874:75-86.

Theobald, W., Jr. 1875. Observations on some Indian and Burmese species of *Trionyx*, with a rectification of their synonymy and a description of two new species. *Proceedings of the Asiatic Society of Bengal* 1875:170-180.

Thieme, U. 1984. Eine unbekannte *Elseya* ? *Sauria* 6(3):3-15.

Thomas, T. M., Granatosky, M. C., Bourque, J. R., Krysko, K. L., Moler, P. E., Gamble, T., Suarez, E., Leone, E., Enge, K. M. and Roman, J. 2014. Taxonomic assessment of Alligator Snapping Turtles (Chelydridae: *Macrochelys*), with the description of two new species from the southeastern United States. *Zootaxa* (PRINO) 3786(2):141-165 (online).

Thomson, R. C., Shedlock, A. M., Edwards, S. V. and Bradley Shaffer, H. 2008. Developing markers for multilocus phylogenetics in non-model organisms: A test case with turtles. *Molecular Phylogenetics and Evolution* 49(2):514-525.

Thomson, R. C., Spinks, P. Q. and Shaffer, H. B. 2018. Molecular phylogeny and divergence of the map turtles (Emydidae: *Graptemys*). *Molecular Phylogenetics and Evolution*, 121:61-70.

Thomson, R. C., Spinks, P. Q. and Shaffer, H. B. 2021. A global phylogeny of turtles reveals a burst of climate-associated diversification on continental margins. *Proceedings of the National Academy of Sciences*, 118(7):10 pp.

Thomson, S. and Georges, A. 2009. *Myuchelys gen. nov*. - a new genus for *Elseya latisternum* and related forms of Australian freshwater turtle (Testudines: Pleurodira: Chelidae). *Zootaxa* (PRINO) 2053:32-42 (online).

Thorpe, S. 2014. Email to taxacom list server, 13 April.

Thunberg, C. P. 1785. *Museum naturalium Academiae Upsaliensis . . .* Praeside C. P. Thunberg, A. C. Kongliga Svenska Vetenskaps-Academiens. Handlingar. Uppsala, Sweden.

Thunberg, C. P. 1787. Beskrifning pé Trenne Skölpaddor. *Kongl. Vetenskaps Academiens Nya Handlingar, För M_naderne 1787* (Julius, Augustus, September):178-180.

Tinkle, D. W. 1958. The systematics and ecology of the *Sternothaerus carinatus* complex (Testudinata, Chelydridae). *Tulane Studies in Zoology* 6:1-56.

Tinkle, D. W. and Webb, R. G. 1955. A new species of *Sternotherus* with a discussion of the *Sternotherus carinatus* complex. *Tulane Studies in Zoology* 3(3):53-67.

Tornier, G. 1902. Die Crocodile, Schildkröten und Eidechsen in Kamerun. *Zool. Jahrb., Abt. Syst.*, 15(6):663-677.

Trape, J. F., Trape, S. and Chirio, L. 2012. *Lézards, crocodiles et tortues d'Afrique occidentale et du Sahara*. IRD Orstom:503 pp.

Tshewang, S. and Letro, L. 2018. The herpetofauna of Jigme Singye Wangchuck National Park in central Bhutan: Status, distribution and new records. *Journal of Threatened Taxa* 10(11):12489-12498.

Ultsch, G. R. and Carroll, D. M. 2020. Climate Change and the Timing of Emergence from Hibernation of Spotted Turtles (*Clemmys guttata*) in Southeastern New Hampshire. *Herpetological Review.* 51:18-20.

Valdez-Villavicencio, J. H., Peralta-García, A. and Guillen-González, J. A. 2016a. New population of the Southwestern Pond Turtle *Emys pallida* in the central desert of Baja California. *Revista Mexicana de Biodiversidad* 87:264-267.

Valdez-Villavicencio, J. H., Peralta-García, A., Galina-Tessaro, P. and Hollingsworth, B. D. 2016b. Notes on the Reproduction of the Southwestern Pond Turtle *Emys pallida* in Baja California, México. *Revista Mexicana de Herpetología* 2(1):36-39.

Valenzuela, N. 2009. Co-Evolution of Genomic Structure and Selective Forces Underlying Sexual Development and Reproduction. *Cytogenet Genome Res*. 127:232-241.

Valverde, J. 2004. Giant tortoises. *Reptilia* (UK) (37):11-19.

Valverde, J. 2005a. African Tortoises. *Reptilia* (UK) 43:12-20.

Valverde, J. 2005b. Afrikanische Landschildkröten. *Reptilia* (Münster) 10(56):18-25.

Valverde, J. 2009. Südamerikanische Schildkröten.

*Reptilia* (Münster) 14(80):16-27.

Valverde, J. 2010. Schlangenhalsschildkröten. *Reptilia* (Münster) 15(85):16-23.

Vamberger, M., Durkin, L., Kim, C., Handschuh, M., Seng, R. and Fritz, U. 2017. The leaf turtle population of Phnom Kulen National Park (northwestern Cambodia) has genetic and morphological signatures of hybridization. *Journal of Zoological Systematics and Evolutionary Research* 55:167-174.

Van Denburgh, J. 1922. The reptiles of Western North America. *Occ. Papers Calif. Acad. Sci*. 10(2):613-1028.

Van Den Berg, P. and Baard, E. H. W. 1994. Regional variation in morphometric characters in the angulate tortoise, *Chersina angulata*, from South Africa. *Journal of the Herpetological Association of Africa* 44:28-32.

Van Dijk, P. P. 1992. Variation in the Southeast Asian Soft-shelled turtle, *Amyda cartilaginea.* Master's of Science thesis, National University of Ireland.

Van Heezik, Y. M., Cooper, J. and Seddon, P. J. 1994. Population characteristics and morphometrics of angulate tortoises on Dassen Island, South Africa. *Journal of Herpetology* 28(4):447-453.

Varela, E. A. 1999. Tipos de la colección herpetológica del Museo Argentino de Ciencias Naturales "Bernardino Rivadavia", Buenos Aires, Argentina. (type catalog) Iheringia, Sér. *Zool., Porto Alegre* (87):57-74.

Vargas-Ramírez, M. J. M. and Fritz, U. 2010. Red and yellow-footed tortoises, *Chelonoidis carbonaria* and *C. denticulata* (Reptilia: Testudines: Testudinidae), in South American savannahs and forests: Do their phylogeographies reflect distinct habitats? *Organisms Diversity and Evolution* 10(1):161-172.

Vargas-Ramírez, M., Vences, M., Branch, W. R., Daniels, S. R., Glaw, F., Hofmeyr, M. D., Kuchling, G., Maran, J., Papenfuss, T.J., Široký, P., Vieites, D. R. and Fritz, U. 2010. Deep genealogical lineages in the widely distributed African helmeted terrapin: Evidence from mitochondrial and nuclear DNA (Testudines: Pelomedusidae: *Pelomedusa subrufa*). *Molecular Phylogenetics and Evolution*, 56:428-440.

Vasudevan, K. and Deepak, V. 2008. Field studies on the ecology of endemic turtles. *Turtle and Tortoise Newsletter* 12:14-16.

Vasudevan, K. and Deepak, V. 2010. Quaint turtle in a gigantic forest. *Hornbill* 2010(July-September):10-13.

Vasudevan, K., Pandav, B. and Deepak, V. 2010. *Ecology of two endemic turtles in the Western Ghats*. Final Technical Report, Wildlife Institute of India:74 pp.

Velo-Antón, G., García-París, M. and Cordero Rivera, A. 2008. Patterns of nuclear and mitochondrial DNA variation in Iberian populations of *Emys orbicularis* (Emydidae): Conservation implications. *Conservation Genetics*, 9:1263-1274.

Velo-Antón, G., Becker, C. G. and Cordero-Rivera, A. 2011. Turtle carapace anomalies: the roles of genetic diversity and environment. *PLoS One*. 6:e18714 (online).

Vijaya, J. 1982. Rediscovery of the forest cane turtle (*Heosemys silvatica*) of Kerala. *Hamadryad* 7:2-3.

Vijaya, J. 1983. World's rarest turtle (we think) lays eggs in captivity. *Hamadryad* 8(1):13.

Vinke, T. and Vinke, S. 2001. The turtle and tortoise fauna of the central Chaco of Paraguay. *Radiata* 10(3):3-19.

Vinke, T. and Vinke, S. 2006. *Acanthochelys macrocephala* (Rhodin, Mittermeier and McMorris). *Sauria* 28(1):1-2.

Vinke, T. and Vinke, S. 2010. Die Pantanal-Plattschildkröte, *Acanthochelys macrocephala* - eine Schildkröte, die noch immer viele Fragen aufwirft. *Reptilia* (Münster) 15(81):42-45.

Vinke, S., Vetter, H., Vinke, T. and Vetter, S. 2008. *South American Tortoises*. Chelonoidis carbonaria, C. denticulata and C. chilensis. Chimaira:355 pp.

Vlachos, E. and Rabi, M. 2018. Total evidence analysis and body size evolution of extant and extinct tortoises (Testudines: Cryptodira: Pan-Testudinidae). *Cladistics* 34: 652-683.

Vogrinc, P. N. and McCleary, R. J. R. 2016. *Cuora amboinensis* (Southeast Asian Box Turtle) Diet. *Herpetological Review* 47(1):121-122.

Vogt, R. C. 1993. Systematics of the false map turtles (*Graptemys pseudogeographic*a compex: Reptilia, Testudines, Emydidae). *Annals of the Carnegie Museum* 62(1):1-46.

Voris, H. K. 2000. Maps of Pleistocene sea levels in Southeast Asia: shorelines, river systems and time durations. *Journal of Biogeography* 27:1153-1167.

Wagler, J .G. 1830. *Natürliches System der Amphibien, mit vorangehender Classification der Säugthiere und Vögel. Ein Beitrag zur vergleichenden Zoologie*. München: J. G. Cotta'schen Buchhandlung, Germany:354 pp. + pls. 1-2.

Wagner, P. 2018a. Die Gattung *Cuora* - eine akut bedrohte, einzigartige Kreation der Evolution. *Reptilia* 23(133):16-21.

Wagner, P. 2018b. Das ACCB - Artenschutz (nicht nur) für Schildkröten in Kambodscha. *Reptilia* 23 (133):38-41.

Wiens, J. J., Kuczynski, C. A. and Stephens, P. R. 2010. Discordant mitochondrial and nuclear gene phylogenies in emydid turtles: implications for speciation and conservation. *Biological Journal of the Linnean Society*, 99:445-461.

Walker, D., Burke, V. J., Barak, I. and Avise, J. C. 1995. A comparison of mtDNA restriction sites vs. control region sequences in phylogeographic assessment of the musk turtle (*Sternotherus minor*). *Molecular Ecology* 4:365-373.

Walker, D., E., Nelson, W. S., Buhlmann, K. A. and Avise, J. C. 1997. Mitochondrial DNA phylogeography and subspecies issues in th monotypic freshwater turtle *Sternotherus odoratus. Copeia* 1997(1):16-21.

Wang, K., Ren, J., Chen, H., Lyu, Z., Jiang, X. G. K., Chen, J., Li, J., Guo, P., Wang, Y. and Che, J. 2020. The updated checklists of amphibians and reptiles of China. *Biodiversity Science* 28(2):189-218.

Wanger, T. C., Motzke, I., Saleh, S. and Iskandar, D. T.

2011. The amphibians and reptiles of the Lore Lindu National Park area, Central Sulawesi, Indonesia. *Salamandra* 47(1):17-29.

Wangyal, J. T., Wangchuk, D. and Das, I. 2012. First Report of Turtles from the Himalayan Kingdom of Bhutan. *Chelonian Conservation and Biology* 11(2):268-272.

Ward, F. P., Hohmann, C. J., Ulrich, J. F. and Hill, S. E. 1976. Seasonal microhabitat selections of spotted turtles (*Clemmys guttata*) in Maryland elucidated by radioisotope tracking. *Herpetologica* 32(1):60-64.

Ward, R., Babitzke, J. B. and Killebrew, F. C. 2013. Genetic Population Structure of Cagle's Map Turtle (*Graptemys caglei*) in the Guadalupe and San Marcos Rivers of Texas: A Landscape Perspective. *Copeia* 2013(4):723-728.

Webb, R. G. 1975. Types of two names of African softshell turtles of the genus *Cyclanorbis* (Testudines: Trionychidae). *Herpetologica* 31:348-350.

Webb, R. G. 1982. Taxonomic notes concerning the trionychid turtle *Lissemys punctata* (Lacepede). *Amphibia-Reptilia* 3(2-3):179-184.

Wells, R. W. 2002. Taxonomic notes on some Australian freshwater turtles of the genera *Chelodina* and *Elseya*. *Australian Biodiversity Record*, 2002:1-12.

Wells, R. W. 2007a. Some taxonomic and nomenclatural considerations on the Class Reptilia in Australia. A new genus of the Family *Chelidae* from eastern Australia. *Australian Biodiversity Record*, 2007(3):1-12.

Wells, R. W. 2007b. Some taxonomic and nomenclatural considerations on the class Reptilia in Australia. Some comments on the *Elseya dentata* (Gray, 1863) complex with redescriptions of the Johnstone River Snapping Turtle, *Elseya stirlingi* Wells and Wellington, 1985 and the Alligator River Snapping Turtle, *Elseya jukesi* Wells, 2002. *Australian Biodiversity Record*, 2007(2):1-12.

Wells, R. W. 2009. Some taxonomic and nomenclatural considerations on the Class Reptilia in Australia. A new species of freshwater turtle in the genus *Wollumbinia* Wells, 2007 (Reptilia: Chelidae) from eastern Australia. *Australian Biodiversity Record*, 2009(1):1-12.

Wells, R. W. and Wellington, C. R. 1984. A synopsis of the class Reptilia in Australia. *Australian Journal of Herpetology* 1(3-4):73-129.

Wells, R. W. and Wellington, C. R. 1985. A classification of the Amphibia and Reptilia of Australia. *Australian Journal of Herpetology Supplementary Series* 1:1-61.

Welsh, H. H. Jr. 1988. An ecogeographic analysis of the herpetofauna of the Sierra San Pedro Mártir region, Baja California with a contribution to the biogeography of the Baja California herpetofauna. *Proc. Cal. Acad. Sci.* 46(1):1-72.

Wermuth, H. and Mertens, R. 1961. *Schildkröten, Krokodile, Brückenechsen*. Gustav Fischer Verlag, Jena. xxvi + 422 pp.

Wermuth, H. and Mertens, R. 1977. Liste der rezenten Amphibien und Reptilien: Testudines, Crocodylia, Rhynchocephalla. *Das Tierreich* Berlin. 100: i-xxvii:1-174

Wermuth, H. and Mertens,R. 1996. Schildkröten, Krokodile, Brückenechsen (reprint of the 1961 edition with an updated appendix by F. J. Obst). Gustav Fischer Verlag, Jena:506 pp.

Werner, F. J. 1900. Reptilien und Batrachier aus Sumatra, gesammelt Herrn. Gustav Schneider jr., im Jahre 1897-1898. *Zool. Jahrb.* (syst) 13:479-508.

Werner, F. J. 1908. On some interesting reptiles collected by Dr. C. M. Wenyon on the Upper Nile. *Third Report of the Wellcome Tropical Research Laboratories at the Gordon Memorial College,*

*Khartoum*, pp. 169-172.

Werner, F. J. 1924. Wissenschaftliche Ergebnisse der mit Unterstutzung der Akademie der Wissenschaften in Wien aus der Erbschaft Treitl von F. Werner unternommenen zoologischen Expedition nach dem anglo-ägyptischen Sudan (Kordofan) 1914. XVIII. *Schildkröten. Denkschriften der Akademie der Wissenschaften in Wien, Mathematisch-Naturwissenschaftliche Classe* 99:263-273.

Werning, H. 2012. Die Reptilien und Amphibien des Südwestens. *Draco* 13(50):18-60.

Wetmore, A. 1925. Dates of publication of Mikan's Flora and Fauna of Brazil. *The Auk* 42(2):183.

Whitaker, N. and Vijaya, J. 2009. Biology of the forest cane turtle, *Vijayachelys silvatica*, in South India. *Chelonian Conservation and Biology* 8(2):109-115.

Wied-Neuwied, M. 1824. Verzeichniss der Amphibien, welche im zweyten Bande der Naturgeschichte Brasiliens vom Prinz Max von Neuwied werden beschrieben werden. *Isis von Oken* 14:661-673.

Wilcox, J. T. 2019. *Actinemys marmorata* (Northern Pond Turtle) Diet. *Herpetological Review* 50(3):553.

Williams, E. E. 1960. Two species of tortoises in northern South America. *Breviora* (120):1-13.

Winkler, J. D. 2006. Testing phylogenetic implications of eggshell characters in side-necked turtles (Testudines: Pleurodira). *Zoology* 109:127-136.

Wilson, D. S. and Karl, S. A. 2001. Genetic relatedness of populations of the Mud Turtle, *Kinosternon baurii*, from mainland Florida and the upper and lower Florida Keys. *Chelonian Conservation Biology* 4(1):228-230.

Wilson, R. L. 1966. A Fossil Map Turtle (*Graptemys pseudogeographica*) from Central Michigan. *Copeia* 1966(2):368-369.

Wilson, S. and Swan, G. 2010. *A complete guide to reptiles of Australia,* 3rd ed. New Holland, Chatswood, NSW, Australia:558 pp.

Wilson, T. P. 2000. Notes on Eggshell Type of the Spotted Turtle, *Clemmys guttata*: Geographic Variation or Differences in Definition? *Bull. Maryland Herpetol. Soc.*, 36(2):68-69.

Winkler, J. D. 2006. Testing phylogenetic implications of eggshell characters in side-necked turtles (Testudines: Pleurodira). *Zoology* 109:127-136.

Witte, G. F. de and Laurent, R. F. 1943. Contribution à la systématique des Boiginae du Congo Belge (Rept.) (and

errata slip). *Rev. Zool. Bot. Afr*. 37:157-189.

Wong, R. A., Fong, J. J. and Papenfuss, T. J. 2010. Phylogeography of the African helmeted terrapin, *Pelomedusa subrufa*: genetic structure, dispersal, and human introduction. *Proceedings of the California Academy of Sciences*, 61:575-585.

Wood, R. C. and Moody, R. T. J. 1976. Unique Arrangement of Carapace Bones in the South American Chelid Turtle *Hydromedusa maximiliani* (Mikan). *Zoological Journal of the Linnean Society*, London 59:69-78.

Woolrich-Piña, G. A., García-Padilla, E., DeSantis, D. L., Johnson, J. D., Mata-Silva, V. and Wilson, L. D. 2017. The herpetofauna of Puebla, Mexico: composition, distribution, and conservation status. *Mesoamerican Herpetology* 4(4):791-884.

Worrell, E. 1963. *Reptiles of Australia*. Angus and Robertson, Sydney, Australia: xv + 207 pp.

Wright, A. H. 1918. Notes on *Clemmys. Proc. Biol. Soc. Washington* 31:51-58.

Wüster, W. 2014. Post on Facebook, 9 January.

Xiao, F., Wang, J., Long, Z. and Shi, H. 2017. Diet of Two Endangered Box Turtles (*Cuora spp*.) on Hainan Island, China. *Chelonian Conservation and Biology* 16(2):236-238.

Yagi, K. T. and Litzgus, J. D. 2012. The Effects of Flooding on the Spatial Ecology of Spotted Turtles (*Clemmys guttata*) in a Partially Mined Peatland. *Copeia* 2012(2):179-190.

Yang, P., Tang, Y., Ding, L., Guo, X. and Wang, Y. 2011. Validity of *Pelodiscus parviformis* (Testudines: Trionychidae) inferred from molecular and morphological analysis. *Asian Herpetological Research* 2:21-29.

Zaragoza, G., Rose, J. P., Purcell, K. and Todd, B. D. 2015. Terrestrial Habitat use by Western Pond Turtles (*Actinemys marmorata*) in the Sierra Foothills. *Journal of Herpetology* 49(3):437-441.

Zessin, B. 2004. Nachzucht von *Kinixys homeana* Bell, 1827. *Elaphe* 12(4):39-46.

Zhang, L., Nie, L., Cao, C. and Zhan, Y. 2008. The complete mitochondrial genome of the Keeled box turtle *Pyxidea mouhotii* and phylogenetic analysis of major turtle groups. *Journal of Genetics and Genomics* 35(1):33-40.

Zhao, E. and Adler, K. 1993. *Herpetology of China*. Society for the Study of Amphibians and Reptiles (Contributions to Herpetology 10), Oxford, Ohio, USA:521 pp.

Zhao, K. 1997. Studies on the classification of Chinese soft-shelled turtles (Trionychidae). (in Chinese). *Sichuan Journal of Zoology* 15(Suppl.):55-64.

Zhou, G., Zhang, X. and Fang, Z. 1991. Bulletin of a new species of *Trionyx* (in Chinese with English summary). *Acta Sci. nat. Univ. norm. Hunan* 14(4):379-382.

Zhou, T. and Li, P. P. 2007. Chelonian species diversity and current status in China. (in Chinese). *Sichuan Journal of Zoology* 26(2):463-467.

Ziegler, T. 2002. *Die Amphibien und Reptilien eines Tieflandfeuchtwald-Schutzgebietes in Vietnam*. Natur und Tier Verlag (Münster):342 pp.

Ziegler, T., Ohler, A., Thanh, V. U., Quyet, L. K., Thuan, N. X., Tri, D. H. and Thanh, B. N. 2006. Review of the amphibian and reptile diversity of Phong Nha - Ke Bang National Park and adjacent areas, central Truong Son, Vietnam. *Herpetologica Bonnensis* II:247-262.

Zocca, C. Z., Nóbrega, Y. C., Acosta, I. C. L., Martins, T. F. and Ferreira, R. B. 2019. *Acanthochelys radiolata* (Brazilian Radiolated Swamp Turtle) Ectoparasites. *Herpetological Review* 50(3):552-553.

Zug, G. R. 1986. *Sternotherus* Gray. Musk turtles. *Catalogue of American Amphibians and Reptiles* 397:1-3.

Zug, G. R. and Mulcahy, D. G. 2019. *Identification guide Amphibians and reptiles of South Tanintharyi*. Fauna and Flora International:101 pp.

Zug, G. R., Win, H., Thin, T., Min, T. Z., Lhon, W. Z. and Kyaw, K. 1998. Herpetofauna of the Chatthin Wildlife Sanctuary, north-central Myanmar with preliminary observations of their Natural History. *Hamadryad* 23(2):111-120.

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