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A revised taxonomy for the Lizard Families Gerrhosauridae and Cordylidae.

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ABSTRACT

This paper revises the taxonomy of the two closely related lizard families Gerrhosauridae Fitzinger, 1843 and Cordylidae Mertens, 1937. This revision is as a result of an assessment of previously published material combined with in situ observations of relevant taxa in the African region and a number of preserved specimens of most previously described species-level taxa within the group. In order to make the classification consistent within both groups and as compared to other squamate families, a number of new tribes, genera and the like are erected in accordance with the Zoological Code (Ride *et al.* 1999).

Gerrhosaurus Wiegmann, 1828 is split three ways, with two new genera named for the first time. The remaining species in *Gerrhosaurus* are split between three subgenera, for which there are already available names, all used herein. Genera within the subfamily Gerrhosaurinae Lang, 1991 are in turn grouped within three newly defined and named tribes, one being split into two subtribes.

At the genus level, Zonosaurinae Lang, 1991 is divided as follows: *Tracheloptychus* Peters, 1854 as widely recognized is retained unchanged. *Zonosaurus* Boulenger, 1887 as widely recognized to date is split into four genera, with three formally named for the first time. In turn, each of the newly created genera are divided into 2, 2 and 4 subgenera respectively.

Also within the Zonosaurinae a tribe and two subtribes are formally defined.

Within the Cordylidae, there are also rearrangements building on the taxonomic arrangement proposed by Stanley *et al.* 2011. Within Cordylinae Mertens, 1937, *Pseudocordylus langi* Loveridge, 1944 is placed in a newly named monotypic genus; *Smaug* Stanley *et al.*, 2011 is divided two ways, with a new genus named for the first time and only the nominate species *Smaug giganteus* (Smith, 1844) remaining within *Smaug*; *Namazonurus* Stanley *et al.*, 2011 is divided into three newly defined subgenera, two formally named for the first time. *Cordylus* Laurenti, 1768 is also divided into two subgenera. Cordylinae is herein divided into four tribes, three formally named and defined for the first time.

The 19 currently recognized species of *Platysaurus* Smith, 1844 are divided into four genera, with three genera named for the first time. One of these is divided into two subgenera and another into three. The subfamily Platysaurinae Stanley *et al.* 2011 is split into three tribes.

Keywords: Taxonomy; nomenclature; Gerrhosauridae; Cordylidae; Gerrhosaurinae; Zonosaurinae; Platysaurinae; Cordylinae; Cordylini; *Cordylosaurus*; *Tetradactylus*; *Gerrhosaurus*; *Tracheloptychus*; *Zonosaurus*; *Ouroborus*; *Karusasaurus*; *Namazonurus*; *Smaug*; *Chamaesaura*; *Pseudocordylus*; *Ninurta*; *Hemicordylus*; *Cordylus*; *Platysaurus*; new tribes; Funkisaurusiini; Tetradactylusiini; Gerrhosaurusiini; Zonosaurini; Cottonsaurini; Namazonurini; Karusasaurini; Platysaurini; Woolfsaurini; Bennettsaurini; new subtribes; Gerrhosaurusiina; Swilesaurusiina; Zonosaurina; Tracheloptychina; new genera; *Swilesaurus*; *Funkisaurus*; *Wellssaurus*; *Hawkeswoodsaurus*; *Wellingtonsaurus*; *Cottonsaurus*; *Ninsaurus*; *Woolfsaurus*; *Bennettsaurus*; *Edwardssaurus*; new subgenera; *Pleurotuchus*; *Angolosaurus*; *Tetradactylus*; *Paratetradactylus*; *Lukefabasaurus*; *Raselimananasaurus*; *Raxworthysaurus*; *Nussbaumsaurus*; *Hallabysaurus*; *Slatteryrsaurus*; *Atikaea*; *Lucysaurea*; *Vrljicsaurus*; *Macgoldrichsaurus*; *Hulimkasaurus*.

INTRODUCTION

In 2009 while doing extensive fieldwork in Southern Africa, it became apparent that the genus *Cordylus* as widely recognized in its widest form was paraphyletic at the genus level and in urgent need of a reclassification. To that end, an investigation into the genus as widely defined at the time, led to an even wider revision of the entire Cordylidae of southern and eastern Africa and the associated Gerrhosauridae of southern Africa and Madagascar.

As a result of criminal charges improperly laid against myself in 2010, by corrupt Australian government officials, Ron Waters, Glenn Sharp and Sharon Webb (for the details of corruption in the relevant department refer to Hoser 1993, 1996 and 2010), the charges being laid as reprisal and revenge for the publication of Hoser (2010), which disclosed new and ongoing corruption within the Victorian (Australian) Government, the reclassification of the Cordylidae and Gerrhosauridae was unexpectedly delayed.

Numerous earlier studies that had been published, had already done considerable groundwork in terms of identifying species groups within the two families that should be placed in their own genera. However most of these authors did not assign new generic names to the obviously improperly grouped species (e.g. Frost *et al.* 2001).

This material did in the main part form the basis of the reclassification I was about to publish.

However, seizing on this same body of work and a newly produced molecular phylogeny for the Cordylidae, Stanley *et al.* did in 2011 reclassify the Cordylidae. The authors resurrected a number of genera and for the first time named five new ones.

All the groups newly named by these authors had in fact been identified as unnamed genera by myself in 2009 and would have been named by myself the following year in 2010, had it not been for the unexpected legal matters that diverted my attention later that year.

Notwithstanding this, the rules of the ICZN and the Zoological Code (Ride *et al.* 1999), are clear in that the three most important rules that underpin zoological nomenclature are:

- 1/ Homonymy (Principal 5, Article 52 and elsewhere),
 - 2/ Priority (Principal 3, Article 23 and elsewhere),
 - 3/ Stability (Principal 4, Articles 23, 65 and elsewhere),
- as well as the ethics of the Code in Appendix A.

Therefore contrary to the radical and destructive position outlined by Kaiser *et al.* (2013), more accurately known as Wüster *et al.* (2013), as explained by Hoser (2013), I do not seek to break the established rules of zoological nomenclature and rename the five genera named by Stanley *et al.* here, even though they may have breached the ethics of the code in naming genus groups in the knowledge another herpetologist was seeking to do so.

Those and all relevant and available names from earlier dates are properly used herein and in accordance with the Zoological Code (Ride *et al.* 1999).

It is also relevant that the Code also states that one should publish taxonomic acts expediently and preferably within 12 months of announcing an intention to do so.

While in 2009, I made it clear to herpetologists globally that I intended reclassifying all the Gerrhosauridae and Cordylidae, the code does not give myself or anyone else a right to monopolize taxa indefinitely, regardless of events and circumstance. Therefore it was entirely allowable that Stanley *et al.* should publish their major reclassification in 2011, which was more than a year after I had announced an intention to reclassify the group, although noting that at least some of the authors were aware of the improper legal proceedings running against me as the basis for my own delay, they should not have rushed in to scoop naming rights for the relevant genera.

I also note that one of the authors of Stanley *et al.* is none other than William (Bill) Branch has a well-documented contempt for

the rules of Zoological Nomenclature. This is best seen in his written endorsement of the reckless hate document Kaiser *et al.* (2013), (better known as Wüster *et al.* 2013), which openly calls for a total abandonment of the established rules of Zoological Nomenclature and the Zoological Code itself (see page 20 of that document), to enable their group known as the Wüster gang to assign patronyms in honour of their friends for taxa that are already properly named.

In spite of the preceding and noting the code-compliant (in terms of the rules, if not the ethics) substantial and generally appropriate reclassification of the Cordylidae by Stanley *et al.* (2011) on taxonomic grounds, it is clear that on the basis of the evidence provided by themselves as well as that provided by earlier authors, that there are taxa within the Cordylidae that should be assigned to other, as yet unnamed genera. This is if one were to use criteria similarly applied across other lizard species groups, or for that matter, vertebrates in general.

19 recognized species of *Platysaurus* (currently the entirety of the family Platysaurinae) as currently recognized are divided herein into four genera, with three genera named for the first time. One of these is divided into two subgenera and another into three. The subfamily Platysaurinae is split into three tribes. It should be made clear that the actual total of species within the Platysaurinae is in fact well in excess of 20 as most widely recognized at the present time, regardless of the generic and subgeneric arrangement used by herpetologists.

A similar situation also exists for the somewhat less speciose Gerrhosauridae, with the nominate genus *Gerrhosaurus* in obvious need of further division. One species in particular, *G. major* is so widely divergent from the rest of the genus that it should be placed in both a separate tribe and genus as is done herein!

In terms of the Zonosaurinae as recognized to date, Recknagel *et al.* 2013 recognized just two genera, namely *Tracheloptychus* Peters, 1854 (containing just two species) and the speciose *Zonosaurus* Boulenger, 1887, (containing 17 species recognized as of 2013, noting herein that some of these are clearly composite) as did Pyron *et al.* (2013) in their phylogeny. Notwithstanding this, Recknagel *et al.* 2013 stated:

“The monophyly of *Zonosaurus* relative to *Tracheloptychus* remains ambiguous, but we identify several highly supported main clades within the genus *Zonosaurus*.”

On the basis of the molecular evidence provided by both Recknagel *et al.* 2013 and that published by Pyron *et al.* (2013), it is clear that *Zonosaurus* as presently recognized is paraphyletic at the genus level. On the basis of both the molecular evidence and the morphological evidence, *Zonosaurus* is divided into a number of well-defined genera, all new genera being formally named according to the Zoological Code for the first time.

Two divergent species taxa *Cicigna madagascariensis* Gray, 1831 and *Zonosaurus haraldmeieri* Brygoo and Böhme, 1985, which clearly form a natural grouping are the only species that remain within *Zonosaurus*.

All readers should note that in his original description of the genus *Zonosaurus*, Boulenger (1887) at page 127 did not specify a type species for the genus and as far as I can ascertain, no author has done so since.

Therefore and in accordance with the relevant sections of the current Zoological Code (Ride *et al.* 1999), namely articles 69 and 69A and the relevant parts therein, I hereby designate the species *Cicigna madagascariensis* Gray, 1831 as the type species for the genus *Zonosaurus* Boulenger, 1887. It should be noted that this species taxon was the first of three that Boulenger listed in his descriptions of the three species within this newly created genus.

The remainder of *Zonosaurus* is herein further divided into several well-defined genera and subgenera, on the basis that obvious morphological differences between well-recognized

species groups that does in fact match the published molecular data for the same species.

MATERIALS AND METHODS

In essence, I have drawn upon all relevant previously published literature on the two lizard families, as well as cross matching the results of earlier authors with my own observations of species in the wild state and captive specimens.

While there has been considerable emphasis on molecular results by taxonomists in recent years as seen for example in the publication of Stanley *et al.* (2011), it is important that before taxonomic decisions are taken, that these results should be accurately cross-checked against the animals themselves and include both morphological and behavioural data, if and when available.

If a conflict arises between any of these then a conservative position of no change to the existing taxonomy should be taken.

In terms of the lizard families Gerrhosauridae and Cordylidae such data, which matches across all relevant disciplines is widely available and was able to be checked myself against specimens of many species across several nominate genera. Due to the relatively large size of most species of Gerrhosauridae and Cordylidae, combined with their abundance both in the wild and captivity, access to specimens for study purposes was not problematic.

Below I present a diagnosis and dissection of each of the relevant families, formally describing new and unnamed groups as required according to the Zoological Code. Where it is appropriate to rely on earlier published material, this is not necessarily rehashed herein. This is especially in terms of when the relevant material is widely available to readers on the world-wide web (internet).

Key published literature relevant to the taxonomy of the Gerrhosauridae includes Adolphs (2006), Andersson (1916), Andreone and Randriamahazo (1997), Auerbach (1987), Baard (1987), Baillie *et al.* (2010), Barbour (1918), Barts (2008), Bates (1993, 1996, 2011), Bauer *et al.* (1993, 1994), Berger-Dellmour (1983, 1985), Blanc (1967, Bocage (1866), Boettger (1883), Bonetti (2002), Boulenger (1887, 1896, 1908), Boycott (1992), Branch (1990, 1993, 1998), Branch and Bauer (2005), Branch and Branch (1992), Branch *et al.* (1992), Broadley (1960, 1962b, 1971b, 1973, 1987, 1991), Broadley and Cotterill (2004), Broadley and Howell (1991), Broadley and Rasmussen (1995), Brygoo (1985a, 1985b), Brygoo and Böhme (1985), Burger (1988), Burger *et al.* (2004), Chirio and Ineich (1996), Chirio and Lebreton (2007), Conradie *et al.* (2011), Daan and Hillenius (1996), Dassow (2008), Dathe (1987), Daudin (1802), D'Cruze *et al.* (2009), del Prato (1895), Duméril and Bibron (1839), Duméril and Duméril (1851), Fitzsimons (1938, 1939, 1947, 1953), Glaw and Vences (1994), Grandidier (1869), Gravenhorst (1851), Gray (1838, 1864), Grys (1938), Haagner and Branch (1992), Haagner *et al.* (2000), Hallermann (1998), Hallowell (1857), Harbig (2003), Hellmich and Schmelcher (1956), Hewitt (1915, 1926), Hewitt and Methuen (1913), Ineich (1999), Jacobsen *et al.* (2010), John (1980), Kirk (1865), Kober (1990), Köhler (1990), Lang (1991b), Lang and Böhme (1989), Lanza (1990), Lamb and Bauer (2013), Lamb *et al.* (2003), Largen and Spawls (2006, 2010), Laurent (1950, 1954), Leaché *et al.* (2006), Lilge (2008), Linnaeus (1758), Loveridge (1920, 1923, 1936, 1942), Mason and Alexander (1996), Meek and Cory (1910), Meier (1988), Mertens (1938, 1967), Mitchell and Steyn (1965), Mitchell *et al.* (1987), Mocquard (1895), Nance (2007), Neumann (1905), Parker (1942), Pauwels and David (2008), Pauwels and Vande weghe (2008), Peters (1854), Pfeffer (1889, 1893), Pietruszka (1987, 1988), Popp (1958), Pyron *et al.* (2013), Raselimanana *et al.* (2000, 2009), Raxworthy and Nussbaum (1994), Recknagel *et al.* (2013), Rensburg *et al.* (2009), Rese (1986), Roux (1907), Salvidio *et al.* (2004), Schmidt (2008), Schmidt (1919), Schmidt and Liebel (1997), Schwier (2007), Scortecci (1930, 1934), Smith (1837, 1849), Spawls and Rotich (1997), Spawls *et al.* (2001), Sternfeld (1917), Steyn (1963),

Switak (1979), Tomsett (1990), Trapé *et al.* (2012), Ulber (1999), Ullenbruch *et al.* (2010), Van Beest (2004), Vences *et al.* (1999), Wagner (2010), Wagner *et al.* (2012), Werner (1906), Whiting *et al.* (2003), Wiegmann (1828) and sources cited therein.

Key published literature relevant to the taxonomy of the Cordylidae includes Abraham (1981), Adolphs (2006), Adolphs and Tröger (1987), Alexander and Marias (2007), Angel (1922, 1942), Armstrong (2011), Bates (2005, 2007), Bates and Whittinton-Jones (2009), Bauer and Branch (2003), Bauer *et al.* (1995), Berger (1978), Berghof (2006, 2007, 2011), Blackburn (1993), Bobe (2006), Bocage (1895), Boie (1828), Bonetti (2002), Boulenger (1885, 1890, 1895, 1899, 1908), Branch (1981, 1988a, 1988b, 1993, 1998), Branch and Branch (1992), Branch and Haagner (1992), Branch and Whiting (1997), Branch *et al.* (1992, 2005a, 2005b), Broadley (1959, 1962a, 1962b, 1964a, 1964b, 1965a, 1965b, 1971a, 1971b, 1976, 1978, 1981, 1995, 2006), Broadley and Branch (2002), Broadley and Cotterill (2004), Broadley and Howell (1991), Burgess *et al.* (2004), Cooper Jr (2005), Cooper Jr and Whiting (2003), Cope (1862), Costandius and Mouton (2006), Curtin *et al.* (2005), Cuvier (1829), Dam (1921), Daniels *et al.* (2004), Dathe (1988), De Waal (1978), Duméril and Bibron (1839), Du Toit *et al.* (2002), Eifler *et al.* (2007), Elzen (1980, 1982), Fitzinger (1843), FitzSimons (1930, 1933, 1937, 1941, 1943, 1948, 1958, 1965), Frost *et al.* (2001), Glaw and Vences (1994), Grandidier (1869), Gray (1831, 1845), Greeff and Whiting (1999, 2000), Greenbaum *et al.* (2012), Groenewald (1992), Gruschwitz and Schmidt (2001), Günther (1880, 1895), Haagner *et al.* (2000), Heath *et al.* (2008), Herselman (1991), Herselman *et al.* (1992a, 1992b), Hewitt (1909, 1927, 1932), Hewitt and Methuen (1913), Hipsley *et al.* (2009), Jacobsen (1989, 1994, 1995), Jacobsen and Newbery (1989), Jacobsen *et al.* (1989), Janse van Rensburg (2009), Janse van Rensburg *et al.* (2009), Jes (1967), Kahl *et al.* (1980), Kappelman *et al.* (2003), Kirckhof *et al.* (2010), Koch-Iseburg (1977), Krabbe-Paulduro and Paulduro (1989), Lambiris (1987), Lang (1991a), Langerwerf (1996, 2001, 2005), Laurent (1964), Laurenti (1768), Lewis *et al.* (2009), Linnaeus (1758), Loehr and Zwartepoorte (1995), Loveridge (1944, 1953), Marais (1984), Matschie (1891), Matz (1974, 1975, 1985), McConnachie and Whiting (2003), McConnachie *et al.* (2010), McLachlan (1986), Meier (1988), Menegon *et al.* (2006), Mertens (1937), Methuen and Hewitt (1914), Moon (2001), Mouton and Le Fras (2011), Mouton *et al.* (1993, 1994, 1995, 1997, 1999, 2002, 2010, 2012), Niekisch (1981), Odierna *et al.* (2002), Olmo and Odierna (1980), Parker (1936), Parusnath (2011), Parusnath and Nielsen (2011), Peers (1930), Peters (1854, 1862, 1879), Popp (1931, 1949), Pyron *et al.* (2013), Raselimanana *et al.* (2006, 2009), Recknagel *et al.* (2013), Schmidt and Liebel (1997), Schmidt (1919, 1924, 1930), Schwier (2007a, 2007b, 2007c), Scott *et al.* (2004), Senfft (1931), Shaw and Nodder (1811), Smith (1838, 1844, 1848), Spawls and Rotich (1997), Spawls *et al.* (2001), Stanley (2009), Stanley *et al.* (2011), Stejneger (1936), Switak (1981, 1987, 1995a, 1995b), Toit *et al.* (2003), Tolley *et al.* (2004), van Dam (1921), Van Beest (2004), Van Wyk (1994, 1995), Van Wyk and Swarts (2002), Van Wyk *et al.* (1998), Visagie *et al.* (2002), Visser (1971, 1984), Waal (1978), Welzel (1981), Whiting (1999, 2002), Whiting and Bateman (1999), Whiting and Greeff (1997, 1999), Whiting *et al.* (2003), and sources cited therein.

Following is a synopsis of the two families as defined herein, including as needed new diagnoses and definitions of taxon groups in accordance with the Zoological Code (Ride *et al.* 1999). In order to maintain relevance, material from earlier and readily available papers is not rehashed or referred to herein, beyond what is necessary to maintain proper context.

In the account below, the Gerrhosauridae is dealt with first, before the Cordylidae.

As an instruction to first or subsequent revisors of this work, no names proposed herein should have their spelling changed or altered in any way unless this is a mandatory requirement under

the existing in force Zoological Code, as published by the ICZN. If emendation of names is in the normal course of events optional only, then the original spelling herein should be used.

FAMILY GERRHOSAURIDAE, FITZINGER, 1843.

Type genus: *Gerrhosaurus* Wiegmann, 1828.

Diagnosis: Build may be robust, moderate, or vermiform; head covered with symmetrical shields; eyes present; eyelids well developed; tympanum distinct; dentition pleurodont, teeth closely set, hollow at the base, with long cylindrical shafts and conical or bicuspid crowns, pterygoid teeth often present; tongue moderate, elongate, arrow-headed, bifid posteriorly, covered with imbricate scale-like papillae or oblique plicae converging towards the median line; body with squarish or rhomboidal imbricate scales, forming regular longitudinal and transverse series (in African but not in all Malagasy species); a lateral fold covered with granular scales (except in the Malagasy genus *Tracheloptychus*); limbs well developed or rudimentary or absent posteriorly; femoral pores present or absent (in some serpentiform species); tail long and fragile.

Skull similar to that of the Lacertidae in every respect, with dermal ossification roofing over the supra temporal fossae; body furnished with osteodermal plates underlying the scales and showing a system of longitudinal tubules intersecting a transverse one as in the Scincidae, this structure being usually more distinct on the ventral plates than on the thicker and rougher dorsal ones; clavicle dilated and loop-shaped proximally; interclavicle cruciform, (adopted from Loveridge 1943, in turn adopted from Boulenger 1887 as cited by Loveridge).

Distribution: Africa and Madagascar.

Content: **Subfamilies:** Gerrhosaurinae; Zonosaurinae.

SUBFAMILY GERRHOSAURINAE LANG, 1991.

Diagnosis: Ventral plates forming a perfectly straight transverse series. Otherwise as for the family Gerrhosauridae, (adapted from Loveridge 1943).

Distribution: Africa.

Content: (Genera): *Gerrhosaurus* Wiegmann, 1828 (type genus); *Cordylosaurus* Gray, 1865; *Funkisaurus* gen. nov.; *Swilesaurus* gen. nov.; *Tetractylus* Merrem, 1820.

GENUS GERRHOSAURUS WIEGMAN, 1828.

Type species: *Gerrhosaurus flavigularis* Wiegmann, 1828.

Diagnosis: Tongue covered with imbricate scale-like papillae; nostril pierced between 2 nasals and first labial; prefrontals and frontoparietal present; lower eyelid scaly; dorsal and ventral scales forming straight longitudinal and transverse series; a strong lateral fold; limbs well developed; subdigital scales smooth or tubercular; femoral pores present, (adapted from Loveridge 1943).

Distribution: Africa, except the far north.

Content: *Gerrhosaurus flavigularis* Wiegmann, 1828 (type species); *G. bulsi* Laurent, 1954; *G. multilineatus* Bocage, 1866; *G. nigrolineatus* Hallowell, 1857; *G. skoogi* Andersson, 1916; *G. typicus* (Smith, 1837).

SUBGENUS PLEUROTUCHUS SMITH, 1837.

Type species: *Pleurotuchus typicus* Smith, 1837.

Diagnosis: Head small, its length being included in the distance from snout to anus 5 to 5.2 (adult) times; head shields smooth; rostral in contact with, or narrowly separated from, the frontonasal; prefrontals

slightly separated or barely in contact; supraoculars 4; supraciliaries 5; tympanic shield broad, crescentic; body cyclohexagonal or slightly depressed; dorsals strongly keeled, not striated, in 22-24 longitudinal and 56-58 transverse rows; laterals smooth; ventrals in 10 longitudinal and 30-35 transverse rows from pectoral to anal shields; femoral pores 15-17 on each side; fourth toe with 16-18 lamellae below; tail about 1.25 to 2 times the length of head and body.

Coloration: Above, head, back, and tail deep olive brown; a broad, light yellow, dorsolateral line, dark-edged above, from head to tail anteriorly; flank dark brown with a double series of dark-edged, white (yellow) spots; a similar, but less distinct, series on the tail. Below, creamy white (yellowish); underside of limbs and distal half of tail carrot-red in adult males. Eyes orange brown.

Tongue covered with imbricate scale-like papillae; nostril pierced between 2 nasals and first labial; prefrontals and frontoparietal present; lower eyelid scaly; dorsal and ventral scales forming straight longitudinal and transverse series; a strong lateral fold; limbs well developed; subdigital scales smooth or tubercular; femoral pores present, (adapted from Loveridge 1943).

Comment: Molecular analysis has placed the species *typicus* (Smith, 1837), monotypic for the subgenus apart from others within the genus *Gerrhosaurus* and due to its obvious morphological differences, an argument has been raised to place it in a monotypic genus. However I have taken a conservative position and placed it in a subgenus, using the available name *Pleurotuchus* Smith, 1837.

Distribution: North-west Republic of South Africa.

Content: *Gerrhosaurus (Pleurotuchus) typicus* (Smith, 1837) (monotypic for the subgenus).

SUBGENUS ANGOLOSAURUS FITZIMONS, 1953.

Type species: *Gerrhosaurus skoogi* Andersson, 1916.

Diagnosis: Head depressed, its length from back of parietal only being included in the distance from snout to anus 5.6 times; head shields smooth; rostral large, with sharp cutting edge, in contact with the frontonasal; prefrontals shortly in contact; supraoculars 4; supraciliaries 5; tympanic shield large, trapezoid; body almost cylindrical (obviously bloated); dorsals smooth anteriorly, feebly tricarinate and serrate posteriorly, in 35 longitudinal and 64 transverse rows; ventrals in 18-22 longitudinal rows; femoral pores 24-27 on each side; tail slightly shorter than the length of head and body.

Coloration: Above, head dusky; body grayish brown; margin of upper jaw, sides of neck, and forelimbs anteriorly, jet black; fore feet light to white. Below, throat, breast and belly anteriorly black; middle and posterior portion of belly and underside of thighs, dusky.

Tongue covered with imbricate scale-like papillae; nostril pierced between 2 nasals and first labial; prefrontals and frontoparietal present; lower eyelid scaly; dorsal and ventral scales forming straight

longitudinal and transverse series; a strong lateral fold; limbs well developed; subdigital scales smooth or tubercular; femoral pores present, (adapted from Loveridge 1943).

Distribution: Angola and south-west Africa (Namibia).

Content: *Gerrhosaurus (Angolosaurus) skoogi* Andersson, 1916 (monotypic for the subgenus).

SUBGENUS GERRHOSAURUS WIEGMAN, 1828.

Type species: *Gerrhosaurus flavigularis* Wiegmann, 1828.

Diagnosis: By exclusion of the two subgenera defined above (being: *Pleurotuchus* Smith, 1837 and *Angolosaurus* Fitzimons, 1953).

Additionally defined by the following suite of characters: Tongue covered with imbricate scale-like papillae; nostril pierced between 2 nasals and first labial; prefrontals and frontoparietal present; lower eyelid scaly; dorsal and ventral scales forming straight longitudinal and transverse series; a strong lateral fold; limbs well developed; subdigital scales smooth or tubercular; femoral pores present, (adapted from Loveridge 1943).

Distribution: Africa, except the far north.

Content: *Gerrhosaurus (Gerrhosaurus) flavigularis* Wiegmann, 1828 (type species); *G. (Gerrhosaurus) bulsi* Laurent, 1954; *G. (Gerrhosaurus) multilineatus* Bocage, 1866; *G. (Gerrhosaurus) nigrolineatus* Hallowell, 1857.

GENUS SWILESAURUS GEN. NOV.

Type species: *Gerrhosaurus validus* Smith, 1849.

Diagnosis: Separated from the genus *Gerrhosaurus* defined above by the following suite of characters: Head moderate, its length being included in the distance from snout to anus 4 (young) to 4.9 (adult) times; head shields smooth (young), feebly striated (halfgrown), or rugose (adult); rostral

separated from, very rarely in contact with, the frontonasal; prefrontals broadly in contact; supraoculars 4; supraciliaries 5; subocular excluded from lip by labial; tympanic shield narrow and bandlike (young) or broad and subtriangular (adult); body cyclotetragonal or depressed; dorsals keeled, unicarinate (young), tricarinate (halfgrown), or multicarinate (adult), and serrated, in 28-34 longitudinal and 50-56 transverse rows; laterals keeled and sometimes striated also; ventrals in 14-20 longitudinal and 40-44 transverse rows from pectoral to anal shields; femoral pores 17-25 on each side; fourth toe with 18-22 lamellae below; tail 1.3 (young) to 1.8 (adult) times the length of head and body.

Coloration: In this genus, the dark markings may be dominant so that they assume the importance of the ground color, but this arrangement followed is sometimes reversed. Above, dark brown or blackish, head flecked and spotted with citron yellow; each dorsal scale with a citron yellow streak or spot on its inner edge; a broad, white, or lemon yellow, dorsolateral line from head to tail anteriorly, continuous in young, more or less interrupted and indistinct in adults; flanks with light vertical bars in young; limbs dark spotted with lighter. Below, throat, chest, and limbs whitish blotched with pale brown; belly and tail brownish or blackish with some white persisting as fine, light, longitudinal lines along the edges of the ventrals and subcaudals; soles of feet black. Furthermore the tongue is covered with imbricate scale-like papillae; nostril pierced between 2 nasals and first labial; prefrontals and frontoparietal present; lower eyelid scaly; dorsal and ventral scales forming straight longitudinal and transverse series; a strong lateral fold; limbs well developed; subdigital scales smooth or tubercular; femoral pores present, (adapted from Loveridge 1943).

Distribution: Southern Africa, except the wetter far south.

Etymology: Named in honour of Keenan Swile of Athlone, Cape Town in South Africa for services to herpetology.

Content: *Swilesaurus validus* Smith, 1849 (monotypic for the genus).

GENUS FUNKISAURUS GEN. NOV.

Type Species: *Gerrhosaurus major* Duméril, 1851.

Diagnosis: Head moderate, its length being included in the distance from snout to anus 4.1 (young) to 5.1 (adult) times; head shields rugose; rostral in contact with, or separated from, the frontonasal; frontonasal divided, rarely entire; prefrontals broadly in contact; supraoculars 4, rarely 3; supraciliaries 5, rarely 3-4; tympanic shield narrow, band-like; body cyclotetragonal or slightly depressed; dorsals strongly keeled, striated or rugose, in 17-21 longitudinal and 32-38 transverse rows; laterals keeled and striated; ventrals in 10, rarely 9, longitudinal and 31-34 transverse rows from pectoral to anal shields; femoral pores 12-14; fourth toe with 13-16 lamellae below; tail 1.25 to 1.5 times the length of head and body.

Coloration: Above, uniform fulvous brown or buff. Below, uniform yellowish white. Individuals sometimes occur, which show slight traces of black on the keels and even form ill-defined dark lines on the lumbar region and tail. The loreal region is commonly rusty red; the lips, auricular border, and lateral folds gray-blue; skin between scales bluish; chin and throat orange yellow; rest of undersurface dirty white.

The occipital scale may be present or absent. Furthermore the tongue is covered with imbricate scale-like papillae; nostril pierced between 2 nasals and first labial; prefrontals and frontoparietal present; lower eyelid scaly; dorsal and ventral

scales forming straight longitudinal and transverse series; a strong lateral fold; limbs well developed; subdigital scales smooth or tubercular; femoral pores present, (adapted from Loveridge 1943).

Comment: *Funkisaurus major* Duméril, 1851 is currently the only species in this genus as defined herein. However several races, treated until now as subspecies, are in my view best treated as full species.

Distribution: Southern Africa, except the wetter far south.

Etymology: Named in honour of Dr Richard Funk, of Mesa, Arizona, United States of America, formerly of Florida, USA, for services to herpetology. For further detail, refer to the etymology for *Funkelapidus* Hoser, 2012 in Hoser (2012).

Content: *Funkisaurus major* Duméril, 1851 (currently monotypic for the species).

GENUS TETRADACTYLUS MERREM, 1820.

Type species: *Chalcides tetradactylus* Daudin, 1802.

Diagnosis: Tongue covered with oblique plicae converging anteriorly towards the median line; nostril pierced between 2 (rarely 3) nasals and first labial, or latter rarely excluded; no prefrontals; frontoparietals present; lower eyelid scaly; dorsal and ventral scales forming straight longitudinal and transverse series; a strong lateral fold; fore limbs present or absent; digits, if present, smooth inferiorly; femoral pores present or absent (subgenus *Tetradactylus*); or:

Tongue covered with oblique plicae converging anteriorly towards the median line; nostril pierced between a single nasal, first labial, and very near rostral; prefrontals present; frontoparietals present; lower eyelid scaly; dorsal and ventral scales forming straight longitudinal and transverse series; a strong lateral fold; no fore limbs; hind limbs minute; no femoral pores (subgenus *Paratetradactylus*).

Distribution: Southern Africa.

Content: *Tetradactylus tetradactylus* (Daudin, 1802) (type species); *T. africanus* (Gray, 1838); *T. breyeri* Roux, 1907; *T. eastwoodae* Hewitt and Methuen, 1913; *T. ellenbergeri* (Angel, 1922); *T. seps* (Linnaeus, 1758); *T. udzungwensis* Salvidio, Menegon, Sindaco and Moyer, 2004.

SUBGENUS PARATETRADACTYLUS ANGEL, 1922.

Type species: *Paratetradactylus ellenbergeri* Angel, 1922.

Diagnosis: Tongue covered with oblique plicae converging anteriorly towards the median line; nostril pierced between a single nasal, first labial, and very near rostral; prefrontals present; frontoparietals present; lower eyelid scaly; dorsal and ventral scales forming straight longitudinal and transverse series; a strong lateral fold; no fore limbs; hind limbs minute; no femoral pores (subgenus *Paratetradactylus*).

The other subgenus *Tetradactylus* is defined as follows: Tongue covered with oblique plicae converging anteriorly towards the median line; nostril pierced between 2 (rarely 3) nasals and first labial, or latter rarely excluded; no prefrontals; frontoparietals present; lower eyelid scaly; dorsal and ventral scales forming straight longitudinal and transverse series; a strong lateral fold; fore limbs present or absent; digits, if present, smooth inferiorly; femoral pores present or absent.

Distribution: Southern Africa.

Content: *Tetradactylus (Paratetradactylus) ellenbergeri* Angel, 1922 (monotypic for the subgenus).

SUBGENUS TETRADACTYLUS MERREM, 1820.

Type species: *Chalcides tetradactylus* Daudin, 1802.

Diagnosis: The subgenus *Tetradactylus* is defined as follows: Tongue covered with oblique plicae converging anteriorly towards the median line; nostril pierced between 2 (rarely 3) nasals and first labial, or latter rarely excluded; no prefrontals; frontoparietals present; lower eyelid scaly; dorsal and ventral scales forming straight longitudinal and transverse series; a strong lateral fold; fore limbs present or absent; digits, if present,

smooth inferiorly; femoral pores present or absent.

The subgenus *Paratetradactylus* is defined as follows: Tongue covered with oblique plicae converging anteriorly towards the median line; nostril pierced between a single nasal, first labial, and very near rostral; prefrontals present; frontoparietals present; lower eyelid scaly; dorsal and ventral scales forming straight longitudinal and transverse series; a strong lateral fold; no fore limbs; hind limbs minute; no femoral pores.

Distribution: Southern Africa.

Content: *Tetradactylus (Tetradactylus) tetradactylus* (Daudin, 1802) (type species); *T. (Tetradactylus) africanus* (Gray, 1838); *T. (Tetradactylus) breyeri* Roux, 1907; *T. (Tetradactylus) eastwoodae* Hewitt and Methuen, 1913; *T. (Tetradactylus) seps* (Linnaeus, 1758); *T. (Tetradactylus) udzungwensis* Salvidio, Menegon, Sindaco and Moyer, 2004.

GENUS *CORDYLOSOSAURUS* GRAY, 1865

Type species: *Gerrhosaurus subtessellatus* Smith, 1844.

Diagnosis: Tongue nearly entirely covered with imbricate scale-like papillae; nostril pierced between 2 nasals and first labial; no prefrontals; frontoparietals present (in young) or absent (in adults); lower eyelid with a transparent disk; dorsal and ventral scales forming straight longitudinal and transverse series; a strong lateral fold; limbs well developed; subdigital scales keeled; femoral pores present.

Head and body depressed. Rostral separated from the frontonasal; no prefrontals; supraoculars 4; supraciliaries 4; frontoparietals, interparietal, and parietal separate and distinct in young, fused into a single shield in adults; tympanic shield narrower or broader than the posterior upper temporal; dorsals distinctly keeled (or nearly smooth), tri- or quinquecarinate or those in lumbar region with a median keel, in 15 longitudinal and 52-55 transverse rows; ventrals in 8 longitudinal rows; femoral pores 7-10 on each side, the distal ones less developed in females; tail about 2 to 2.7 times the length of head and body.

Coloration: Above, dark brown or black; a pale olive, pale buff, or yellowish, dorsolateral line, never more than two scales in width on body, commencing on head becomes pinkish buff or pale greenish blue posteriorly changing to bluish green or bright blue on tail; limbs tinged with pink; feet, or at least the digits, reddish. Below, chin pinkish buff; chest and belly whitish; limbs reddish; or alternatively above, middle of back yellow brown, dorsolateral region chequered white and blackish; sides dark brown; below, brownish.

Distribution: The countries of south-west Africa. This being the drier parts of Angola, Namibia, Republic of South Africa and Botswana.

Content: *Cordylosaurus subtessellatus* Smith, 1844 (monotypic for the genus).

TRIBE *FUNKISAURUSIINI* TRIBE *NOV.*

Terminal taxon: *Gerrhosaurus major* Duméril, 1851.

Diagnosis: As for the genus *Funkisaurus gen. nov.*

Head moderate, its length being included in the distance from snout to anus 4.1 (young) to 5.1 (adult) times; head shields rugose; rostral in contact with, or separated from, the frontonasal; frontonasal divided, rarely entire; prefrontals broadly in contact; supraoculars 4, rarely 3; supraciliaries 5, rarely 3-4; tympanic shield narrow, band-like; body cyclohexagonal or slightly depressed; dorsals strongly keeled, striated or rugose, in 17-21 longitudinal and 32-38 transverse rows; laterals keeled and striated; ventrals in 10, rarely 9, longitudinal and 31-34 transverse rows from pectoral to anal shields; femoral pores 12-14; fourth toe with 13-16 lamellae below; tail 1.25 to 1.5 times the length of head and body.

Coloration: Above, uniform fulvous brown or buff. Below, uniform yellowish white. Individuals sometimes occur, which show slight traces of black on the keels and even form ill-defined dark lines on the lumbar region and tail. The loreal region is commonly rusty red; the lips, auricular border, and lateral folds gray-blue;

skin between scales bluish; chin and throat orange yellow; rest of undersurface dirty white. The occipital scale may be present or absent. Furthermore the tongue is covered with imbricate scale-like papillae; nostril is pierced between 2 nasals and first labial; prefrontals and frontoparietal present; lower eyelid scaly; dorsal and ventral scales forming straight longitudinal and transverse series; a strong lateral fold; limbs well developed; subdigital scales smooth or tubercular; femoral pores present, (adapted from Loveridge 1943).

Comment: *Funkisaurus major* Duméril, 1851 is currently the only species in the genus *Funkisaurus gen. nov.* as defined herein. However several races, treated until now as subspecies, are in my view best treated as full species.

Distribution: Southern Africa, except the wetter far south.

Etymology: Named in honour of Dr Richard Funk, of Mesa, Arizona, the United States of America, formerly of Florida, USA, for services to herpetology. For further detail, refer to the etymology for *Funkelapidus* Hoser, 2012 in Hoser (2012).

Content: *Funkisaurus gen. nov.* (see above).

TRIBE *TETRADACTYLUSIINI* TRIBE *NOV.*

Terminal taxon: *Chalcides tetradactylus* Daudin, 1802.

Diagnosis: As for the two component genera.

For *Cordylosaurus* Gray, 1865 the tongue is nearly entirely covered with imbricate scale-like papillae; nostril pierced between 2 nasals and first labial; no prefrontals; frontoparietals present (in young) or absent (in adults); lower eyelid with a transparent disk; dorsal and ventral scales forming straight longitudinal and transverse series; a strong lateral fold; limbs well developed; subdigital scales keeled; femoral pores present.

Head and body depressed. Rostral separated from the frontonasal; no prefrontals; supraoculars 4; supraciliaries 4; frontoparietals, interparietal, and parietal separate and distinct in young, fused into a single shield in adults; tympanic shield narrower or broader than the posterior upper temporal; dorsals distinctly keeled (or nearly smooth), tri- or quinquecarinate or those in lumbar region with a median keel, in 15 longitudinal and 52-55 transverse rows; ventrals in 8 longitudinal rows; femoral pores 7-10 on each side, the distal ones less developed in females; tail about 2 to 2.7 times the length of head and body.

Coloration: Above, dark brown or black; a pale olive, pale buff, or yellowish, dorsolateral line, never more than two scales in width on body, commencing on head becomes pinkish buff or pale greenish blue posteriorly changing to bluish green or bright blue on tail; limbs tinged with pink; feet, or at least the digits, reddish. Below, chin pinkish buff; chest and belly whitish; limbs reddish; or alternatively above, middle of back yellow brown, dorsolateral region chequered white and blackish; sides dark brown; below, brownish, (genus *Cordylosaurus* Gray, 1865), or: one or other of the following for either subgenus within *Tetradactylus* Merrem, 1820:

The subgenus *Tetradactylus* is defined as follows: Tongue is covered with oblique plicae converging anteriorly towards the median line; nostril pierced between 2 (rarely 3) nasals and first labial, or latter rarely excluded; no prefrontals; frontoparietals present; lower eyelid scaly; dorsal and ventral scales forming straight longitudinal and transverse series; a strong lateral fold; fore limbs present or absent; digits, if present, smooth inferiorly; femoral pores present or absent, or:

The subgenus *Paratetradactylus* is defined as follows: Tongue covered with oblique plicae converging anteriorly towards the median line; nostril pierced between a single nasal, first labial, and very near rostral; prefrontals present; frontoparietals present; lower eyelid scaly; dorsal and ventral scales forming straight longitudinal and transverse series; a strong lateral fold; no fore limbs; hind limbs minute; no femoral pores.

Distribution: Southern Africa.

Content: *Tetradactylus* Merrem, 1820; *Cordylosaurus* Gray, 1865.

TRIBE GERRHOSAURIINI TRIBE NOV.

Terminal taxon: *Gerrhosaurus flavigularis* Wiegmann, 1828.

Diagnosis: Tongue covered with imbricate scale-like papillae; nostril pierced between 2 nasals and first labial; prefrontals and frontoparietal present; lower eyelid scaly; dorsal and ventral scales forming straight longitudinal and transverse series; a strong lateral fold; limbs well developed; subdigital scales smooth or tubercular; femoral pores present, (adapted from Loveridge 1943).

The tribe *Funkisaurusiini* *tribe nov.* (monotypic for the genus *Funkisaurus gen. nov.*) is separated from this tribe (*Gerrhosaurusiini* *tribe nov.*) by the following suite of characters: Head moderate, its length being included in the distance from snout to anus 4.1 (young) to 5.1 (adult) times; head shields rugose; rostral in contact with, or separated from, the frontonasal; frontonasal divided, rarely entire; prefrontals broadly in contact; supraoculars 4, rarely 3; supraciliaries 5, rarely 3-4; tympanic shield narrow, band-like; body cyclotetragonal or slightly depressed; dorsals strongly keeled, striated or rugose, in 17-21 longitudinal and 32-38 transverse rows; laterals keeled and striated; ventrals in 10, rarely 9, longitudinal and 31-34 transverse rows from pectoral to anal shields; femoral pores 12-14; fourth toe with 13-16 lamellae below; tail 1.25 to 1.5 times the length of head and body.

Coloration: Above, uniform fulvous brown or buff. Below, uniform yellowish white. Individuals sometimes occur, which show slight traces of black on the keels and even form ill-defined dark lines on the lumbar region and tail. The loreal region is commonly rusty red; the lips, auricular border, and lateral folds gray-blue; skin between scales bluish; chin and throat orange yellow; rest of undersurface dirty white.

The occipital scale may be present or absent.

Distribution: Africa.

Content: *Gerrhosaurus* Wiegmann, 1828; *Swilesaurus gen. nov.*

SUBTRIBE GERRHOSAURIINA SUBTRIBE NOV.

Terminal taxon: *Gerrhosaurus flavigularis* Wiegmann, 1828.

Diagnosis: As for the tribe Gerrhosauriini, but by elimination of the other subtribe within this tribe, namely *Swilesauriina subtribe nov.*, itself monotypic for the genus *Swilesaurus gen. nov.*

Swilesaurus gen. nov. (*Swilesauriina* *tribe nov.*) is separated from the genus *Gerrhosaurus* defined above by the following suite of characters: Head moderate, its length being included in the distance from snout to anus 4 (young) to 4.9 (adult) times; head shields smooth (young), feebly striated (halfgrown), or rugose (adult); rostral separated from, very rarely in contact with, the frontonasal; prefrontals broadly in contact; supraoculars 4; supraciliaries 5; subocular excluded from lip by labial; tympanic shield narrow and bandlike (young) or broad and subtriangular (adult); body cyclotetragonal or depressed; dorsals keeled, unicarinate (young), tricarinate (halfgrown), or multicarinate (adult), and serrated, in 28-34 longitudinal and 50-56 transverse rows; laterals keeled and sometimes striated also; ventrals in 14-20 longitudinal and 40-44 transverse rows from pectoral to anal shields; femoral pores 17-25 on each side; fourth toe with 18-22 lamellae below; tail 1.3 (young) to 1.8 (adult) times the length of head and body.

Coloration: In this genus, the dark markings may be dominant so that they assume the importance of the ground color, but this arrangement followed is sometimes reversed. Above, dark brown or blackish, head flecked and spotted with citron yellow; each dorsal scale with a citron yellow streak or spot on its inner edge; a broad, white, or lemon yellow, dorsolateral line from head to tail anteriorly, continuous in young, more or less interrupted and indistinct in adults; flanks with light vertical bars in young; limbs dark spotted with lighter. Below, throat, chest, and limbs whitish blotched with pale brown; belly and tail brownish or blackish with some white persisting as fine, light, longitudinal lines along the edges of the ventrals and

subcaudals; soles of feet black. Furthermore in *Swilesaurus* (*Swilesaurusiina subtribe nov.*) and the subtribe *Gerrhosaurusiina subtribe nov.*, the tongue is covered with imbricate scale-like papillae; nostril pierced between 2 nasals and first labial; prefrontals and frontoparietal present; lower eyelid scaly; dorsal and ventral scales forming straight longitudinal and transverse series; a strong lateral fold; limbs well developed; subdigital scales smooth or tubercular; femoral pores present, (adapted from Loveridge 1943).

Distribution: Africa.

Content: *Gerrhosaurus* Wiegmann, 1828.

SUBTRIBE SWILESURIINA SUBTRIBE NOV.

Terminal taxon: *Gerrhosaurus validus* Smith, 1849.

Diagnosis: Separated from the genus *Gerrhosaurus* defined above by the following suite of characters: Head moderate, its length being included in the distance from snout to anus 4 (young) to 4.9 (adult) times; head shields smooth (young), feebly striated (halfgrown), or rugose (adult); rostral separated from, or very rarely in contact with, the frontonasal; prefrontals broadly in contact; supraoculars 4; supraciliaries 5; subocular excluded from lip by labial; tympanic shield narrow and bandlike (young) or broad and subtriangular (adult); body cyclotetragonal or depressed; dorsals keeled, unicarinate (young), tricarinate (halfgrown), or multicarinate (adult), and serrated, in 28-34 longitudinal and 50-56 transverse rows; laterals keeled and sometimes striated also; ventrals in 14-20 longitudinal and 40-44 transverse rows from pectoral to anal shields; femoral pores 17-25 on each side; fourth toe with 18-22 lamellae below; tail 1.3 (young) to 1.8 (adult) times the length of head and body.

Coloration: In this genus, the dark markings may be dominant so that they assume the importance of the ground color, but this arrangement followed is sometimes reversed. Above, dark brown or blackish, head flecked and spotted with citron yellow; each dorsal scale with a citron yellow streak or spot on its inner edge; a broad, white, or lemon yellow, dorsolateral line from head to tail anteriorly, continuous in young, more or less interrupted and indistinct in adults; flanks with light vertical bars in young; limbs dark spotted with lighter. Below, throat, chest, and limbs whitish blotched with pale brown; belly and tail brownish or blackish with some white persisting as fine, light, longitudinal lines along the edges of the ventrals and subcaudals; soles of feet black. Furthermore the tongue is covered with imbricate scale-like papillae; nostril pierced between 2 nasals and first labial; prefrontals and frontoparietal present; lower eyelid scaly; dorsal and ventral scales forming straight longitudinal and transverse series; a strong lateral fold; limbs well developed; subdigital scales smooth or tubercular; femoral pores present, (adapted from Loveridge 1943).

Distribution: Southern Africa, except the wetter far south.

Content: *Swilesaurus gen. nov.*

SUBFAMILY ZONOSAURINAE LANG, 1991.

Diagnosis: Ventral plates not forming straight transverse series; nostril pierced between 2 nasals, first labial and the rostral. Otherwise as for the family Gerrhosauridae, (adapted from Loveridge 1943).

Distribution: Madagascar.

Content: (Genera): *Zonosaurus* Boulenger, 1887 (type genus); *Hawkeswoodsaurus gen. nov.*; *Tracheloptychus* Peters, 1854; *Wellingtonsaurus gen. nov.*; *Wellssaurus gen. nov.*

GENUS ZONOSAURUS BOULENGER, 1887.

Type species: *Cicigna madagascariensis* Gray, 1831.

Diagnosis: In his original description of the genus *Zonosaurus*, Boulenger (1887) at page 127 did not specify a type species for the genus and as far as I can ascertain, no author has done so since.

Therefore, in accordance with the relevant sections of the current Zoological Code (Ride *et al.* 1999), namely Articles 69 and 69A and the relevant parts therein, I hereby designate the

species *Cicigna madagascariensis* Gray, 1831 as the type species for the genus *Zonosaurus* Boulenger, 1887. It should be noted that this species taxon was the first of three that Boulenger listed in his descriptions of the three species within this newly created genus.

The genus *Zonosaurus* Boulenger, 1887 is herein diagnosed and separated from other Zonosaurinae by the following suite of characters: Interparietal usually absent, four upper labials anterior to the subocular; 16 to 22 femoral pores on each side. In common with other Zonosaurinae the genus *Zonosaurus* Boulenger, 1887 has the following diagnostic features: Nostril pierced between the rostral, the first labial, and two nasals; prefrontal shields present, no frontoparietals. Lower eyelid scaly. A strong lateral fold. Dorsal scales forming straight longitudinal and transverse series, ventrals hexagonal, in longitudinal series. Subdigital scales smooth or tubercular. Tongue nearly entirely covered with rhomboidal papillae.

The genus *Zonosaurus* Boulenger, 1887 is in turn further separated from the genera *Wellssaurus* gen. nov., *Hawkeswoodsaurus* gen. nov. and *Wellingtonsaurus* gen. nov. by absence of the suite of characters for each genus as outlined in the descriptions below.

Tracheloptychus Peters, 1854 is separated from other Zonosaurinae by the following suite of characters: Nostril pierced between the rostral, the first labial, and two nasals. Prefrontal and frontoparietal shields present. Lower eyelid scaly. No lateral fold on the body. Dorsal and ventral scales arranged quincuncially, laterals forming straight longitudinal and transverse series. Subdigital scales keeled. Tongue entirely covered with rhomboidal papillae.

Distribution: Madagascar.

Content: *Zonosaurus madagascariensis* (Gray, 1831) (type species); *Z. haraldmeieri* Brygoo and Böhme, 1985.

GENUS WELLSSAURUS GEN. NOV.

Type species: *Zonosaurus boettgeri* Steindachner, 1891.

Diagnosis: Separated from other Zonosaurinae by one or other of the following suite of characters:

1/ fewer than 17 rows of scales around the body (as opposed to more than 17 in all other species, and an extremely long original tail being more than 2.5 times longer than their snout-vent length, and a conspicuous color pattern of transverse dark bars, (for species *Wellssaurus boettgeri* Steindachner, 1891 or *W. maramaintso* Raselimanana, Nussbaum and Raxworthy, 2006 of subgenus *Wellssaurus* subgen. nov.) or:

2/ Fronto-nasal a little broader than long, forming a broad suture with the rostral, and widely separated from the frontal, the praefrontals forming a long median suture, three or four lower labials anterior to the subocular, a small interparietal. Dorsal scales strongly keeled, in 20 or 22 longitudinal and 45 or 46 transverse series (from occiput to base of tail), ventrals in 8 longitudinal series. 20 to 30 femoral pores on each side. Tail moderately depressed at the base, strongly compressed further back, about one and two fifths the length of the head and body. Dark olive-brown above, more or less distinctly spotted with darker colour, with or without a series of pale olive spots along each side of the back, sides pale olive, speckled and spotted with dark brown, yellowish or greenish-white beneath, (for species *W. maximus* Boulenger, 1896 of subgenus *Lukefabasaurus* subgen. nov.).

The genus *Zonosaurus* Boulenger, 1887 is herein diagnosed and separated from other Zonosaurinae by the following suite of characters: Interparietal usually absent, four upper labials anterior to the subocular; 16 to 22 femoral pores on each side. In common with other Zonosaurinae the genus *Wellssaurus* gen. nov. and both subgenera have the following diagnostic features: Nostril pierced between the rostral, the first labial, and two nasals; prefrontal shields present, no frontoparietals. Lower eyelid scaly. A strong lateral fold. Dorsal scales forming straight

longitudinal and transverse series, ventrals hexagonal, in longitudinal series. Subdigital scales smooth or tubercular. Tongue nearly entirely covered with rhomboidal papillae.

Tracheloptychus Peters, 1854 is separated from other Zonosaurinae by the following suite of characters: Nostril pierced between the rostral, the first labial, and two nasals. Prefrontal and frontoparietal shields present. Lower eyelid scaly. No lateral fold on the body. Dorsal and ventral scales arranged quincuncially, laterals forming straight longitudinal and transverse series. Subdigital scales keeled. Tongue entirely covered with rhomboidal papillae.

Distribution: Madagascar.

Etymology: Named in honour of Richard Wells of Lismore in New South Wales, Australia, in recognition of a stellar career as an Australian herpetologist, best known for several major taxonomic publications in the 1980's (with co-author Cliff Ross Wellington) and also the post 2000 period.

Content: *Wellssaurus boettgeri* (Steindachner, 1891) (type species); *W. maramaintso* (Raselimanana, Nussbaum and Raxworthy, 2006); *W. maximus* (Boulenger, 1896).

SUBGENUS WELLSSAURUS SUBGEN. NOV.

Type species: *Zonosaurus boettgeri* Steindachner, 1891.

Diagnosis: Separated from other Zonosaurinae and the subgenus *Lukefabasaurus* subgen. nov. by the following suite of characters: Fewer than 17 rows of scales around the body (as opposed to more than 17 in all other species, and an extremely long original tail being more than 2.5 times longer than their snout-vent length, and a conspicuous color pattern of transverse dark bars, (for species *Wellssaurus boettgeri* Steindachner, 1891 or *W. maramaintso* Raselimanana, Nussbaum and Raxworthy, 2006).

The subgenus *Wellssaurus* subgen. nov. is separated from the subgenus *Lukefabasaurus* subgen. nov. which possesses the following suite of characters: Fronto-nasal a little broader than long, forming a broad suture with the rostral, and widely separated from the frontal, the praefrontals forming a long median suture, three or four lower labials anterior to the subocular, a small interparietal. Dorsal scales strongly keeled, in 20 or 22 longitudinal and 45 or 46 transverse series (from occiput to base of tail), ventrals in 8 longitudinal series. 20 to 30 femoral pores on each side. Tail moderately depressed at the base, strongly compressed further back, about once and two fifths the length of head and body. Dark olive-brown above, more or less distinctly spotted with darker, with or without a series of pale olive spots along each side of the back, sides pale olive, speckled and spotted with dark brown, yellowish or greenishwhite beneath, (for species *W. (Lukefabasaurus) maximus* Boulenger, 1896).

In common with other Zonosaurinae the genus *Wellssaurus* gen. nov. and both subgenera have the following diagnostic features: Nostril pierced between the rostral, the first labial, and two nasals; prefrontal shields present, no frontoparietals. Lower eyelid scaly. A strong lateral fold. Dorsal scales forming straight longitudinal and transverse series, ventrals hexagonal, in longitudinal series. Subdigital scales smooth or tubercular. Tongue nearly entirely covered with rhomboidal papillae.

Tracheloptychus Peters, 1854 is separated from other Zonosaurinae by the following suite of characters: Nostril pierced between the rostral, the first labial, and two nasals. Prefrontal and frontoparietal shields present. Lower eyelid scaly. No lateral fold on the body. Dorsal and ventral scales arranged quincuncially, laterals forming straight longitudinal and transverse series. Subdigital scales keeled. Tongue entirely covered with rhomboidal papillae.

Distribution: Madagascar.

Etymology: Named in honour of Richard Wells of Lismore in New South Wales, Australia, in recognition of a stellar career as a herpetologist, best known for several major taxonomic

publications in the 1980's (with co-author Cliff Ross Wellington) and also the post 2000 period.

Content: *Wellssaurus* (*Wellssaurus*) *boettgeri* (Steindachner, 1891) (type species); *W.* (*Wellssaurus*) *maramaintso* (Raselimanana, Nussbaum and Raxworthy, 2006).

SUBGENUS LUKEFABASAURUS SUBGEN. NOV.

Type species: *Zonosaurus maximus* Boulenger, 1896.

Diagnosis: The subgenus *Lukefabasaurus subgen. nov.* is separated from the subgenus *Wellssaurus subgen. nov.* by the following suite of characters: Fronto-nasal a little broader than long, forming a broad suture with the rostral, and widely separated from the frontal, the praefrontals forming a long median suture, three or four lower labials anterior to the subocular, a small interparietal. Dorsal scales strongly keeled, in 20 or 22 longitudinal and 45 or 46 transverse series (from occiput to base of tail), ventrals in 8 longitudinal series. 20 to 30 femoral pores on each side. Tail moderately depressed at the base, strongly compressed further back, about once and two fifths the length of head and body. Dark olive-brown above, more or less distinctly spotted with darker, with or without a series of pale olive spots along each side of the back, sides pale olive, speckled and spotted with dark brown, yellowish or greenishwhite beneath, (for species *W.* (*Lukefabasaurus*) *maximus* Boulenger, 1896).

The subgenus *Wellssaurus subgen. nov.* is separated from other Zonosaurinae and the subgenus *Lukefabasaurus subgen. nov.* by the following suite of characters: Fewer than 17 rows of scales around the body (as opposed to more than 17 in all other species, and an extremely long original tail being more than 2.5 times longer than their snout-vent length, and a conspicuous color pattern of transverse dark bars, (for species *Wellssaurus boettgeri* Steindachner, 1891 or *W. maramaintso* Raselimanana, Nussbaum and Raxworthy, 2006).

In common with other Zonosaurinae the genus *Wellssaurus gen. nov.* and both subgenera have the following diagnostic features: Nostril pierced between the rostral, the first labial, and two nasals; prefrontal shields present, no frontoparietals. Lower eyelid scaly. A strong lateral fold. Dorsal scales forming straight longitudinal and transverse series, ventrals hexagonal, in longitudinal series. Subdigital scales smooth or tubercular. Tongue nearly entirely covered with rhomboidal papillae.

Tracheloptychus Peters, 1854 is separated from other Zonosaurinae by the following suite of characters: Nostril pierced between the rostral, the first labial, and two nasals. Prefrontal and frontoparietal shields present. Lower eyelid scaly. No lateral fold on the body. Dorsal and ventral scales arranged quincuncially, laterals forming straight longitudinal and transverse series. Subdigital scales keeled. Tongue entirely covered with rhomboidal papillae.

Distribution: Madagascar.

Etymology: Named in honour of Luke Faba of Doncaster, Victoria, Australia, in recognition of his contributions to herpetology in his role as lawyer, defending this author against bogus criminal charges and other relevant legal matters, initiated by police-protected criminals and laid by corrupt wildlife officers in Victoria, Australia.

Content: *Wellssaurus* (*Lukefabasaurus*) *maximus* (Boulenger, 1896).

GENUS HAWKESWOODSAURUS GEN. NOV.

Type species: *Gerrhosaurus* (*Cicigna*) *rufipes* Boettger, 1881.

Diagnosis: *Hawkeswoodsaurus gen. nov.* are separated from all other Zonosaurini, including *Wellingtonsaurus gen. nov.* by having an adult snout-vent length of less than 94 mm and 2-3 supralabials anterior to the subocular.

This compares with an adult snout-vent length of 132-230 mm and 4-5 supralabials anterior to the subocular in all species within *Wellingtonsaurus gen. nov.*

Within this diagnosis for the genus *Hawkeswoodsaurus gen.*

nov. includes the exceptional species *Hawkeswoodsaurus tsingy* (Raselimanana, Raxworthy and Nussbaum, 2000), which has 2-4 supralabials anterior to the subocular and is separated from all other *Hawkeswoodsaurus gen. nov.* and all *Wellingtonsaurus gen. nov.* species by the following characters: Femoral pores 14-20; no obvious dorsolateral lines (dark or pale brown) between level of insertion of hind-limbs and the base of the tail; throat lacking obvious bold black longitudinal lines; skin on dorsum of body fragile (very easily broken if restrained during handling).

The genus *Zonosaurus* Boulenger, 1887 is herein diagnosed and separated from other Zonosaurinae by the following suite of characters: Interparietal usually absent, four upper labials anterior to the subocular; 16 to 22 femoral pores on each side.

The genus *Wellssaurus gen. nov.* is separated from other Zonosaurinae by one or other of the following suite of characters:

1/ Fewer than 17 rows of scales around the body (as opposed to more than 17 in all other species, and an extremely long original tail being more than 2.5 times longer than their snout-vent length, and a conspicuous color pattern of transverse dark bars, (for species *Wellssaurus boettgeri* Steindachner, 1891 or *W. maramaintso* Raselimanana, Nussbaum and Raxworthy, 2006 of subgenus *Wellssaurus subgen. nov.*) or:

2/ Fronto-nasal a little broader than long, forming a broad suture with the rostral, and widely separated from the frontal, the praefrontals forming a long median suture, three or four lower labials anterior to the subocular, a small interparietal. Dorsal scales strongly keeled, in 20 or 22 longitudinal and 45 or 46 transverse series (from occiput to base of tail), ventrals in 8 longitudinal series. 20 to 30 femoral pores on each side. Tail moderately depressed at the base, strongly compressed further back, about one and two fifths the length of head and body. Dark olive-brown above, more or less distinctly spotted with darker colour, with or without a series of pale olive spots along each side of the back, sides pale olive, speckled and spotted with dark brown, yellowish or greenishwhite beneath, (for species *W. maximus* Boulenger, 1896 of subgenus *Lukefabasaurus subgen. nov.*).

In common with other Zonosaurinae the genus *Hawkeswoodsaurus gen. nov.* and all four subgenera have the following diagnostic features: Nostril pierced between the rostral, the first labial, and two nasals; prefrontal shields present, no frontoparietals. Lower eyelid scaly. A strong lateral fold. Dorsal scales forming straight longitudinal and transverse series, ventrals hexagonal, in longitudinal series. Subdigital scales smooth or tubercular. Tongue nearly entirely covered with rhomboidal papillae.

Tracheloptychus Peters, 1854 is separated from other Zonosaurinae by the following suite of characters: Nostril pierced between the rostral, the first labial, and two nasals. Prefrontal and frontoparietal shields present. Lower eyelid scaly. No lateral fold on the body. Dorsal and ventral scales arranged quincuncially, laterals forming straight longitudinal and transverse series. Subdigital scales keeled. Tongue entirely covered with rhomboidal papillae.

Distribution: Madagascar.

Etymology: Named in honour of Dr. Trevor J. Hawkeswood, biologist and author of scientific papers, books and other publications on Australian, New Guinean and other non-Australasian plants and animals, in recognition for his valuable work in relation to invertebrate systematics, most notably that of beetles.

Content: *Hawkeswoodsaurus rufipes* (Boettger, 1881) (type species); *H. aeneus* (Grandidier, 1872); *H. bemaraha* (Raselimanana, Raxworthy and Nussbaum, 2000); *H. brygooi* (Lang and Böhme, 1990); *H. rufipes* (Boettger, 1881); *H. subunicolor* (Boettger, 1881); *H. tsingy* (Raselimanana, Raxworthy and Nussbaum, 2000).

SUBGENUS RASELIMANANASAUROS SUBGEN. NOV.

Type species: *Gerrhosaurus aeneus* Grandidier, 1872.

Diagnosis: This subgenus, monotypic for the species *Hawkeswoodsaurus aeneus* (Grandidier, 1872), is separated from all other Zonosaurinae by the following suite of characters: An adult snout-vent length of under 94 mm; a pale dorsolateral line on the anterior half of the body, broken or continuous; 51-59 ventral scale rows between the chin and cloaca; usually one (rarely two) supralabial/s posterior to the subocular; 2-3 supralabials anterior to the subocular.

Tracheloptychus Peters, 1854 is separated from other Zonosaurinae by the following suite of characters: Nostril pierced between the rostral, the first labial, and two nasals. Prefrontal and frontoparietal shields present. Lower eyelid scaly. No lateral fold on the body. Dorsal and ventral scales arranged quincuncially, laterals forming straight longitudinal and transverse series. Subdigital scales keeled. Tongue entirely covered with rhomboidal papillae.

Distribution: Madagascar.

Etymology: Named in honour of Achille P. Raselimanana of Antananarivo, Madagascar, in recognition of his work on the systematics of Madagascar lizards.

Content: *Hawkeswoodsaurus (Raselimananasaurus) aeneus* (Grandidier, 1872).

SUBGENUS RAXWORTHYSAURUS SUBGEN. NOV.

Type species: *Zonosaurus brygooi* Lang and Böhme, 1990.

Diagnosis: *Raxworthysaurus subgen. nov.* monotypic for the species *Hawkeswoodsaurus brygooi* (Lang and Böhme, 1990) is separated from all other Zonosaurinae by the following suite of characters: An adult snout-vent length of under 76 mm; a pale and always broken dorsolateral line on the anterior third to half of the body; 43-50 ventral scale rows between the chin and cloaca; always two supralabials posterior to the subocular on both sides of the head; always three supralabials anterior to subocular; lamellae under the fourth toe 16-21; femoral pores 13-20.

Tracheloptychus Peters, 1854 is separated from other Zonosaurinae by the following suite of characters: Nostril pierced between the rostral, the first labial, and two nasals. Prefrontal and frontoparietal shields present. Lower eyelid scaly. No lateral fold on the body. Dorsal and ventral scales arranged quincuncially, laterals forming straight longitudinal and transverse series. Subdigital scales keeled. Tongue entirely covered with rhomboidal papillae.

Distribution: Madagascar.

Etymology: Named in honour of Christopher J. Raxworthy of Kansas, USA, in recognition of his work on the systematics of Madagascar lizards.

Content: *Hawkeswoodsaurus (Raxworthysaurus) brygooi* (Lang and Böhme, 1990).

SUBGENUS NUSSBAUMSAURUS SUBGEN. NOV.

Type species: *Zonosaurus tsingy* Raselimanana, Raxworthy and Nussbaum, 2000.

Diagnosis: *Nussbaumsaurus subgen. nov.* monotypic for the species *Hawkeswoodsaurus tsingy* (Raselimanana, Raxworthy and Nussbaum, 2000) is separated from all other Zonosaurinae by the following suite of characters: An adult snout-vent length of under 94 mm; 2-4 supralabials anterior to the subocular; no pale dorsolateral line present on the anterior half of the body; femoral pores 14-20; no obvious dorsolateral lines (dark or pale brown) between level of insertion of hind-limbs and the base of the tail; throat lacking obvious bold black longitudinal lines; skin on dorsum of body fragile, as in it is very easily broken if restrained during handling.

Tracheloptychus Peters, 1854 is separated from other Zonosaurinae by the following suite of characters: Nostril pierced between the rostral, the first labial, and two nasals.

Prefrontal and frontoparietal shields present. Lower eyelid scaly. No lateral fold on the body. Dorsal and ventral scales arranged quincuncially, laterals forming straight longitudinal and transverse series. Subdigital scales keeled. Tongue entirely covered with rhomboidal papillae.

Distribution: Madagascar.

Etymology: Named in honour of Ronald A. Nussbaum of Michigan, USA, in recognition of his work on the systematics of Madagascar lizards.

Content: *Hawkeswoodsaurus (Nussbaumsaurus) tsingy* (Raselimanana, Raxworthy and Nussbaum, 2000).

SUBGENUS HAWKESWOODSAURUS SUBGEN. NOV.

Type species: *Gerrhosaurus (Cicigna) rufipes* Boettger, 1881.

Diagnosis: The subgenus *Hawkeswoodsaurus subgen. nov.* is best separated from the other subgenera within the genus *Hawkeswoodsaurus gen. nov.* by a process of elimination of the three other subgenera.

The subgenus *Raselimananasaurus subgen. nov.*, monotypic for the species *Hawkeswoodsaurus aeneus* (Grandidier, 1872), is separated from all other Zonosaurinae by the following suite of characters: An adult snout-vent length of under 94 mm; a pale dorsolateral line on the anterior half of the body, broken or continuous; 51-59 ventral scale rows between the chin and cloaca; usually one (rarely two) supralabial/s posterior to the subocular; 2-3 supralabials anterior to the subocular.

Raxworthysaurus subgen. nov. monotypic for the species *Hawkeswoodsaurus brygooi* (Lang and Böhme, 1990) is separated from all other Zonosaurinae by the following suite of characters: An adult snout-vent length of under 76 mm; a pale and always broken dorsolateral line on the anterior third to half of the body; 43-50 ventral scale rows between the chin and cloaca; always two supralabials posterior to the subocular on both sides of the head; always three supralabials anterior to subocular; lamellae under the fourth toe 16-21; femoral pores 13-20.

Nussbaumsaurus subgen. nov. is monotypic for the species *Hawkeswoodsaurus tsingy* (Raselimanana, Raxworthy and Nussbaum, 2000) and is separated from all other Zonosaurinae by the following suite of characters: An adult snout-vent length of under 94 mm; 2-4 supralabials anterior to the subocular; no pale dorsolateral line present on the anterior half of the body; femoral pores 14-20; no obvious dorsolateral lines (dark or pale brown) between level of insertion of hind-limbs and the base of the tail; throat lacking obvious bold black longitudinal lines; skin on dorsum of body fragile, as in it is very easily broken if restrained during handling.

Hawkeswoodsaurus subgen. nov. (including all within the nominate subgenus) are separated from all other Zonosaurini, including *Wellingtonsaurus gen. nov.* by having an adult snout-vent length of less than 94 mm and 2-3 supralabials anterior to the subocular.

This compares with an adult snout-vent length of 132-230 mm and 4-5 supralabials anterior to the subocular in all species within *Wellingtonsaurus gen. nov.*

Within this diagnosis for the genus *Hawkeswoodsaurus gen. nov.* includes the exceptional species *Hawkeswoodsaurus tsingy* (Raselimanana, Raxworthy and Nussbaum, 2000), which has 2-4 supralabials anterior to the subocular and is separated from all other *Hawkeswoodsaurus gen. nov.* and all *Wellingtonsaurus gen. nov.* species by the following characters: Femoral pores 14-20; no obvious dorsolateral lines (dark or pale brown) between level of insertion of hind-limbs and the base of the tail; throat lacking obvious bold black longitudinal lines; skin on dorsum of body fragile (very easily broken if restrained during handling).

The genus *Zonosaurus* Boulenger, 1887 is herein diagnosed and separated from other Zonosaurinae by the following suite of characters: Interparietal usually absent, four upper labials

anterior to the subocular; 16 to 22 femoral pores on each side. The genus *Wellssaurus gen. nov.* is separated from other Zonosaurinae by one or other of the following suite of characters:

1/ Fewer than 17 rows of scales around the body (as opposed to more than 17 in all other species, and an extremely long original tail being more than 2.5 times longer than their snout-vent length, and a conspicuous color pattern of transverse dark bars, (for species *Wellssaurus boettgeri* Steindachner, 1891 or *W. maramaintso* Raselimanana, Nussbaum and Raxworthy, 2006 of subgenus *Wellssaurus subgen. nov.*) or:

2/ Fronto-nasal a little broader than long, forming a broad suture with the rostral, and widely separated from the frontal, the praefrontals forming a long median suture, three or four lower labials anterior to the subocular, a small interparietal. Dorsal scales strongly keeled, in 20 or 22 longitudinal and 45 or 46 transverse series (from occiput to base of tail), ventrals in 8 longitudinal series. 20 to 30 femoral pores on each side. Tail moderately depressed at the base, strongly compressed further back, about one and two fifths the length of head and body. Dark olive-brown above, more or less distinctly spotted with darker colour, with or without a series of pale olive spots along each side of the back, sides pale olive, speckled and spotted with dark brown, yellowish or greenish-white beneath, (for species *W. maximus* Boulenger, 1896 of subgenus *Lukefabasaurus subgen. nov.*).

In common with other Zonosaurinae the genus *Hawkeswoodsaurus gen. nov.* and all four subgenera have the following diagnostic features: Nostril pierced between the rostral, the first labial, and two nasals; prefrontal shields present, no frontoparietals. Lower eyelid scaly. A strong lateral fold. Dorsal scales forming straight longitudinal and transverse series, ventrals hexagonal, in longitudinal series. Subdigital scales smooth or tubercular. Tongue nearly entirely covered with rhomboidal papillae.

Tracheloptychus Peters, 1854 is separated from other Zonosaurinae by the following suite of characters: Nostril pierced between the rostral, the first labial, and two nasals. Prefrontal and frontoparietal shields present. Lower eyelid scaly. No lateral fold on the body. Dorsal and ventral scales arranged quincuncially, laterals forming straight longitudinal and transverse series. Subdigital scales keeled. Tongue entirely covered with rhomboidal papillae.

Distribution: Madagascar.

Etymology: Named in honour of Dr. Trevor J. Hawkeswood, biologist and author of scientific papers, books and other publications on Australian, New Guinean and other non-Australasian plants and animals, in recognition for his valuable work in relation to invertebrate systematic, most notably that work he has done on beetles.

Content: *Hawkeswoodsaurus rufipes* (Boettger, 1881) (type species); *H. (Hawkeswoodsaurus) bemaraha* (Raselimanana, Raxworthy and Nussbaum, 2000); *H. (Hawkeswoodsaurus) rufipes* (Boettger, 1881); *H. (Hawkeswoodsaurus) subunicolor* (Boettger, 1881).

GENUS WELLINGTONSAURUS GEN. NOV.

Type species: *Gerrhosaurus laticaudatus* Grandidier, 1869.

Diagnosis: *Hawkeswoodsaurus gen. nov.* (described above) are separated from all other Zonosaurini, including *Wellingtonsaurus gen. nov.* by having an adult snout-vent length of less than 94 mm and 2-3 supralabials anterior to the subocular.

This contrasts with *Wellingtonsaurus gen. nov.* which is diagnosed herein by having an adult snout-vent length of 132-230 mm and 4-5 supralabials anterior to the subocular in all species (within *Wellingtonsaurus gen. nov.*).

Within the preceding diagnosis for the genus *Hawkeswoodsaurus gen. nov.* includes the exceptional species *Hawkeswoodsaurus tsingy* (Raselimanana, Raxworthy and

Nussbaum, 2000), which has 2-4 supralabials anterior to the subocular and is separated from all other *Hawkeswoodsaurus gen. nov.* and all *Wellingtonsaurus gen. nov.* species by the following characters: Femoral pores 14-20; no obvious dorsolateral lines (dark or pale brown) between level of insertion of hind-limbs and the base of the tail; throat lacking obvious bold black longitudinal lines; skin on dorsum of body fragile (very easily broken if restrained during handling).

The genus *Zonosaurus* Boulenger, 1887 is herein diagnosed and separated from other Zonosaurinae by the following suite of characters: Interparietal usually absent, four upper labials anterior to the subocular; 16 to 22 femoral pores on each side.

The genus *Wellssaurus gen. nov.* is separated from other Zonosaurinae by one or other of the following suites of characters:

1/ Fewer than 17 rows of scales around the body (as opposed to more than 17 in all other species, and an extremely long original tail being more than 2.5 times longer than their snout-vent length, and a conspicuous color pattern of transverse dark bars, (for species *Wellssaurus boettgeri* Steindachner, 1891 or *W. maramaintso* Raselimanana, Nussbaum and Raxworthy, 2006 of subgenus *Wellssaurus subgen. nov.*) or:

2/ Fronto-nasal a little broader than long, forming a broad suture with the rostral, and widely separated from the frontal, the praefrontals forming a long median suture, three or four lower labials anterior to the subocular, a small interparietal. Dorsal scales strongly keeled, in 20 or 22 longitudinal and 45 or 46 transverse series (from occiput to base of tail), ventrals in 8 longitudinal series. 20 to 30 femoral pores on each side. Tail moderately depressed at the base, strongly compressed further back, about one and two fifths the length of head and body. Dark olive-brown above, more or less distinctly spotted with darker, with or without a series of pale olive spots along each side of the back, sides pale olive, speckled and spotted with dark brown, yellowish or greenish-white beneath, (for species *W. maximus* Boulenger, 1896 of subgenus *Lukefabasaurus subgen. nov.*).

In common with other Zonosaurinae the genus *Wellingtonsaurus gen. nov.* and both subgenera have the following diagnostic features: Nostril pierced between the rostral, the first labial, and two nasals; prefrontal shields present, no frontoparietals. Lower eyelid scaly. A strong lateral fold. Dorsal scales forming straight longitudinal and transverse series, ventrals hexagonal, in longitudinal series. Subdigital scales smooth or tubercular. Tongue nearly entirely covered with rhomboidal papillae.

Tracheloptychus Peters, 1854 is separated from other Zonosaurinae by the following suite of characters: Nostril pierced between the rostral, the first labial, and two nasals. Prefrontal and frontoparietal shields present. Lower eyelid scaly. No lateral fold on the body. Dorsal and ventral scales arranged quincuncially, laterals forming straight longitudinal and transverse series. Subdigital scales keeled. Tongue entirely covered with rhomboidal papillae.

Distribution: Madagascar.

Etymology: Named in honour of Cliff Ross Wellington, herpetologist and scientist of Woy Woy in New South Wales, Australia for his many contributions to Australian herpetology, and perhaps best known for co-authoring with Richard Wells of New South Wales, Australia a series of seminal taxonomic publications in the 1980's, lampooned at the time by others, but since shown in the fullness of time, to be largely correct.

Content: *Wellingtonsaurus laticaudatus* (Grandidier, 1869) (type species); *W. anelanelany* (Raselimanana, Raxworthy and Nussbaum, 2000); *W. karsteni* (Grandidier, 1869); *W. ornatus* (Gray, 1831); *W. quadrilineatus* (Grandidier, 1867); *W. trilineatus* (Angel, 1939).

SUBGENUS HALLABYSAURUS SUBGEN. NOV.

Type species: *Zonosaurus trilineatus* Angel, 1939.

Diagnosis: Lizards in the subgenus *Hallabysaurus subgen. nov.*

are most readily separated from the nominate subgenus *Wellingtonsaurus subgen. nov.* by dorsal patterning and colouration.

Hallabysaurus subgen. nov. are identified by a dorsal pattern consisting of one or other of:

A/ Blackish dorsally and two yellow stripes present, or:
B/ Blackish dorsally and one stripe present, either complete or broken into squares, in turn one or other of either a single central stripe being yellow and unbroken or a central stripe broken into irregular whitish squares.

By contrast, lizards within the subgenus *Wellingtonsaurus subgen. nov.* are identified by having one or other of:

A/ A reddish-brown dorsal colouration, often with a red flush to the chin and stripes equal in width along length of body, or:
B/ Dark brown with a uniform light brown head with stripes widest close to the head, becoming thinner towards the tail and which may become broken into light spots.

Distribution: Southern Madagascar.

Etymology: Named in honour of Fouad Mezah Hallaby of Park Orchards, Melbourne, Victoria, Australia for services to herpetology in Australia. As mechanic for the Snakebusters fleet of vehicles, he has provided a valuable service beyond the call of duty in order to keep the cars on the road, enabling the staff at Snakebusters, Australia's best reptile displays to continue educating Australians about reptiles, wildlife and conservation. This has been in a marketplace riddled with charlatans, thieves, police-protected criminals and the like who not only give out false information on a regular basis but in effect also work against the wildlife conservation ideal.

Without the so-called back room or background staff such as mechanics, the vital front-line efforts of Snakebusters would not continue.

Content: *Wellingtonsaurus (Hallabysaurus) trilineatus* (Angel, 1939) (type species); *W. (Hallabysaurus) quadrilineatus* (Grandidier, 1867).

SUBGENUS WELLINGTONSAURUS SUBGEN. NOV.

Type species: *Gerrhosaurus laticaudatus* Grandidier, 1869.

Diagnosis: Lizards in the subgenus *Hallabysaurus subgen. nov.* are most readily separated from the nominate subgenus *Wellingtonsaurus subgen. nov.* by dorsal patterning and colouration.

Hallabysaurus subgen. nov. are identified by a dorsal pattern consisting of one or other of:

A/ Blackish dorsally and two yellow stripes present, or:
B/ Blackish dorsally and one stripe present, either complete or broken into squares, in turn one or other of either a single central stripe being yellow and unbroken or a central stripe broken into irregular whitish squares.

By contrast, lizards within the subgenus *Wellingtonsaurus subgen. nov.* are identified by having one or other of:

A/ A reddish-brown dorsal colouration, often with a red flush to the chin and stripes equal in width along length of body, or:
B/ Dark brown with a uniform light brown head with stripes widest close to the head, becoming thinner towards the tail and which may become broken into light spots.

Distribution: Southern Madagascar.

Etymology: See for genus.

Content: *Wellingtonsaurus laticaudatus* (Grandidier, 1869) (type species); *W. anelanelany* (Raselimanana, Raxworthy and Nussbaum, 2000); *W. karsteni* (Grandidier, 1869); *W. ornatus* (Gray, 1831).

GENUS TRACHELOPTYCHUS PETERS, 1854

Type species: *Tracheloptychus madagascariensis* Peters, 1854.

Diagnosis: Nostril pierced between the rostral, the first labial, and two nasals. Prefrontal and frontoparietal shields present. Lower eyelid scaly. No lateral fold on the body. Dorsal and ventral scales arranged quincuncially, laterals forming straight

longitudinal and transverse series. Subdigital scales keeled. Tongue entirely covered with rhomboidal papillae.

Distribution: Madagascar.

Content: *Tracheloptychus madagascariensis* Peters, 1854 (type species); *T. petersi* Grandidier, 1869.

TRIBE ZONOSAURINI TRIBE NOV.

Diagnosis: Ventral plates not forming straight transverse series; nostril pierced between 2 nasals, first labial and the rostral. Otherwise as for the family Gerrhosauridae, (adapted from Loveridge 1943).

Distribution: Madagascar.

Content: (Genera): *Zonosaurus* Boulenger, 1887 (type genus); *Hawkeswoodsaurus gen. nov.*; *Tracheloptychus* Peters, 1854; *Wellingtonsaurus gen. nov.*; *Wellssaurus gen. nov.*

SUBTRIBE ZONOSAURINA TRIBE NOV.

Diagnosis: Ventral plates not forming straight transverse series; nostril pierced between 2 nasals, first labial and the rostral. Otherwise as for the family Gerrhosauridae, (adapted from Loveridge 1943).

Separated from the subtribe *Tracheloptychina subtribe nov.* by the absence of the following suite of characters: Nostril pierced between the rostral, the first labial, and two nasals. Prefrontal and frontoparietal shields present. Lower eyelid scaly. No lateral fold on the body. Dorsal and ventral scales arranged quincuncially, laterals forming straight longitudinal and transverse series. Subdigital scales keeled. Tongue entirely covered with rhomboidal papillae.

Distribution: Madagascar.

Content: (Genera): *Zonosaurus* Boulenger, 1887 (type genus); *Hawkeswoodsaurus gen. nov.*; *Wellingtonsaurus gen. nov.*; *Wellssaurus gen. nov.*

SUBTRIBE TRACHELOPTYCHINA TRIBE NOV.

Diagnosis: Separated from the subtribe *Zonosaurina subtribe nov.* by the following suite of characters: Nostril pierced between the rostral, the first labial, and two nasals. Prefrontal and frontoparietal shields present. Lower eyelid scaly. No lateral fold on the body. Dorsal and ventral scales arranged quincuncially, laterals forming straight longitudinal and transverse series. Subdigital scales keeled. Tongue entirely covered with rhomboidal papillae.

In common with all *Zonosaurini tribe nov.* species within this subtribe have the following characters: Ventral plates not forming straight transverse series; nostril pierced between 2 nasals, first labial and the rostral. Otherwise as for the family Gerrhosauridae, (adapted from Loveridge 1943).

Distribution: Madagascar.

Content: (Genus): *Tracheloptychus* Peters, 1854 (monotypic for the type genus).

FAMILY CORDYLIDAE, MERTENS, 1937.

Type Genus: *Cordylus* Laurenti, 1768.

Diagnosis: Short, distally divided tongue covered in long papillae. Large square parietal plates present. Cranial osteoderms invariably present. Body scales large and in regular transverse rows or granular. Large rectangular ventral scales. Spiny or strongly keeled caudal scales arranged in whorls. Body often depressed. Femoral pores present, (adopted from Stanley *et al.* 2011).

Distribution: Southern and Eastern Africa.

Content: Subfamilies: *Cordylinae* Mertens, 1937; *Platysaurinae* Stanley *et al.*, 2011.

SUBFAMILY CORDYLINAE MERTENS, 1937.

Type genus: *Cordylus* Laurenti, 1768.

Diagnosis: Moderately dorso-ventrally flattened or serpentiform, dorsal, lateral and ventral osteoderms on trunk variable. Limbs fully formed or reduced. Caudal osteoderms often present (absent in *Chamaesaura fide* Lang, 1991). Enlarged lateral

spines at base of tail in limbed forms. Viviparous, (adopted from Stanley *et al.* 2011).

Distribution: Southern and south-eastern Africa.

Content: (Genera): *Cordylus* Laurenti, 1768 (type genus); *Chamaesaura* Schneider, 1801;

Cottonsaurus gen. nov.; *Hemicordylus* Smith, 1838; *Karusasaurus* Stanley *et al.*, 2011; *Namazonurus* Stanley *et al.*, 2011; *Ninsaurus* gen. nov.; *Ninurta* Stanley *et al.*, 2011; *Ouroborus* Stanley *et al.*, 2011; *Pseudocordylus* Smith, 1838; *Smaug* Stanley *et al.*, 2011.

GENUS *CORDYLUS* LAURENTI, 1768.

Type species: *Cordylus verus* Laurenti, 1768.

(Currently known as *Cordylus cordylus* (Linnaeus, 1758).

Diagnosis: Body moderately flattened in cross-section, small to medium-sized (maximum SVL 66-95 mm), robust. Limbs of moderate length, digits unreduced. Dorsal scales small and smooth to keeled in 16-30 transverse rows; caudal scales enlarged and spinose; head triangular; no occipital spines present. Lower eyelid without transparent disc. Tongue unpigmented. Osteoderms distributed across entire body. Viviparous, giving birth to (usually) 1-3 young, (adopted from Stanley *et al.* 2011).

Distribution: Southern Africa.

Content: *Cordylus cordylus* (Linnaeus, 1758) (type species); *Cordylus angolensis* (Bocage, 1895); *Cordylus aridus* Mouton and Van Wyk, 1994; *Cordylus beraduccii* Broadley and Branch, 2002; *Cordylus cloetei* Mouton and Van Wyk, 1994; *Cordylus imkeae* Mouton and Van Wyk, 1994; *Cordylus jonesii* (Boulenger, 1891); *Cordylus machadoi* Laurent, 1964; *Cordylus macropholis* (Boulenger, 1910); *Cordylus marunguensis* Greenbaum, Stanley, Kusamba, Moninga, Goldberg and Bursley, 2012; *Cordylus mclachlani* Mouton, 1986; *Cordylus meculae* Branch, Rödel and Marias, 2005; *Cordylus minor* Fitzsimons, 1943; *Cordylus niger* Cuvier, 1829; *Cordylus nyikae* Broadley and Mouton, 2000; *Cordylus oelofseni* Mouton and Van Wyk, 1990; *Cordylus rhodesianus* (Hewitt, 1933); *Cordylus rivae* (Boulenger, 1896); *Cordylus tasmani* Power, 1930; *Cordylus tropidosternum* (Cope, 1869); *Cordylus ukingensis* (Loveridge, 1932); *Cordylus vittifer* (Reichenow, 1887).

SUBGENUS *HULIMKACORDYLUS* SUBGEN. NOV.

Type species: *Zonurus tropidosternum* Cope, 1869.

Diagnosis: The lizards of the subgenus *Hulimkacordylus* subgen. nov. as described herein constitute a long well-known morphologically distinct grouping of lizards (e.g. Broadley 1971a, Stanley *et al.* 2011) traditionally placed within the genus *Cordylus*. On morphological evidence alone, I'd have placed them all within a new genus. However to date molecular evidence published has been somewhat ambiguous (e.g. Stanley *et al.* 2011, Pyron *et al.* 2013) and so I take the conservative position and place all within the new subgenus *Hulimkacordylus* subgen. nov. as defined below.

Species within *Hulimkacordylus* subgen. nov. are separated from other *Cordylus* species by the possession of one or other of the following three suites of characters:

1/ Lower eyelid opaque; supranasals absent; rostral in contact with frontonasal; occipital spines

present; occipitals present; nuchal scales moderate or large; nuchals comprising foremost, i.e. postoccipital, row, twice as large as those in second row; or:

2/ Lower eyelid opaque; supranasals absent; rostral in contact with frontonasal; occipital spines

present; occipitals present; nuchal scales moderate or large; nuchals comprising foremost, i.e. postoccipital, row, subequal, certainly not twice as large as those in second row; interparietal enclosed between two pairs of parietals; dorsals elongate, the two vertebral rows not enlarged or only scarcely enlarged; laterals unlike dorsals; or:

3/ Lower eyelid opaque; supranasals absent; rostral in contact with frontonasal only rarely, usually

separated from it; occipital spines absent; occipitals present; nuchal scales moderate or large; nuchals comprising foremost, i.e. postoccipital, row, subequal, certainly not twice as large as those in second row; interparietal on a line with anterior parietals and in contact with (or rarely separated from) the postfrontals; 11-14 gulars between angles of jaws; the two vertebral rows of dorsals enlarged; 14-18 longitudinal rows of dorsolaterals; 9-12 longitudinal rows of ventrals; gulars very large, a few anterior ones moderately enlarged followed by a zone of much smaller ones; dorsals in 16-19 transverse rows; ventrals smooth in 20-22 transverse rows.

Alternatively, species within either subgenus may be distinguished via the elimination of species in the other subgenus as defined in the diagnosis of each.

Distribution: East and southern Africa, in the region south from about Ethiopia.

Etymology: The first part of the genus name is in honour of the Roman Hulimka of Park Orchards, Melbourne, Victoria, Australia for his magnificent services to herpetology in Australia in the period 2001 to 2013. As of 2013, the Polish immigrant to Australia (arriving shortly after World War 2), was 91 years of age and still going strong.

Content: *Cordylus (Hulimkacordylus) tropidosternum* (Cope, 1869) (type species); *C. (Hulimkacordylus) angolensis* (Bocage, 1895); *C. (Hulimkacordylus) beraduccii* Broadley and Branch, 2002; *C. (Hulimkacordylus) jonesii* (Boulenger, 1891); *C. (Hulimkacordylus) machadoi* Laurent, 1964; *C. (Hulimkacordylus) marunguensis* Greenbaum, Stanley, Kusamba, Moninga, Goldberg and Bursley, 2012; *C. (Hulimkacordylus) meculae* Branch, Rödel and Marias, 2005; *C. (Hulimkacordylus) nyikae* Broadley and Mouton, 2000; *C. (Hulimkacordylus) rhodesianus* (Hewitt, 1933); *C. (Hulimkacordylus) rivae* (Boulenger, 1896); *C. (Hulimkacordylus) ukingensis* (Loveridge, 1932); *C. (Hulimkacordylus) vittifer* (Reichenow, 1887).

SUBGENUS *CORDYLUS* LAURENTI, 1768.

Type species: *Cordylus verus* Laurenti, 1768.

(Currently known as *Cordylus cordylus* (Linnaeus, 1758).

Diagnosis: Species within the subgenus *Cordylus* are separated from the other subgenus *Hulimkacordylus* subgen. nov. by one or other of the following four suites of characters:

1/ Lower eyelid opaque; supranasals absent; rostral in contact with frontonasal only rarely, usually

separated from it; occipital spines absent; occipitals present; nuchal scales moderate or large; nuchals comprising foremost, i.e. postoccipital, row, subequal, certainly not twice as large as those in second row; interparietal enclosed between two pairs of parietals; dorsals squarish, the two vertebral rows much enlarged; laterals on flanks are slightly smaller than the dorsals; or:

2/ Lower eyelid opaque; supranasals absent; rostral is only rarely in contact with the frontonasal, but typically separated from it; occipital spines absent; occipitals present; nuchal scales moderate or large; nuchals comprising foremost, i.e. postoccipital, row, subequal, certainly not twice as large as those in the second row; interparietal enclosed between two pairs of parietals; dorsals squarish, the two vertebral rows are much enlarged; laterals like the dorsals as in laterals on flanks are just as large as the dorsals; rostral is two and a third to two and a quarter times as broad as high; median subocular not, or but rarely, descending to the lip; color above brown or olive with or without markings; or:

3/ Lower eyelid opaque; supranasals absent; rostral in contact with frontonasal only rarely, usually

separated from it; occipital spines absent; occipitals present; nuchal scales moderate or large; nuchals comprising foremost,

i.e. postoccipital, row, subequal, certainly not twice as large as those in second row; interparietal enclosed between two pairs of parietals; dorsals squarish, the two vertebral rows much enlarged; laterals like dorsals; laterals on flanks just as large as the dorsals; rostral, two to two and a quarter times as broad as high; median subocular descending to the lip between fourth and fifth labials; color above uniformly jet black; head shields smooth or slightly rugose; nasal moderate,

not swollen or only slightly swollen; temporals are large, rarely keeled; the two vertebral rows of dorsals enlarged; femoral pores number 5-9; or:

4/ Lower eyelid opaque; supranasals absent; rostral in contact with frontonasal only rarely, usually

separated from it; occipital spines absent; occipitals present; nuchal scales moderate or large; nuchals comprising foremost, i.e. postoccipital, row, subequal, certainly not twice as large as those in second row; interparietal on a line with anterior parietals and in contact with the postfrontals; 11-14 gulars between angles of jaws; the two vertebral rows of dorsals enlarged; 14-18 longitudinal rows of dorsolaterals; 9-12 longitudinal rows of ventrals; gulars very large, a few anterior ones moderately enlarged followed by a zone of much smaller ones; dorsals in 16-19 transverse rows; ventrals smooth in 20-22 transverse rows.

Alternatively, species within either subgenus may be distinguished via the elimination of species in the other subgenus as defined in the diagnosis of each.

Distribution: Southern and eastern Africa.

Content: Distribution: Southern Africa.

Content: *Cordylus (Cordylus) cordylus* (Linnaeus, 1758) (type species); *C. (Cordylus) aridus* Mouton and Van Wyk, 1994; *C. (Cordylus) doetei* Mouton and Van Wyk, 1994; *C. (Cordylus) imkeae* Mouton and Van Wyk, 1994; *C. (Cordylus) macropholis* (Boulenger, 1910); *C. (Cordylus) mclachlani* Mouton, 1986; *C. (Cordylus) minor* Fitzsimons, 1943; *C. (Cordylus) niger* Cuvier, 1829; *C. (Cordylus) oelofseni* Mouton and Van Wyk, 1990; *C. (Cordylus) tasmani* Power, 1930.

GENUS HEMICORDYLUS SMITH, 1838.

Type species: *Cordylus (Hemicordylus) capensis* Smith, 1838.

Diagnosis: Body gracile, somewhat flattened in cross-section, small-sized (maximum SVL 76 mm). Limbs long, digits long, slender, unreduced. Dorsal scales large and separated by granules; lateral body scales granular. Caudal scales keeled but not spinose; occipital spines not present. Tongue is unpigmented, Osteoderms restricted to tail and dorsum of head. Melanistic and sexually dichromatic in some populations. Viviparous, usually giving birth to 1-3 young, (modified from Stanley *et al.* 2011).

Distribution: Cape Fold Mountains of southwestern South Africa.

Content: *Hemicordylus capensis* (Smith, 1838); *H. nebulosus* (Mouton and van Wyk 1995).

GENUS NINURTA STANLEY ET AL. 2011.

Type species: *Zonurus coeruleopunctatus* Hewitt and Methuen 1913.

Diagnosis: Body gracile, limbs elongate, digits unreduced. Medium-sized (maximum snout-vent-length of 82 mm). No occipital spines present, granular scales on nape. Keeled dorsal scales arranged in 40-46 transverse and 20-30 longitudinal rows. Spinose tail-whorls lacking. A band of granular lateral scales present between the dorsals and ventrals. Osteoderms widely distributed across body. Enamel blue spots on head and dorsum in eastern populations. Breeding males develop a yellow-to-orange gular patch. Viviparous, usually giving birth to 3-4 young (adapted from Stanley *et al.* 2011).

Distribution: The southern part of South Africa.

Content: *Ninurta coeruleopunctatus* (Hewitt and Methuen 1913) (monotypic for the genus).

GENUS PSEUDOCORDYLUS SMITH, 1838.

Type species: *Cordylus (Pseudocordylus) montanus* Smith, 1838.

Currently known as *Pseudocordylus microlepidotus* (Cuvier, 1829).

Diagnosis: Body subcylindrical in cross-section, medium to very large-bodied (maximum SVL 76-145 mm), robust. Limbs long, digits unreduced. Dorsal scales granular or larger scales separated by granules, tail spiny; occipital spines not present. Tongue unpigmented. Osteoderms restricted to tail and dorsum of head. Sexually dichromatic in some populations. Viviparous, usually giving birth to 1-7 young.

The species described as "*Pseudocordylus langi* Loveridge, 1944", while clearly related to the other species within *Pseudocordylus* Smith, 1838, is sufficiently divergent to warrant being placed in its own genus, which is done herein. Molecular phylogenies published have confirmed the morphological evidence of divergence of the taxa (Stanley *et al.* 2011, Pyron *et al.* 2013).

The monotypic genus *Ninsaurus gen. nov.* (for the species described as "*Pseudocordylus langi* Loveridge, 1944") and until now placed within *Pseudocordylus* is separated from *Pseudocordylus* by the following suite of characters:

Flanks entirely covered with minute granules, or, at most some widely separated, small, subcorneal tubercles differing greatly from the enlarged dorsals; back, or vertebral region only, is covered with feebly keeled, or smooth, dorsals; slightly enlarged dorsals form 6-8 irregular, ill-defined, longitudinal rows in the vertebral region; ventrals in 10 longitudinal rows; there are 5-6 enlarged temporals.

Distribution: Drakensberg and Cape Fold Mountain regions of South Africa, Swaziland and Lesotho.

Content: *P. microlepidotus* (Cuvier, 1829) (type species); *P. melanotus* (Smith, 1838); *P. spinosus* Fitzsimons, 1947; *P. subviridis* (Smith, 1838); *P. transvaalensis* FitzSimons, 1943.

GENUS NINSAURUS GEN. NOV.

Type species: *Pseudocordylus langi* Loveridge, 1944.

Diagnosis: The monotypic genus *Ninsaurus gen. nov.* (for the species described as "*Pseudocordylus langi* Loveridge, 1944") and until now placed within *Pseudocordylus* is separated from *Pseudocordylus* by the following suite of characters:

Flanks entirely covered with minute granules or at most some widely separated, small, subcorneal tubercles differing greatly from the enlarged dorsals; back, or vertebral region only, is covered with feebly keeled, or smooth, dorsals; slightly enlarged dorsals form 6-8 irregular, ill-defined, longitudinal rows in the vertebral region; ventrals in 10 longitudinal rows; there are 5-6 enlarged temporals.

In common with *Pseudocordylus* Smith 1838, *Ninsaurus gen. nov.* has the following characteristics: Body subcylindrical in cross-section, medium to very large-bodied (maximum SVL 76-145 mm), robust. Limbs long, digits unreduced. Dorsal scales granular or larger scales separated by granules, tail spiny; occipital spines not present. Tongue unpigmented. Osteoderms restricted to tail and dorsum of head. Sexually dichromatic in some populations. Viviparous, usually giving birth to 1-7 young.

The species described as *Pseudocordylus langi* Loveridge, 1944, while clearly related to the other species within *Pseudocordylus* Smith, 1838, is sufficiently divergent to warrant being placed in its own genus, which is done herein. Molecular phylogenies published have confirmed the morphological evidence of divergence of the taxa (Stanley *et al.* 2011, Pyron *et al.* 2013).

In turn the genus *Pseudocordylus* Smith, 1838 (and *Ninsaurus gen. nov.*) are separated from all other Cordylinae by the following suite of characters referred to above: Body subcylindrical in cross-section, medium to very large-bodied (maximum SVL 76-145 mm), robust. Limbs long, digits

unreduced. Dorsal scales granular or larger scales separated by granules, tail spiny; occipital spines not present. Tongue unpigmented. Osteoderms restricted to tail and dorsum of head. Sexually dichromatic in some populations. Viviparous, usually giving birth to 1-7 young (adapted from Stanley *et al.* (2011).

Distribution: Drakensberg of Basutoland to eastern Cape Province in Southern Africa.

Etymology: Named in honour of Dara Nin, of Ringwood, Victoria, Australia in recognition of his valuable conservation and education work, over many years with Snakebusters, Australia's best live reptile shows.

These are the only hands on reptile shows in Australia that actually let people hold the animals. In spite of howls of protest from inexperienced imitators, Dara and many other educators strongly believe that hands-on education that allows people to learn by handling the animals is vastly superior to the hands-off approach, preferred by the government regulators, Melbourne Zoo (their own dysfunctional business enterprise) and other displays they have licenced, all of whom have repeatedly and publicly alleged that there is absolutely no educational value whatsoever in allowing people to hold the animals at wildlife displays.

For the record, we are here talking about harmless non-venomous species such as pythons, baby crocodiles, tree frogs and freshwater turtles. Snakebusters is alone in the reptile display and venomous snake show business to have been operating for decades and with an unmatched perfect safety record. Within Australia, only Snakebusters have the expertise to have surgically de-venomized (venomoid snakes) for the welfare of the snakes (no sticks and tongs are ever used to handle them) and to remove any element of risk of a fatal or near fatal snakebite at any of our events. By the way, the relevant snakes have been tested (by biting myself and not envenomating me) and cleared at 100 per cent safe by veterinary surgeon Dr Richard Funk as being totally safe.

Furthermore to confirm the obvious fact that the venomoid snakes are safe, in the face of repeated reckless false claims by inexperienced rivals and the government regulator, that competes against Snakebusters, stating the snakes have regenerated venom (physically impossible), Dara Nin and others have taken bites from the relevant snakes to prove they are totally safe. This includes species such as inland Taipans (*Parademansia micolepidota*), Death Adders (*Acanthopis spp.*) and so on.

Content: *Ninsaurus langi* (Loveridge, 1944).

GENUS CHAMAESAURA SCHNEIDER, 1801.

Type species: *Lacerta anguina* Linnaeus, 1758.

Currently known as *Chamaesaura anguina* Linnaeus, 1758.

Diagnosis: Body slender and attenuate with greatly reduced limbs and digits, maximum SVL 140-170 mm. Tail extremely elongate (3-4 times SVL). Dorsal scales strongly keeled and arranged in regular rows; no occipital spines present.

Osteoderms limited to dorsum of head. Viviparous, usually giving birth to 6-12 young, (adapted from Stanley *et al.* (2011).

Distribution: Southern and eastern Africa from South Africa to Angola, the Democratic Republic of Congo and Tanzania.

Content: *Chamaesaura anguina* (Linnaeus, 1758) (type species); *C. aenea* (Fitzinger, 1843); *C. macrolepis* (Cope, 1862); *C. miopropus* (Boulenger, 1894); *C. tenuior* Günther, 1895.

GENUS SMAUG STANLEY ET AL. 2011.

Type species: *Cordylus giganteus* Smith, 1844.

Diagnosis: The genus *Smaug* as defined herein is monotypic for the type species only.

All other species placed in this genus by Stanley *et al.* 2011 have herein been placed in a new genus *Cottonsaurus gen. nov.*

The species within *Smaug* (*S. giganteus*) is defined as follows: Body subcylindrical in cross-section, large to very large (maximum SVL 112-205 mm), robust. Limbs of moderate length, digits unreduced. Dorsal and caudal scales enlarged and spinose; occipital spines greatly enlarged. Nasal scales not in contact with one another. Frontonasal scale in broad contact with the rostral scale. Median subocular not reaching the lip; occipital spines enormous; scales beneath forelimbs smooth; caudal whorls subequal, gradually diminishing towards the tip of the tail; tongue partly or fully pigmented. Osteoderms distributed across entire body. Viviparous, usually giving birth to 1-6 young. The following traits separate *Smaug* Stanley *et al.* 2011 from *Cottonsaurus gen. nov.*:

Median subocular not reaching the lip; occipital spines are enormous; scales beneath the forelimbs are smooth; caudal whorls subequal, gradually diminishing towards the tip of the tail; whereas in *Cottonsaurus gen. nov.* the condition seen is: Median subocular reaches lip between two labials; occipital spines are short; scales beneath the forelimbs are keeled; large caudal whorls separated by smaller ones.

Distribution: The northeastern part of South Africa, occurring most frequently on the steppes of the eastern Free State.

Content: *Smaug giganteus* (Smith, 1844) (monotypic).

GENUS COTTONSAURUS GEN. NOV.

Type species: *Zonurus warreni* Boulenger, 1908.

Diagnosis: The genus *Cottonsaurus gen. nov.* are separated from other Cordylinae by the following suite of characters: Median subocular reaches lip between two labials; occipital spines are present and are short; scales beneath the forelimbs are keeled; large caudal whorls separated by smaller ones. Rostral is in contact with the frontonasal; Lower eyelid is opaque; supranasals absent.

The following traits separate *Smaug* Stanley *et al.* 2011 from *Cottonsaurus gen. nov.*:

In *Smaug*, the median subocular does not reach the lip; occipital spines are enormous; scales beneath the forelimbs are smooth; caudal whorls are subequal, gradually diminishing towards the tip of the tail; whereas by contrast, in *Cottonsaurus gen. nov.* the condition seen is: The median subocular reaches the lip between two labials; occipital spines are short; scales beneath the forelimbs are keeled; large caudal whorls are separated by smaller ones.

Both genera, *Smaug* Stanley *et al.* 2011 and *Cottonsaurus gen. nov.* are not only sufficiently divergent to warrant separation on a molecular basis (see Stanley *et al.* 2011 and Pyron *et al.* 2013), but the species within each genus are also sufficiently divergent to be placed separately (in two genera) on the basis of morphology (see for example Loveridge, 1944). Both genera are also of significantly different habits. While placing all relevant species in the genus *Smaug*, Stanley *et al.* (2011) did also note these obvious differences, when they wrote:

"While *S. giganteus* is entirely terricolous, members of the *S. warreni* complex prefer deep, horizontal crevices in shaded rock outcrops."

Distribution: North-east Republic of South Africa (from Ubombo Mountains in Zululand through Transvaal Drakensberg, Soutpansberg), Swaziland, Zimbabwe, Botswana and Mozambique.

Etymology: Named in honour of Thomas Cotton, of Ringwood, Victoria, Australia in recognition of his valuable conservation and education work, over almost a decade with Snakebusters, Australia's best live reptile shows. These are the only hands on reptile shows in Australia that actually let people hold the animals. In spite of howls of protest from inexperienced imitators, Tom and many other educators strongly believe that hands-on education that allows people to learn by handling the animals is vastly superior to the hands-off approach, preferred by the government regulators, Melbourne Zoo (their own dysfunctional business enterprise) and other displays they

have licenced. All of these people have repeatedly and publicly alleged that there is absolutely no educational value whatsoever in allowing people to hold the animals at wildlife displays.

For the record, we are here talking about harmless non-venomous species such as pythons, baby crocodiles, tree frogs and freshwater turtles. Snakebusters is alone in the reptile display and venomous snake show business to have been operating for decades and with an unmatched perfect safety record. Within Australia, only Snakebusters have the expertise to have surgically de-venomized (venomoid snakes) for the welfare of the snakes (no sticks and tongs used to handle them) and to remove any element of risk of a fatal or near fatal snakebite at any of our events. All snakes have been tested as safe many times. They have also been certified and cleared by veterinary surgeon Dr Richard Funk as being totally safe and without venom.

Furthermore to confirm the obvious fact that the venomoid snakes are safe, in the face of repeated reckless false claims by inexperienced rivals and the government regulator, that competes against Snakebusters, stating the snakes have regenerated venom (physically impossible), Cotton and others have taken bites from the relevant snakes to prove they are totally safe. This includes species such as inland Taipans (*Parademansia micolepidota*), Death Adders (*Acanthopphis spp.*) and so on.

Content: *Cottonsaurus warreni* (Boulenger, 1908) (type species); *C. breyeri* (Van Dam), 1921; *C. mossambicus* (Fitzsimons, 1958); *C. regius* (Broadley, 1962); *C. vandami* (Fitzsimons, 1930).

GENUS NAMAZONURUS STANLEY ET AL. 2011

Type species: *Zonurus pustulatus* Peters, 1862.

Diagnosis: Body flattened in cross-section, small-sized (maximum SVL 75-82 mm), robust. Limbs of moderate length, digits unreduced. Supernasals enlarged and tubular. Dorsal scales small and smooth to keeled in 22-32 transverse rows; caudal scales enlarged and spinose; head triangular; no occipital spines present. Lower eyelid with or without transparent disc. Tongue unpigmented. Osteoderms distributed across entire body. Viviparous, usually giving birth to 2-4 young, (adapted from Stanley *et al.* 2011).

While all five described species form a well-defined genus, the three morphologically distinct clades within the genus, do warrant recognition at the subgenus level and this is done below according to the Zoological Code (Ride *et al.* 1999).

Distribution: Namaqualand, South Africa and parts of southern and central Namibia.

Content: *Namazonurus pustulatus* (Peters, 1862) (type species); *N. namaquensis* (Methuen and Hewitt, 1914); *N. peersi* (Hewitt 1932); *N. campbelli* (Fitzsimons, 1938); *N. lawrenci* (Fitzsimons, 1939).

SUBGENUS ATIKAEA SUBGEN. NOV.

Type species: *Zonurus peersi* Hewitt, 1932.

Diagnosis: Lizards of the subgenus *Atikaea subgen. nov.* are separated from congeners in the other subgenera by the following suite of characters being one or other of:

1/ Lower eyelid opaque; supranasals absent; rostral not in contact with the frontonasal only rarely, but more commonly separated from it; occipital spines absent. Occipitals present; nuchal scales moderate or large. Nuchals comprising foremost, i.e. postoccipital, row, subequal, certainly not twice as large as those in second row; interparietal enclosed between two pairs of parietals; dorsals elongate, the two vertebral rows are either not enlarged or scarcely enlarged; laterals unlike dorsals; head much depressed; temporals large; gulars moderate to large; posterior parietals subequal to the anterior; dorsals in 24 transverse rows; ventrals in 12 longitudinal rows (*N. lawrenci*), or:

2/ Lower eyelid opaque; supranasals absent; rostral in contact

with frontonasal only rarely, but usually is separated from it; occipital spines absent; occipitals present; nuchal scales moderate or large; nuchals comprising foremost, i.e. postoccipital, row, subequal, certainly not twice as large as those in second row; interparietal enclosed between two pairs of parietals; dorsals squarish, the two vertebral rows much enlarged; laterals like dorsals; laterals on flanks just as large as the dorsals; rostral is two to two and a half times as broad as high; median subocular descending to the lip between fourth and fifth labials; color above uniformly jet black; head shields very strongly rugose; nasal large, very strongly swollen; temporals very large, strongly keeled; vertebral rows of dorsals not differentiated from adjacent dorsals; femoral pores 8-12 (*N. peersi*).

Distribution: Little Namaqualand, Republic of South Africa.

Etymology: Named in honour of Atika Campbell, of Ringwood, Victoria, Australia in recognition of her valuable conservation and education work, over many years with Snakebusters, Australia's best live reptile shows. Snakebusters are only hands on reptile shows in Australia that actually let people hold the animals. In spite of howls of protest from inexperienced imitators, Atika and many other educators strongly believe that hands-on education that allows people to learn by handling the animals is vastly superior to the hands-off approach, preferred by the government regulators, Melbourne Zoo (the government's own dysfunctional business enterprise) and other displayers they have licenced. These others all have repeatedly and publicly alleged that there is absolutely no educational value whatsoever in allowing people to hold the animals at wildlife displays.

For the record, we are here talking about harmless non-venomous species such as pythons, baby crocodiles, tree frogs and freshwater turtles. Snakebusters is alone in the reptile display and venomous snake show business to have been operating for decades and with an unmatched perfect safety record. Within Australia, only Snakebusters have the expertise to have surgically de-venomized (venomoid snakes) for the welfare of the snakes (no sticks and tongs used to handle them) and to remove any element of risk of a fatal or near fatal snakebite at any of our events. All snakes have been tested as safe and cleared by veterinary surgeon Dr Richard Funk as being totally safe and not having any venom.

Furthermore to confirm the obvious fact that the venomoid snakes are safe, in the face of repeated reckless false claims by inexperienced rivals and the government regulator, that competes against Snakebusters, stating the snakes have regenerated venom (physically impossible), Snakebusters staff have taken bites from the relevant snakes to prove they are totally safe. This includes species such as inland Taipans (*Parademansia micolepidota*), Death Adders (*Acanthopphis spp.*) and so on.

Content: *Namazonurus (Atikaea) peersi* (Hewitt, 1932) (type species); *N. (Atikaea) lawrenci* (Fitzsimons, 1939).

SUBGENUS SLATTERYSAURUS SUBGEN. NOV.

Type species: *Zonurus namaquensis* Methuen and Hewitt, 1914.

Diagnosis: This monotypic subgenus is readily identified and separated from the other subgenera of *Namazonurus* by the following unique suite of characters:

Head much depressed; head shields rugose except for two hindmost supraoculars; rostral rarely in contact with, usually separated from, the frontonasal, which is shorter than broad; nostril pierced in the lower centre of a very large nasal which is much swollen; a loreal; a preocular; median subocular not descending to the lip; prefrontals forming a suture; postfrontals as long as broad; interparietal on a line with the anterior parietals, in contact with the postfrontals; posterior parietals slightly larger than the anterior; 6 keeled occipitals; temporals moderate, rugose, keeled, without spines, but those of hind row pointed, projecting over ear; sides of neck with keeled, spinose

scales; gulars small, the anterior irregularly enlarged, the median slightly imbricate, smooth, or the lateral feebly keeled; collar scales large, only the lateral lanceolate and mucronate.

Dorsals elongate, scarcely rugose, moderately keeled, neither mucronate nor serrate, those on the vertebral line regular or irregular; laterals like dorsals but more spiny, keeled, serrate, spinose; ventrals quadrangular, smooth, not or but slightly imbricate; scales below forelimbs keeled, below hind limbs smooth; tail with whorls of large, striate, strongly keeled, serrate, spinose scales above and below, the lateral spines longest.

Colour: Above, head brown, heavily spotted, a dark streak from nostril through eye to ear or forearm, a narrower streak from posterior corner of eye along upper edge of temporals, lower labials edged with darker colour; back light to dark chestnut brown variegated with darker brown; two dark brown lateral bands sometimes present. Below, greyish white to light muddy brown; tail is light brown.

Distribution: Only known from the vicinity of the Great Karasberg district, Namibia, south-west Africa.

Etymology: Named in honour of Mr. Paul Slattery, of Park Orchards, Melbourne, Victoria, Australia in recognition of his services for probity in local government in Australia.

Content: *Namazonurus (Slatterysaurus) namaquensis* (Methuen and Hewitt, 1914).

SUBGENUS *NAMAZONURUS* STANLEY ET AL. 2011

Type species: *Zonurus pustulatus* Peters, 1862.

Diagnosis: The species in the nominate subgenus *Namazonurus* are separated from the two other subgenera by the following suite of characters, being one or other of:

- 1/ Lower eyelid opaque; supranasals absent; head much depressed; head shields rugose; rostral separated from the frontonasal; nostril pierced in the lower centre of a large nasal which is swollen; a loreal; a preocular; median subocular not descending to the lip; fifth upper labial smallest, fifth not higher than others; prefrontals forming a suture; temporals moderate, rugose, keeled, without spines; gulars small, almost granular, ventrals in 14 longitudinal rows, dorsolaterals in 24-32 longitudinal rows and 30-32 transverse rows, 16-21 gulars between angles of jaws; vertebral rows of dorsals not enlarged; 14-29 longitudinal rows of ventrals; interparietal on a line with anterior parietals and usually in contact with the postfrontals; nuchals comprising foremost, i.e. postoccipital, row, subequal, certainly not twice as large as those in second row; occipitals present; nuchal scales moderate or large. (*N. pustulatus*) or:
- 2/ Head much depressed; head shields rugose; rostral separated from the frontonasal, which is longer than broad or as long as broad; nostril directed upwards and outwards in a nasal which is much swollen and slightly tubular; supranasals absent; lower eyelid with a semitransparent disk; prefrontals forming a suture; postfrontals as long as broad; inter parietal enclosed between 2 pairs of parietals; posterior parietals slightly larger than the anterior; 6 keeled, rugose occipitals; temporals moderate, rugose, keeled, without spines, but those of hind row obtusely pointed and flattened, projecting over ear; sides of neck with keeled, spinose scales; gulars small, the anterior irregularly enlarged, the median slightly imbricate, smooth, or the lateral feebly keeled; collar scales large, only the lateral lanceolate and mucronate. Dorsals elongate, scarcely rugose, obtusely keeled, neither mucronate nor serrate, those on the vertebral line irregular; laterals like dorsals but more spiny, keeled, serrate, spinose; ventrals quadrangular, smooth, slightly imbricate; scales below forelimbs keeled; below hind limbs smooth, serrately pointed, imbricate; tail with whorls of large, striate, strongly keeled, serrate, spinose scales above and below, the lateral spines longest (*N. campbelli*).

Distribution: Namibia, south-west Africa.

Content: *Namazonurus (Namazonurus) pustulatus* (Peters, 1862) (type species); *N. (Namazonurus) campbelli* (Fitzsimons, 1938).

GENUS *KARUSASAURUS* STANLEY ET AL. 2011.

Type species: *Cordylus polyzonus* Smith, 1838.

Diagnosis: Body flattened in cross-section, large-sized (maximum SVL 113-127 mm), robust. Limbs of moderate length, digits unreduced. Dorsal scales small and smooth to keeled in 38-46 transverse rows; caudal scales enlarged and spinose; no occipital spines present. Lower eyelid with transparent disc. Tongue unpigmented. Osteoderms distributed across entire body. Viviparous, usually giving birth to 2-4 young (adapted from Stanley *et al.* 2011).

Distribution: Throughout semi-arid areas of South Africa and southern Namibia.

Content: *Karusasaurus polyzonus* (Smith, 1838) (type species), *K. jordani* (Parker, 1936).

GENUS *OUROBORUS* STANLEY ET AL. 2011.

Type species: *Cordylus cataphractus* Boie, 1828.

Diagnosis: Body flattened to subcylindrical in cross-section, medium to large-bodied (maximum SVL 105 mm), robust. Limbs of moderate length, digits unreduced. Dorsal and scales greatly enlarged (in 15-17 transverse rows) and spinose, caudal scales forming large spines; six large keeled occipitals. Tongue darkly pigmented. Viviparous, giving birth to 1-2 young.

Distribution: Semi-arid regions of the western portions of the Western and Northern Cape provinces of South Africa, (adapted from Stanley *et al.* 2011).

Content: *Ouroborus cataphractus* (Boie, 1828) (monotypic).

TRIBE CORDYLINI LANG, 1989.

Terminal taxon: *Cordylus verus* Laurenti, 1768.

(Currently known as *Cordylus cordylus* (Linnaeus, 1758).

Diagnosis: The tribe is defined and diagnosed as consisting of each of the three component genera, listed below, namely *Cordylus* Laurenti, 1768 (the type genus), *Hemicordylus* Smith, 1838 and *Ninurta* Stanley *et al.*, 2011.

As part of the formal redescription of this tribe, the diagnosis for it is given as being one or other of each of the following three genera diagnoses, which are:

1/ *Cordylus* Laurenti, 1768 is defined as follows: Body moderately flattened in cross-section, small to medium-sized (maximum SVL 66-95 mm), robust. Limbs of moderate length, digits unreduced. Dorsal scales small and smooth to keeled in 16-30 transverse rows; caudal scales enlarged and spinose; head triangular; no occipital spines present. Lower eyelid without transparent disc. Tongue unpigmented. Osteoderms distributed across entire body. Viviparous, giving birth to (usually) 1-3 young; or:

2/ *Hemicordylus* Smith, 1838 is defined as follows: Body gracile, somewhat flattened in cross-section, small-sized (maximum SVL 76 mm). Limbs long, digits long, slender, unreduced. Dorsal scales large and separated by granules; lateral body scales granular. Caudal scales keeled but not spinose; occipital spines not present. Tongue is unpigmented, Osteoderms restricted to tail and dorsum of head. Melanistic and sexually dichromatic in some populations. Viviparous, usually giving birth to 1-3 young; or:

3/ *Ninurta* Stanley *et al.*, 2011 is defined as follows: Body gracile, limbs elongate, digits unreduced. Medium-sized (maximum snout-vent-length of 82 mm). No occipital spines present, granular scales on nape. Keeled dorsal scales arranged in 40-46 transverse and 20-30 longitudinal rows. Spinose tail-whorls lacking. A band of granular lateral scales present between the dorsals and ventrals. Osteoderms widely distributed across body. Enamel blue spots on head and dorsum in eastern populations. Breeding males develop a yellow-to-orange gular patch. Viviparous, usually giving birth to 3-4 young (all three generic diagnoses herein being adapted from Stanley *et al.* 2011).

Distribution: Southern and eastern Africa, south from Ethiopia.

Content: *Cordylus Laurenti*, 1768 (type genus); *Hemicordylus* Smith, 1838; *Ninurta* Stanley *et al.*, 2011.

TRIBE COTTONSAURINI TRIBE NOV.

Terminal taxon: *Zonurus warreni* Boulenger, 1908.

Diagnosis: The tribe *Cottonosaurini* *tribe nov.* is defined as the content of the five component genera, namely *Cottonosaurus* *gen. nov.* (the type genus), *Chamaesaura* Schneider, 1801, *Ninsaurus* *gen. nov.*, *Pseudocordylus* Smith, 1838 and *Smaug* Stanley *et al.*, 2011.

The diagnosis for the tribe is best done by defining each of the component genera individually, these being one or other of the following five:

1/ The genus *Cottonosaurus* *gen. nov.* are separated from other Cordylinae by the following suite of characters: Median subocular reaches lip between two labials; occipital spines are present and are short; scales beneath the forelimbs are keeled; large caudal whorls separated by smaller ones. Rostral is in contact with the frontonasal; Lower eyelid is opaque; supranasals absent.

The following traits separate *Smaug* Stanley *et al.* 2011 from *Cottonosaurus* *gen. nov.*:

In *Smaug*, the median subocular does not reach the lip; occipital spines are enormous; scales beneath the forelimbs are smooth; caudal whorls are subequal, gradually diminishing towards the tip of the tail; whereas by contrast, in *Cottonosaurus* *gen. nov.* the condition seen is: The median subocular reaches the lip between two labials; occipital spines are short; scales beneath the forelimbs are keeled; large caudal whorls are separated by smaller ones.

2/ *Smaug* Stanley *et al.*, 2011 are separated from other Cordylinae by the following suite of characters: Body subcylindrical in cross-section, large to very large (maximum SVL 112-205 mm), robust. Limbs of moderate length, digits un-reduced. Dorsal and caudal scales enlarged and spinose; occipital spines greatly enlarged. Nasal scales not in contact with one another. Frontonasal scale in broad contact with the rostral scale. Median subocular not reaching the lip; occipital spines enormous; scales beneath forelimbs smooth; caudal whorls subequal, gradually diminishing towards the tip of the tail; tongue partly or fully pigmented. Osteoderms distributed across entire body. Viviparous, usually giving birth to 1-6 young. The following traits separate *Smaug* Stanley *et al.* 2011 from *Cottonosaurus* *gen. nov.*:

Median subocular not reaching the lip; occipital spines are enormous; scales beneath the forelimbs are smooth; caudal whorls subequal, gradually diminishing towards the tip of the tail; whereas in *Cottonosaurus* *gen. nov.* the condition seen is: Median subocular reaches lip between two labials; occipital spines are short; scales beneath the forelimbs are keeled; large caudal whorls separated by smaller ones.

3/ *Chamaesaura* Schneider, 1801 are separated from other Cordylinae by the following suite of characters: Body slender and attenuate with greatly reduced limbs and digits, maximum SVL 140-170 mm. Tail extremely elongate (3-4 times SVL). Dorsal scales strongly keeled and arranged in regular rows; no occipital spines present. Osteoderms limited to dorsum of head. Viviparous, usually giving birth to 6-12 young, (adapted from Stanley *et al.* 2011).

4/ *Pseudocordylus* Smith, 1838 are separated from other Cordylinae by the following suite of characters: Body subcylindrical in cross-section, medium to very large-bodied (maximum SVL 76-145 mm), robust. Limbs long, digits un-reduced. Dorsal scales granular or larger scales separated by granules, tail spiny; occipital spines not present. Tongue unpigmented. Osteoderms restricted to tail and dorsum of head. Sexually dichromatic in some populations. Viviparous, usually giving birth to 1-7 young.

The monotypic genus *Ninsaurus* *gen. nov.* (for the species described as "*Pseudocordylus langi* Loveridge, 1944") and until

now placed within *Pseudocordylus* is separated from *Pseudocordylus* by the following suite of characters: Flanks entirely covered with minute granules or at most some widely separated, small, subcorneal tubercles differing greatly from the enlarged dorsals; back, or vertebral region only, is covered with feebly keeled, or smooth, dorsals; slightly enlarged dorsals form 6-8 irregular, ill-defined, longitudinal rows in the vertebral region; ventrals in 10 longitudinal rows; there are 5-6 enlarged temporals.

5/ *Ninsaurus* *gen. nov.* are separated from other Cordylinae by the following suite of characters: Flanks entirely covered with minute granules or at most some widely separated, small, subcorneal tubercles differing greatly from the enlarged dorsals; back, or vertebral region only, is covered with feebly keeled, or smooth, dorsals; slightly enlarged dorsals form 6-8 irregular, ill-defined, longitudinal rows in the vertebral region; ventrals in 10 longitudinal rows; there are 5-6 enlarged temporals.

In common with *Pseudocordylus* Smith 1838, *Ninsaurus* *gen. nov.* has the following characteristics: Body subcylindrical in cross-section, medium to very large-bodied (maximum SVL 76-145 mm), robust. Limbs long, digits un-reduced. Dorsal scales granular or larger scales separated by granules, tail spiny; occipital spines not present. Tongue unpigmented. Osteoderms restricted to tail and dorsum of head. Sexually dichromatic in some populations. Viviparous, usually giving birth to 1-7 young.

Distribution: Southern and Eastern Africa.

Content: *Cottonosaurus* *gen. nov.* (type genus); *Chamaesaura* Schneider, 1801; *Ninsaurus* *gen. nov.*; *Pseudocordylus* Smith, 1838; *Smaug* Stanley *et al.*, 2011.

TRIBE NAMAONURINI TRIBE NOV.

Terminal taxon: *Zonurus pustulatus* Peters, 1862.

Diagnosis: The tribe is monotypic for the genus *Namaonurus* Stanley *et al.* 2011, including the three subgenera defined within. Species within the tribe are diagnosed as follows: Body flattened in cross-section, small-sized (maximum SVL 75-82 mm), robust. Limbs of moderate length, digits un-reduced. Supernasals enlarged and tubular. Dorsal scales small and smooth to keeled in 22-32 transverse rows; caudal scales enlarged and spinose; head triangular; no occipital spines present. Lower eyelid with or without transparent disc. Tongue unpigmented. Osteoderms distributed across entire body. Viviparous, usually giving birth to 2-4 young, (adapted from Stanley *et al.* 2011).

Distribution: Namaqualand in north-west South Africa and parts of southern and central Namibia.

Content: *Namaonurus* Stanley *et al.* 2011 (monotypic).

TRIBE KARUSASOURINI TRIBE NOV.

Terminal taxon: *Cordylus polyzonus* Smith, 1838.

Diagnosis: The tribe *Karusasaurini* *tribe nov.* is defined as consisting of the two component genera, namely *Karusasaurus* Stanley *et al.*, 2011 being the type genus and *Ouroborus* Stanley *et al.*, 2011.

The tribe *Karusasaurini* *tribe nov.* is also diagnosed by defining each of the component genera, this being one or other of the following:

1/ *Karusasaurus* Stanley *et al.*, 2011 is defined as follows: Body flattened in cross-section, large-sized (maximum SVL 113-127 mm), robust. Limbs of moderate length, digits un-reduced. Dorsal scales small and smooth to keeled in 38-46 transverse rows; caudal scales enlarged and spinose; no occipital spines present. Lower eyelid with transparent disc. Tongue unpigmented. Osteoderms distributed across entire body. Viviparous, usually giving birth to 2-4 young, or:

2/ *Ouroborus* Stanley *et al.*, 2011 is defined as follows: Body flattened to subcylindrical in cross-section, medium to large-bodied (maximum SVL 105 mm), robust. Limbs of moderate length, digits un-reduced. Dorsal and scales greatly enlarged (in 15-17 transverse rows) and spinose, caudal scales forming large spines; six large keeled occipitals. Tongue darkly pigmented.

Viviparous, giving birth to 1-2 young.

Distribution: South west South Africa and Namibia.

Content: *Karusasaurus* Stanley *et al.*, 2011 (type genus); *Ouroborus* Stanley *et al.*, 2011.

SUBFAMILY PLATYSAURINAE STANLEY *ET AL.* 2011.

Type genus: *Platysaurus* Smith, 1844.

Diagnosis: Extremely dorso-ventrally flattened. Medium to very large-bodied (maximum snout-vent-length, SVL usually in the range of 73-146 mm), limbs long and digits unreduced. Granular dorsal scales, ventrals large, square or quadrangular, smooth, juxtaposed, in regular longitudinal and transverse series. Caudal scales not spinose and arranged in whorls. Osteoderms restricted to dorsum of head *vide* Lang 1991. Oviparous, laying 1-2 eggs. Sexually dichromatic, with brightly colored males and cryptic females.

Distribution: Southern Africa, specifically known from the following places: Zimbabwe, eastern and northwestern South Africa, extreme southern Namibia, Swaziland, Mozambique, Malawi, southern Tanzania, (adopted from Stanley *et al.* 2011).

Content: (Genera): *Platysaurus* Smith, 1844 (type genus); *Bennettsaurus* *gen. nov.*; *Edwardssaurus* *gen. nov.*; *Woolfsaurus* *gen. nov.*

Note: The four genera listed immediately above are placed in three newly described tribes in this paper).

GENUS PLATYSAURUS SMITH, 1844.

Type species: Type species: *Platysaurus capensis* Smith, 1844.

Diagnosis: The genus *Platysaurus* Smith, 1844 as defined herein is now restricted to the two species, *Platysaurus capensis* Smith, 1844 and *P. broadleyi*, Branch and Whiting, 1997.

Specimens in this genus are separated from other Platysaurinae by the following suite of characters:

Rostral rarely in contact with, usually separated from, the frontonasal, sometimes by an azygous scale; frontonasal as long as broad, sometimes with an azygous scale posteriorly; second or second and third subocular descending to the lip; sometimes a prefrontal also descending to the lip between loreal and preocular; interparietal large, diamond-shaped, enclosed between 2 pairs of parietals; occipitals broken up or absent; enlarged temporals in 2 longitudinal rows, upper largest; sides of neck covered with small granules only; gulars small, elongate, those on the median line more or less enlarged and squarish; granules on flanks minute or but slightly enlarged; limbs above with granules and smooth or feebly keeled scales.

Color in males: Above; head and back bright green anteriorly passing to dull orange on posterior third, with or without three light longitudinal lines on the head which tend to disappear on back; between the lines some ill-defined light spots may be present or absent; flanks greenish blue and orange; tail yellow ringed with brown, a dusky median line anteriorly.

Below, chin and gular region are bright blue; belly anteriorly dark blue, in middle black, posteriorly whitish; limbs and tail pale straw yellow (grenadine in life), the latter ringed with darker colour.

Color in females: Above, head and back very dark brown, with three well-defined light longitudinal lines, between which there are no light spots; flanks and limbs with obsolete pale spots, tail yellow alternately ringed with pale brown, a dusky median line anteriorly. Below, whitish, belly with or without pale blue and pinkish suffusions and a small black patch; tail straw yellow ringed with gray brown.

Both sexes attain a maximum size up to about 207 mm.

Distribution: North-west South Africa and nearby Namibia, which separates this genus from other Platysaurinae by at least 700 km of Kalahari Desert in south-west Africa.

Content: *Platysaurus capensis* Smith, 1844; *P. broadleyi*, Branch and Whiting, 1997.

GENUS WOOLFSAURUS *GEN. NOV.*

Type species: *Platysaurus pungweensis* Broadley, 1959.

Diagnosis: *Woolfsaurus* *gen. nov.* is separated from the other Platysaurinae genera as defined within this paper by the following suite of characters: 14-16 longitudinal rows of ventrals; opaque lower eyelids, each divided into a series of vertical septa. The supranasals are fused with the nasals. The middle row of gulars is not very enlarged. The scales on the side of the neck are spiny and enlarged and those on the flanks are no larger than those on the back. Males have 13-20 femoral pores. Females and juveniles have a black back with three buff stripes, the middle one commonly being broken into spots or ending on the neck; there not being spots between the stripes. Adult males vary in colour depending on locality (and according to subspecies).

Distribution: East Zimbabwe and nearby Mozambique.

Etymology: Named in honour of Paul Woolf of Walloon, Queensland, Australia in recognition of many decades of long commitment to herpetology and conservation in Australia, including as a Foundation President of the Herpetological Society of Queensland Incorporated (HSQI), also publisher of the journal *Boydii*.

Content: *Woolfsaurus pungweensis* (Broadley, 1959) (monotypic).

GENUS BENNETTSAURUS *GEN. NOV.*

Type species: *Platysaurus mitchelli* Loveridge, 1953.

Diagnosis: The two species within the genus *Bennettsaurus* *gen. nov.* are readily separated from all other Platysaurinae by the possession of a pair of supranasals. In the case of the species *Platysaurus capensis* from south-west Africa, the scale configuration is quite different and in this species, the nostril is usually considered as being between the upper and lower portions of a divided nasal.

Bennettsaurus *gen. nov.* are also separated from all other Platysaurinae by the following suite of characters: 12-20 quadrangular ventrals in longitudinal series across the belly; there are two superposed postnasals; occipital is usually absent; lower eyelid is opaque, divided into vertical septa; 4-5 upper labials; 5-6 lower labials; a curved collar composed of 6-11 plates. Femoral pores are equally developed in both sexes, usually in the range of 16-25. 19-24 lamellae under the fourth toe and the scales on the heel and lateral caudals are not spinose.

Distribution: These are the northernmost species of the Platysaurinae being known only from Malawi and Eastern Tanzania and being the only extant species found north of the Zambezi river system.

Etymology: Named in honour of Steve Bennett of Narre Warren, Victoria, Australia, for various services to herpetology spanning over 20 years, as well as in recognition for his services to the Australian fitness and automobile industries.

Content: *Bennettsaurus mitchelli* (Loveridge, 1953) (type species); *B. maculatus* (Broadley, 1965).

SUBGENUS BENNETTSAURUS *SUBGEN. NOV.*

Type species: *Platysaurus mitchelli* Loveridge, 1953.

Diagnosis: The monotypic subgenus *Bennettsaurus subgen. nov.* is most readily separated from the monotypic subgenus *Lucysaurea subgen. nov.* (and all other Platysaurinae) by having 12 quadrangular ventrals in longitudinal series across the belly.

Lucysaurea subgen. nov. in turn is separated from *Bennettsaurus subgen. nov.* by having 16-18, or rarely 14 or 20 quadrangular ventrals in longitudinal series across the belly.

Distribution: Malawi, Africa.

Etymology: See for genus.

Content: *Bennettsaurus (Bennettsaurus) mitchelli* (Loveridge, 1953).

SUBGENUS LUCYSAUREA SUBGEN. NOV.

Type species: *Platysaurus mitchelli* Loveridge, 1953.

Diagnosis: The monotypic subgenus *Bennettsaurus subgen. nov.* is most readily separated from the monotypic subgenus *Lucysaurea subgen. nov.* (and as a rule all other *Platysaurinae*) by having 12 quadrangular ventrals in longitudinal series across the belly.

Lucysaurea subgen. nov. in turn is separated from *Bennettsaurus subgen. nov.* by having 16-18, or rarely 14 or 20 quadrangular ventrals in longitudinal series across the belly.

As an exception to the first part of the above, but in no way affecting the validity of this diagnosis, I should mention that exceptional specimens of *Vrljicsaurus subgen. nov.* (within *Edwardssaurus gen. nov.*) do occasionally have just 12 ventrals in longitudinal series across the belly, but are readily separated from *Bennettsaurus gen. nov.* by the absence of a pair of supranasals.

Distribution: Eastern Tanzania, Africa.

Etymology: Named in honour of Lucy Bennett of Narre Warren, Victoria, Australia, (wife of Steve Bennett of Narre Warren, Victoria, Australia), for various services to herpetology spanning over 20 years.

Content: *Bennettsaurus (Lucysaurea) maculatus* (Broadley, 1965).

GENUS EDWARDSSAURUS GEN. NOV.

Type species: *Platysaurus torquatus* Peters, 1879.

Diagnosis: *Edwardssaurus gen. nov.* is best diagnosed by the exclusion of all other genera within the *Platysaurinae* (3 others), leaving the remaining species (most) within the genus *Edwardssaurus gen. nov.*

1/ The genus *Platysaurus* Smith, 1844 as defined herein is now restricted to the two species, *Platysaurus capensis* Smith, 1844 and *P. broadleyi*, Branch and Whiting, 1997.

Specimens in this genus are separated from other *Platysaurinae* by the following suite of characters:

Rostral rarely in contact with, usually separated from, the frontonasal, sometimes by an azygous scale; frontonasal as long as broad, sometimes with an azygous scale posteriorly; second or second and third subocular descending to the lip; sometimes a prefrontal also descending to the lip between loreal and preocular; interparietal large, diamond-shaped, enclosed between 2 pairs of parietals; occipitals broken up or absent; enlarged temporals in 2 longitudinal rows, upper largest; sides of neck covered with small granules only; gulars small, elongate, those on the median line more or less enlarged and squarish; granules on flanks minute or but slightly enlarged; limbs above with granules and smooth or feebly keeled scales.

Color in males: Above; head and back bright green anteriorly passing to dull orange on posterior third, with or without three light longitudinal lines on the head which tend to disappear on back; between the lines some ill-defined light spots may be present or absent; flanks greenish blue and orange; tail yellow ringed with brown, a dusky median line anteriorly. Below, chin and gular region are bright blue; belly anteriorly dark blue, in middle black, posteriorly whitish; limbs and tail pale straw yellow (grenadine in life), the latter ringed with darker colour.

Color in females: Above, head and back very dark brown, with three well-defined light longitudinal lines, between which there are no light spots; flanks and limbs with obsolete pale spots, tail yellow alternately ringed with pale brown, a dusky median line anteriorly. Below, whitish, belly with or without pale blue and pinkish suffusions and a small black patch; tail straw yellow ringed with gray brown.

Both sexes attain a maximum size up to about 207 mm.

2/ *Woolfsaurus gen. nov.* is separated from the other *Platysaurinae* genera as defined within this paper by the following suite of characters: 14-16 longitudinal rows of ventrals; opaque lower eyelids, each divided into a series of vertical

septa. The supranasals are fused with the nasals. The middle row of gulars is not very enlarged. The scales on the side of the neck are spiny and enlarged and those on the flanks are no larger than those on the back. Males have 13-20 femoral pores. Females and juveniles have a black back with three buff stripes, the middle one commonly being broken into spots or ending on the neck; there not being spots between the stripes. Adult males vary in colour depending on locality (and according to subspecies).

3/ The two species within the genus *Bennettsaurus gen. nov.* are readily separated from all other *Platysaurinae* by the possession of a pair of supranasals. In the case of the species *Platysaurus capensis* from south-west Africa, the scale configuration is quite different and in this species, the nostril is usually considered as being between the upper and lower portions of a divided nasal.

Bennettsaurus gen. nov. are also separated from all other *Platysaurinae* by the following suite of characters: 12-20 quadrangular ventrals in longitudinal series across the belly; there are two superposed postnasals; occipital is usually absent; lower eyelid is opaque, divided into vertical septa; 4-5 upper labials; 5-6 lower labials; a curved collar composed of 6-11 plates; femoral pores are equally developed in both sexes, usually in the range of 16-25. 19-24 lamellae under the fourth toe and the scales on the heel and lateral caudals are not spinose.

In addition to the above: *Edwardssaurus gen. nov.* are further diagnosed and identified as follows: Extremely dorso-ventrally flattened. Medium to very large-bodied (maximum snout-vent-length, SVL usually in the range of 73-146 mm), limbs long and digits unreduced. Granular dorsal scales, ventrals large, square or quadrangular, smooth, juxtaposed, in regular longitudinal and transverse series. Caudal scales not spinose and arranged in whorls. Osteoderms restricted to dorsum of head *vide* Lang 1991. Oviparous, laying 1-2 eggs. Sexually dichromatic, with brightly colored males and cryptic females.

Distribution: Eastern Southern Africa.

Etymology: Named in honour of Euan Edwards, currently of the Gold Coast, Queensland, Australia, for his immense contributions to herpetology world-wide, including considerable behind the scenes logistical support for herpetologists and scientists in several countries (including myself), including extensive fieldwork in Australia, the United States of America, Madagascar and Africa and gaining access to various institutions, collections, diagnostic facilities and the like, spanning some decades.

Content: *Edwardssaurus torquatus* (Peters, 1879) (type species); *E. guttatus* (Smith, 1849); *E. imperator* (Broadley, 1962); *E. intermedius* (Matschie, 1891); *E. leomboensis* (Jacobsen, 1994); *E. minor* (Fitzsimons, 1930); *E. monotropis* (Jacobsen, 1994); *E. nigrescens* (Broadley, 1981); *E. ocellatus* (Broadley, 1962); *E. orientalis* (Fitzsimons, 1941); *E. relictus* (Broadley, 1976); *E. rhodesianus* (Fitzsimons, 1941); *E. torquatus* (Peters, 1879); *E. wilhelmi* (Hewitt, 1909).

SUBGENUS VRLJICSAURUS SUBGEN. NOV.

Type species: *Platysaurus ocellatus* Broadley, 1962.

Diagnosis: *Vrljicsaurus subgen. nov.*, monotypic for "*Platysaurus ocellatus* Broadley, 1962", is separated from other *Edwardssaurus* by the following suite of characters: Females and juveniles are unusual among all *Platysaurinae* in that they completely lack any trace of three dorsal stripes. The lower eyelids are opaque, each divided into a series of vertical septa. The supranasals are fused with the nasals. The middle row of gulars is very enlarged. The scales on the sides of the neck are spiny but not enlarged, and the collar is straight and composed of large plates. The ventrals are in 12-14 longitudinal rows. Males have 13-18 femoral pores. Females and juveniles have a bronze back with numerous pale, ill-defined spots. The tail is a blackish colour. The throat is white, speckled with grey. The belly is cream and yellow under the base of the tail. Adult males have

a uniform black-brown head and an olive-brown back with sulphur-yellow, dark edged spots. The tail is brown above and orange to yellow below, but in large specimens may be orange to yellow above and below. The belly is pale green to blue.

Distribution: Known only from south east Zimbabwe and adjacent Mozambique.

Etymology: Named in honour of Mike Vrljic (better known as "H-bomb") of Melbourne, Victoria, Australia for services to the Australian Fitness Industry, in particular his main area of endeavour, power lifting and strong man competitions.

In 2012-2013, he overcame the odds against him and beat a life-threatening case of heart disease to become (again) a champion of his sport.

Content: *Edwardssaurus (Vrljicsaurus) ocellatus* (Broadley, 1962).

SUBGENUS *MACGOLDRICHAURUS* SUBGEN. NOV.

Type species: *Platysaurus guttatus minor* Fitzsimons, 1930.

Diagnosis: Species within the subgenus *Macgoldrichsaurus subgen. nov.* are separated from the other subgenera within the genus by the possession of one or other of the following three suites of characters:

1/ A large occipital wedged between the posterior parietals; sides of neck covered with small and enlarged granules; granules on flanks distinctly enlarged; scales covering limbs, above mostly rugose and strongly keeled; adpressed hind limb reaches axilla or shoulder or in rare cases the neck; adult length from snout to anus less than 80 mm; some dorsals in the vertebral series very slightly enlarged; lower surface in both sexes dark; interparietal forming a suture with an occipital as large as itself; spines prominent both on tibia towards heel and on lateral caudals; chin and throat of male black; edges of light lines on dorsum of female blurred; or:

2/ A large occipital wedged between the posterior parietals; sides of neck covered with small and enlarged granules; granules on flanks distinctly enlarged; scales covering limbs, above mostly rugose and strongly keeled; adpressed hind limb reaches axilla or shoulder or in rare cases the neck; adult length from snout to anus less than 80 mm; dorsals subuniform; lower surface in both sexes light but males with dark patches on belly; males above, olive brown to reddish brown with light spots on dorsum arranged in longitudinal lines; in females such light spots are arranged in longitudinal lines also, but no black spots present on abdomen; flanks buff; or:

3/ A large occipital wedged between the posterior parietals; sides of neck covered with small and enlarged granules; granules on flanks distinctly enlarged; scales covering limbs, above mostly rugose and strongly keeled; adpressed hind limb reaches axilla or shoulder or in rare cases the neck; adult length from snout to anus less than 80 mm; males above, dull green to bluish green with light spots on dorsum scattered; in females such light spots are absent or only present posteriorly; but irregular black spots are present on abdomen; flanks dull green to bluish green.

Distribution: South-east Africa in the region centred around north-east South Africa.

Etymology: Named in honour of Simon McGoldrich of Ringwood East, Victoria, Australia, in recognition of his excellent wildlife conservation work assisting Snakebusters, Australia's best reptiles displays.

Content: *Edwardssaurus (Macgoldrichsaurus) minor* (Fitzsimons, 1930) (type species); *E. (Macgoldrichsaurus) intermedius* (Matschie, 1891); *E. (Macgoldrichsaurus) lebomboensis* (Jacobsen, 1994); *E. (Macgoldrichsaurus) monotropis* (Jacobsen, 1994); *E. (Macgoldrichsaurus) nigrescens* (Broadley, 1981); *E. (Macgoldrichsaurus) orientalis* (Fitzsimons, 1941); *E. (Macgoldrichsaurus) relictus* (Broadley, 1976); *E. (Macgoldrichsaurus) wilhelmi* (Hewitt, 1909).

SUBGENUS *EDWARDSSAURUS* SUBGEN. NOV.

Type species: *Platysaurus torquatus* Peters, 1879.

Diagnosis: Species within the subgenus *Edwardssaurus subgen. nov.* are separated from the other subgenera within the genus by the possession of one or other of the following three suites of characters:

1/ A large occipital wedged between the posterior parietals; sides of neck covered with small and enlarged granules; granules on flanks distinctly enlarged; scales covering limbs, above mostly rugose and strongly keeled; adpressed hind limb reaches axilla or shoulder or in rare cases the neck; rostral in contact with frontonasal; inter-parietal separated from occipital; collar scales 6-7; ventral plates in 16-20 longitudinal and 39-45 transverse rows (from collar); adult length from snout to anus between 90 and 105 mm., or:

2/ A large occipital wedged between the posterior parietals; sides of neck covered with small and enlarged granules; granules on flanks distinctly enlarged; scales covering limbs, above mostly rugose and strongly keeled; adpressed hind limb reaches axilla or shoulder or in rare cases the neck; adult length from snout to anus more than 90 mm; rostral separated from frontonasal; inter-parietal in contact with occipital; collar scales 7-12; ventral plates in 18-26 longitudinal and 40-48 transverse rows., or:

3/ A large occipital wedged between the posterior parietals; sides of neck covered with small and enlarged granules; granules on flanks distinctly enlarged; scales covering limbs, above mostly rugose and strongly keeled; adpressed hind limb reaches axilla or shoulder or in rare cases the neck; adult length from snout to anus less than 80 mm; some dorsals in the vertebral series very slightly enlarged; lower surface in both sexes is dark; interparietal forming a suture with a small occipital which may be broken up; spines on tibia towards heel poorly developed, on lateral caudals not at all; chin and throat of male gray green with black markings; edges of light lines on dorsum of female sharply defined.

Distribution: South-east Africa in the region centred around Zimbabwe.

Etymology: See for the genus *Edwardssaurus gen. nov.*

Content: *Edwardssaurus (Edwardssaurus) torquatus* (Peters, 1879) (type species); *E. (Edwardssaurus) guttatus* (Smith, 1849); *E. (Edwardssaurus) imperator* (Broadley, 1962); *E. (Edwardssaurus) rhodesianus* (Fitzsimons, 1941); *E. (Edwardssaurus) torquatus* (Peters, 1879).

TRIBE WOOLFSURINI TRIBE. NOV.

Terminal taxon: *Platysaurus pungweensis* Broadley, 1959.

Diagnosis: *Woolfsaurini tribe nov.* is monotypic for the genus *Woolfsaurus gen. nov.* and so at the present time and in the absence of fossil material has the same diagnosis.

Woolfsaurini tribe nov. is separated from the other *Platusaurinae* genera as defined within this paper by the following suite of characters: 14-16 longitudinal rows of ventrals; opaque lower eyelids, each divided into a series of vertical septa. The supranasals are fused with the nasals. The middle row of gulars is not very enlarged. The scales on the side of the neck are spiny and enlarged and those on the flanks are no larger than those on the back.

Males have 13-20 femoral pores. Females and juveniles have a black back with three buff stripes, the middle one commonly being broken into spots or ending on the neck; there not being spots between the stripes.

Adult males vary in colour depending on locality (and according to subspecies).

Distribution: East Zimbabwe and nearby Mozambique.

Etymology: See for genus *Woolfsaurus gen. nov.*

Content: *Woolfsaurus gen. nov.* (monotypic).

TRIBE BENNETTSAURINI TRIBE NOV.

Terminal taxon: *Platysaurus mitchelli* Loveridge, 1953.

Diagnosis: As the tribe is monotypic for the genus *Bennettsaurus gen. nov.*, the diagnosis in the absence of fossil material is one and the same. The two species within the genus *Bennettsaurus gen. nov.* are readily separated from all other Platysaurinae by the possession of a pair of supranasals. In the case of the species *Platysaurus capensis* from south-west Africa (within a separate tribe as defined within this paper), the scale configuration is quite different and in this species, the nostril is usually considered as being between the upper and lower portions of a divided nasal.

Bennettsaurus gen. nov. are also separated from all other Platysaurinae by the following suite of characters: 12-20 quadrangular ventrals in longitudinal series across the belly. There are two superposed postnasals; occipital is usually absent; lower eyelid is opaque, divided into vertical septa; 4-5 upper labials; 5-6 lower labials; A curved collar composed of 6-11 plates.

Femoral pores are equally developed in both sexes, usually in the range of 16-25. 19-24 lamellae under the fourth toe and the scales on the heel and lateral caudals are not spinose.

Distribution: These are the northernmost species of the Platysaurinae being known only from Malawi and Eastern Tanzania and being the only extant species found north of the Zambezi river system.

Etymology: See for genus *Bennettsaurus gen. nov.*

Content: *Bennettsaurus gen. nov.*

TRIBE PLATYSAURINI TRIBE NOV.

Terminal taxon: *Platysaurus capensis* Smith, 1844.

Diagnosis: The tribe *Platysaurini tribu nov.* is defined best by defining the two component genera.

1/ The genus *Platysaurus* Smith, 1844 as defined herein is now restricted to the two species, *Platysaurus capensis* Smith, 1844 and *P. broadleyi*, Branch and Whiting, 1997.

Specimens in this genus are separated from other Platysaurinae by the following suite of characters:

Rostral rarely in contact with, usually separated from, the frontonasal, sometimes by an azygous scale; frontonasal as long as broad, sometimes with an azygous scale posteriorly; second or second and third subocular descending to the lip; sometimes a prefrontal also descending to the lip between loreal and preocular; interparietal large, diamond-shaped, enclosed between 2 pairs of parietals; occipitals broken up or absent; enlarged temporals in 2 longitudinal rows, upper largest; sides of neck covered with small granules only; gulars small, elongate, those on the median line more or less enlarged and squarish; granules on flanks minute or but slightly enlarged; limbs above with granules and smooth or feebly keeled scales.

Color in males: Above; head and back bright green anteriorly passing to dull orange on posterior third, with or without three light longitudinal lines on the head which tend to disappear on back; between the lines some ill-defined light spots may be present or absent; flanks greenish blue and orange; tail yellow ringed with brown, a dusky median line anteriorly. Below, chin and gular region are bright blue; belly anteriorly dark blue, in middle black, posteriorly whitish; limbs and tail pale straw yellow (grenadine in life), the latter ringed with darker colour.

Color in females: Above; head and back very dark brown, with three well-defined light longitudinal lines, between which there are no light spots; flanks and limbs with obsolete pale spots, tail yellow alternately ringed with pale brown, a dusky median line anteriorly. Below, whitish, belly with or without pale blue and pinkish suffusions and a small black patch; tail straw yellow ringed with gray brown.

Both sexes attain a maximum size up to about 207 mm.

2/ *Edwardssaurus gen. nov.* is best diagnosed by the exclusion of all other genera within the Platysaurinae (3 other genera),

leaving the remaining species (most) within the genus *Edwardssaurus gen. nov.*

A/ The genus *Platysaurus* Smith, 1844 is defined above.

B/ *Woolfsaurus gen. nov.* is separated from the other Platysaurinae genera as defined within this paper by the following suite of characters: 14-16 longitudinal rows of ventrals; opaque lower eyelids, each divided into a series of vertical septa. The supranasals are fused with the nasals. The middle row of gulars is not very enlarged. The scales on the side of the neck are spiny and enlarged and those on the flanks are no larger than those on the back. Males have 13-20 femoral pores. Females and juveniles have a black back with three buff stripes, the middle one commonly being broken into spots or ending on the neck; there not being spots between the stripes. Adult males vary in colour depending on locality (and according to subspecies).

C/ The two species within the genus *Bennettsaurus gen. nov.* are readily separated from all other Platysaurinae by the possession of a pair of supranasals. In the case of the species *Platysaurus capensis* from south-west Africa, the scale configuration is quite different and in this species, the nostril is usually considered as being between the upper and lower portions of a divided nasal.

Bennettsaurus gen. nov. are also separated from all other Platysaurinae by the following suite of characters: 12-20 quadrangular ventrals in longitudinal series across the belly. There are two superposed postnasals; occipital is usually absent; lower eyelid is opaque, divided into vertical septa; 4-5 upper labials; 5-6 lower labials; A curved collar composed of 6-11 plates.

Femoral pores are equally developed in both sexes, usually in the range of 16-25. 19-24 lamellae under the fourth toe and the scales on the heel and lateral caudals are not spinose.

In addition to the above: *Edwardssaurus gen. nov.* are further diagnosed and identified as follows: Extremely dorso-ventrally flattened. Medium to very large-bodied (maximum snout-vent-length, SVL usually in the range of 73-146 mm), limbs long and digits unreduced. Granular dorsal scales, ventrals large, square or quadrangular, smooth, juxtaposed, in regular longitudinal and transverse series. Caudal scales not spinose and arranged in whorls. Osteoderms restricted to dorsum of head *vide* Lang 1991. Oviparous, laying 1-2 eggs. Sexually dichromatic, with brightly colored males and cryptic females.

Distribution: For the genus *Platysaurus* Smith, 1844 the distribution is north-west South Africa and nearby Namibia on the east side of the Kalahari Desert. For the genus *Edwardssaurus gen. nov.* the distribution is centred on north-west South Africa and nearby regions.

Etymology: As for the type genus (Flat lizard).

Content: *Platysaurus* Smith, 1844 (type genus); *Edwardssaurus gen. nov.*

FIRST REVISOR NOTES

In the event that a subsequent worker seeks to merge named tribes, genera or subgenera first named herein; in the absence of Zoological Code rules to the contrary, the order of retention should be as published, that being by line or page priority in this original publication, in terms of the descriptions themselves.

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CONFLICT OF INTEREST
The author has no conflicts of interest in terms of this paper or conclusions within.

A seven way division of the Amphibolurinae (Squamata: Sauria: Agamidae).

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ABSTRACT

The taxonomy and nomenclature of the Australasian Amphibolurinae Wagler, 1830 is revised.

While the taxonomy and nomenclature of the group at the genus level is generally found to properly reflect both morphological and phylogenetic groups, a number of larger genera are split to give a more consistent taxonomy. Largely as a result of the work of Wells and Wellington 1985, as well as to a lesser extent other authors, there are available names for all generic groupings with the exception of the placement of just one west Australian species and an eastern Australian species.

A new genus is erected to accommodate the divergent species originally described as *Diporiphora superba* Storr, 1974.

Similarly a new genus is erected to accommodate the divergent species originally described as *Lophyrus spinipes* Duméril and Bibron, 1851.

The subfamily is also formally divided into seven newly named and defined tribes for the first time according to the Zoological Code.

Keywords: Taxonomy; nomenclature; Agamids; Wells; Wellington; new genera; *Jackyhosersaur*; *Adelynhosersaur*; new tribes; Amphibolurini; Ctenophorini; Physignathini; Adelynhosersaurini; Hypsilurini; Molochini; Intelligamini.

INTRODUCTION

The Australasian Amphibolurinae Wagler, 1830 has been well-studied by herpetologists in Australia and elsewhere in the period leading to 2013.

The detailed body of knowledge of the group has arisen due to a combination of circumstances relatively unusual to Australia, which is where all but a few members of the subfamily group are distributed.

The country has a stable political and economic situation and although sparsely populated, is served by efficient transportation by road network to all parts, including the most remote regions.

Extremely well-funded government paid herpetologists and relatively wealthy (by world standards) private herpetologists have also been able to travel to the most remote parts of the continent in search of specimens, meaning that most species likely to be found and scientifically described have been.

Exceptional to this of course are wide-ranging species complexes, which while well-known and collected may consist of more than one species being grouped under a single species label.

In the period post 2000 a number of such species groups have been the subject of intense study, the result being new species being named.

A review was conducted of all described species of Australasian Amphibolurinae with a view to reviewing placement of species

within appropriate genera. In terms of the materials and methods, this was based on my own field and lab work involving most species as well as a review of the relevant literature spanning the last 200 years.

The taxonomy and nomenclature that follows is a synthesis of the best fit model in terms of recognizing both morphological and molecular differences between groups. In detail it does not reflect any individual previously published work, although broadly it makes little significant changes to the well-known and established taxonomy and nomenclature currently used by publishing authors.

However what the following taxonomy does do for the first time, is to without prejudice classify all the Australasian Amphibolurinae in a consistent manner so that genus-level groups are recognized consistently in terms of relative differences between species in each group.

To this end, I make mention of two publications by Wells and Wellington in 1983 and 1985, the latter clearly being the more important of the pair.

To their credit, these authors made a significant attempt to divide the Australian herpetofauna into appropriate genera. At the time of these publications, other herpetologists lampooned the pair for daring to split so many genera and even as of 2013, many names first proposed by the pair have been totally ignored by virtually all other herpetologists.

As I reviewed the taxonomy and divided the groups of species appropriately, relying on both morphology and phylogenies recently published (e.g. Pyron *et al.* 2013), I found that time after time, I had to assign names to well defined and as yet unrecognized genera. The Zoological Code (Ride *et al.* 1999) has well defined rules of homonymity and priority in order to maintain stability and in complying with these rules, I have found myself resurrecting names proposed by earlier authors. This includes a number of effectively unused Wells and Wellington names such as *Intellagama* Wells and Wellington, 1985, *Gowidon* Wells and Wellington, 1983 and *Wittenagama* Wells and Wellington, 1985, as well as names generally unused and proposed by others.

Following publication of this paper, there will be the inevitable claims by a mob of criminals and ratbags known as the Wüster gang. These should be ignored as they will invariably be a collection of lies and defamation (see Hoser 2012a, 2012b and 2013 for the detail).

A common complaint in the past has been that I uncritically accept the taxonomy of Wells and Wellington. This has never been the case. In fact in the first paper in which I described species, namely Hoser (1998), I used a significantly different taxonomy to that proposed by Wells and Wellington. In this paper, I also use a different taxonomy to that of Wells and Wellington (1985), that being their most recent relevant publication, including non-recognition of some genera proposed by the pair, most notably including those genera they erected as a result of division of the genus *Ctenophorus* Fitzinger, 1843.

I do note however that an argument can be raised to divide *Ctenophorus* Fitzinger, 1843 into about 8 subgenera, to better define relevant species groups, in which case, if this were done, then the Wells and Wellington names must be used where appropriate.

However and I note herein explicitly, where I recognize genera that they (Wells and Wellington) were the first to formally name, I am bound by the Zoological Rules (Ride *et al.* 1999) and therefore do use their names. This is as I do for all other relevant authors, be they Wagler, Storr or whomever.

Following herein, I first present a formal description of a new genus *Jackyhosersaur gen. nov.*, to accommodate the divergent species originally described as *Diporiphora superba* Storr, 1974, from the Kimberley region of Western Australia.

Similarly a new genus is erected to accommodate the divergent species originally described as *Lophyrus spinipes* Duméril and Bibron, 1851, currently most widely known in the literature as *Hypsilurus spinipes* (Duméril and Bibron, 1851).

I then present a series of seven formal descriptions of tribes, formally named for the first time that in combination accommodate all the Amphibolurinae, listing the complete list of component genera for each.

As an instruction to first or subsequent revisors of this work, no names proposed herein should have their spelling changed or altered in any way unless this is a mandatory requirement under the existing in force Zoological Code, as published by the ICZN. If emendation of names is in the normal course of events optional only, then the original spelling herein should be used.

In the event any tribes are merged by later authors, they should be merged in favour of page priority, in that those described first in this paper take priority over the later one/s.

While it is not necessary or even possible for me to list all the material consulted in terms of the Amphibolurinae over the last 30 plus years that I have been studying these reptiles, important and relevant publications relating to the taxonomy of Amphibolurinae as described within this paper include the following: Cogger (2000), Cogger *et al.* (1983), Hoser (1989, 2007, 2012a, 2012b, 2013), Joger (1991), Pianka and Vitt (2003), Pyron *et al.* (2013), Storr (1974), Wells and Wellington (1983, 1985), Wilson and Swan (2010) and sources cited therein.

JACKYHOSERSAUR GEN. NOV.

Type species: *Diporiphora superba* Storr, 1974.

Diagnosis: *Jackyhosersaur gen. nov.*, monotypic for the species originally described as "*Diporiphora superba* Storr, 1974" is readily separated from all other *Diporiphora* Gray, 1842, the genus it was until now assigned to, on the basis of the following suite of characters: Keels of the dorsal scales are parallel to the vertebral line; gular and ventral scales (excluding chin shields) are weakly to strongly keeled; no gular fold; no indication of spines or a fold behind the ear; usually greenish or greenish yellow above, yellow below and without pale dorso-lateral stripes; there is sometimes a brown vertebral stripe present; the adpressed hind limb reaches about the eye; the hindlimb is about 70-100 per cent of the snout-vent length, the tail about 300 to 400 percent of the snout-vent length; there are four preanal pores.

Distribution: Known only from the region near the type locality of Mitchell River in the west Kimberley, north-west Western Australia, Australia.

Etymology: *Jackyhosersaur gen. nov.* is named in honour of my younger daughter Jacky Hoser, of Melbourne, Victoria, Australia, aged 12 as of 2013 in recognition of her excellent work in reptile education, working with Snakebusters, Australia's best reptile shows.

Content: *Jackyhosersaur superba* (Storr, 1974) (monotypic).

ADELYNHOSERSAUR GEN. NOV.

Type species: *Lophyrus spinipes* Duméril and Bibron, 1851.

Currently most widely known as (*Hypsilurus spinipes* Duméril and Bibron, 1851).

Diagnosis: *Adelynhosersaur gen. nov.* is monotypic for the type species. The species (and genus) is readily separated from other Australian *Tiaris* Duméril and Bibron, 1837 (the only genus it is likely to be confused with) and *Hypsilurus* from regions north of Australia, by the absence of a longitudinal row of grossly enlarged scales on the throat. In the other two genera, such scales are similar to those of the nuchal crest.

The genus *Adelynhosersaur gen. nov.* is also separated from all other Amphibolurinae by the following suite of characters: grey, grey-brown or chocolate brown above, often suffused with green. Immaculate or with dark brown flecks, spots of variegations and occasionally with obscure dark transverse bands across the top of the back and tail. Whitish or dirty brown below. Usually a broad, dark brown bar from the eye to the ear, and some darker bars on the jaws. The body scales are heterogeneous, the scales on the dorsum and flanks are small and keeled and with scattered, enlarged, strongly keeled or spinose scales, often aligned to form irregular transverse rows. A series of enlarged spinose scales on the upper surfaces of the limbs. There is a fairly strong nuchal crest continuous with a low but conspicuous dorsal crest. Gulars are keeled with a few scattered, larger, keeled scales, especially on the midline. Remaining ventral and caudal scales are strongly keeled. The head is large and wedge-shaped, with a thick, angular canthus rostralis which continues as an acute supraocular ridge. The tympanum is large and superficial. The nostril is subcircular, facing outwards and slightly backwards and downwards in an enlarged and somewhat swollen nasal scale lying below the canthal ridge. The adpressed hindlimb reaches to between the eye and the tip of the snout, the hindlimb being about 90 per cent of the snout-vent length and the tail being about 200 per cent of the snout-vent length, (adapted from Cogger, 2000).

Distribution: Wetter parts of northern NSW and Southern Queensland, generally near the coast.

Etymology: Named in honour of my eldest daughter, Adelyn Hoser, of Melbourne, Victoria, Australia, aged 14 as of 2013 in recognition of her excellent work in reptile education, working with Snakebusters, Australia's best reptile shows.

Content: *Adelynhosersaur spinipes* Duméril and Bibron, 1851 (monotypic).

AMPHIBOLURINI TRIBE NOV.**(Terminal taxon: *Lacerta muricata* White, 1790)**Currently known as *Amphibolurus muricatus* (White, 1790).**Diagnosis:** Lizards within Amphibolurini *tribe nov.* are separated from all other Australian Amphibolurinae by one or other of the following suites of characters: One or other of the following suite of characters:1/ Body without very large conical spines or a spiny nuchal hump; a large loose "frill" or skin around the neck (*Chlamydosaurus*, Gray, 1825), or for all other genera within the tribe:2/ Body without very large conical spines or a spiny nuchal hump; no large skin frill around the neck; femoral and/or preanal pores present, at least in males; tail at most slightly laterally compressed, without a strongly differentiated dorsal keel; and not including the following suite of characters that diagnoses the tribe Ctenophorini *tribe nov.*, these relevant characters as a suite further being: a vertebral series of enlarged scales present or absent on the back and if absent, then three or more femoral pores present on each side; nuchal crest and/or series of enlarged keeled vertebral scales present or absent and if absent present along at least the anterior two thirds of the body; enlarged strongly keeled or spinose scales are present elsewhere on the dorsum; spinose scales on sides of base of tail may be present or absent, but in a single row if present; lower edge of the supralabials straight or at most slightly curved, forming a more or less straight or even edge to the upper lip; a row of enlarged scales from below the eye to above the eye; dorsal scales of the body are more or less homogeneous with at most a few slightly enlarged scattered tubercles.**Distribution:** Most parts of Australia, including Tasmania.**Content:** *Amphibolurus* Wagler 1830 (type genus); *Caimanops* Storr, 1974; *Chlamydosaurus* Gray, 1825; *Cryptagama* Witten, 1984; *Diporiphora* Gray, 1842; *Gowidon* Wells and Wellington, 1983; *Houstoniasaurus* Wells and Wellington, 1985; *Jackyhosersaur gen. nov.*; *Mantichorasaurus* Wells and Wellington, 1983; *Pogona* Storr, 1982; *Rankina* Wells and Wellington, 1983; *Wittenagama* Wells and Wellington, 1985.**TRIBE ADELYNHOSERSAURINI TRIBE NOV.****(Terminal taxon: *Lophyrus spinipes* Duméril and Bibron, 1851)**Currently most widely known as *Hypsilurus spinipes* (Duméril and Bibron, 1851).**Diagnosis:** Lizards within Adelynhosersaurini *tribe nov.* are separated from all other Australian Amphibolurinae by the following suite of characters: Body without very large conical spines or a spiny nuchal hump; no large skin frill around the neck; femoral and/or preanal pores absent; there is a transverse gular fold present; the tail is twice as long as the head and body; body laterally compressed, dorsals small, rhomboid, hardly overlapping, keeled, directed backwards and upwards; uniform ventrals significantly larger, strongly keeled.Upper head scales small, slightly heterogeneous; unlike in *Hypsilurini tribe nov.* described below, there is not a more or less curved row of enlarged scales below the eye adjacent to the orbit, or if present, it is at best only weakly developed; tympanum visible; males and females with almost equally developed gular pouch (frequently with one or two transverse folds in the relaxed state) and well developed vertebral crest. Sexual dimorphism usually only weakly developed.**Distribution:** Wetter parts of north-east Australia and New Guinea.**Content:** *Adelynhosersaur gen. nov.* (type genus); *Tiaris* Duméril and Bibron, 1837.**TRIBE HYP SILURINI TRIBE NOV.****(Terminal taxon: *Lophura (Hypsilurus) godeffroyi* Peters, 1867)**Currently most widely known as *Hypsilurus dilophus* (Duméril and Bibron, 1837).**Diagnosis:** Lizards within *Hypsilurini tribe nov.* are separated from all other Australasian Amphibolurinae by the following suite of characters: Body without very large conical spines or a spiny nuchal hump; no large skin frill around the neck; femoral and/or preanal pores absent; there is a transverse gular fold present; the tail is twice as long as the head and body; body laterally compressed, dorsals small, rhomboid, hardly overlapping, keeled, directed backwards and upwards; uniform ventrals significantly larger, strongly keeled. Upper head scales small, slightly heterogeneous; a more or less curved row of enlarged scales below the eye adjacent to the orbit (as opposed to only weakly or not developed in *Adelynhosersaurini tribe nov.* described above); tympanum visible; males and females with almost equally developed gular pouch (frequently with one or two transverse folds in the relaxed state) and well developed vertebral crest (no dorsal crest in the species *Hypsilurus modestus*). Sexual dimorphism usually only weakly developed.**Distribution:** The region around New Guinea and nearby.**Content:** *Hypsilurus* Peters, 1867 (monotypic).**TRIBE INTELLAGAMINI TRIBE NOV.****(Terminal taxon: *Lophura lesueurii* Gray, 1831)**Currently known as: *Intellagama lesueurii* (Gray, 1831).Until recently, most widely known as *Physignathus lesueurii* (Gray, 1831).**Diagnosis:** Separated from all other Amphibolurinae by the following suite of characters: Body without very large conical spines or a spiny nuchal hump; no large skin frill around the neck; femoral and/or preanal pores present, at least in males; tail strongly compressed with a strongly differentiated dorsal keel; not a strong emerald-green colour and lacks diagonal stripes of green or turquoise on the body.**Distribution:** East coast of Australia and nearby areas.**Content:** *Intellagama* Wells and Wellington, 1985 (monotypic).**TRIBE PHYSIGNATHINI TRIBE NOV.****(Terminal taxon: *Physignathus cocincinus* Cuvier, 1829)****Diagnosis:** Separated from all other Amphibolurinae by the following suite of characters: Body without very large conical spines or a spiny nuchal hump; no large skin frill around the neck; femoral and/or preanal pores present, at least in males; tail strongly compressed with a strongly differentiated dorsal keel; colouration is a strong emerald-green colour; diagonal stripes of green or turquoise are found on the body, while the tail is banded from the middle to the end with green and dark brown. Their undersides range from white, off white, very pale green or pale yellow.**Distribution:** Mainland south-east Asia.**Content:** *Physignathus* Cuvier, 1829 (monotypic).**TRIBE MOLOCHINI TRIBE NOV.****(Terminal taxon: *Moloch horridus* Gray, 1841).****Diagnosis:** Separated from all other Amphibolurinae by one or other of the following suites of characters:1/ The body is covered above with large conical spines, each being much larger than the eye and the nape has a large spiny hump (*Moloch* Gray, 1841), or:2/ Body without very large conical spines or a spiny nuchal hump; no large skin frill around the neck; femoral and/or preanal pores absent; there is no transverse gular fold and the tail is about one and a quarter times as long as the body (*Chelosania* Gray, 1845).**Distribution:** Most drier parts of mainland Australia.**Content:** *Moloch* Gray, 1841 (type genus); *Chelosania* Gray, 1845.

TRIBE CTENOPHORINI TRIBE NOV.

(Terminal taxon: *Grammatophora decresii* Duméril and Bibron, 1837).

Currently known as *Ctenophorus decresii* (Duméril and Bibron, 1837).

Diagnosis: Lizards within *Ctenophorini* *tribe nov.* are separated from all other Australian Amphibolurinae by the following suite of characters: Body without very large conical spines or a spiny nuchal hump; no large skin frill around the neck; femoral and/or preanal pores present, at least in males; tail at most slightly laterally compressed and without a strongly differentiated dorsal keel; a vertebral series of enlarged scales present or absent on the back and if absent, then three or more femoral pores present on each side; nuchal crest and/or series of enlarged keeled vertebral scales present or absent and if absent present along at least the anterior two thirds of the body; enlarged strongly keeled or spinose scales are present elsewhere on the dorsum; spinose scales on sides of base of tail may be present or absent, but in a single row if present; lower edge of the supralabials straight or at most slightly curved, forming a more or less straight or even edge to the upper lip; a row of enlarged scales from below the eye to above the eye; dorsal scales of the body are more or less homogeneous with at most a few slightly enlarged scattered tubercles.

Distribution: Most parts of mainland Australia.

Content: *Ctenophorus* Fitzinger, 1843 (monotypic for the type genus).

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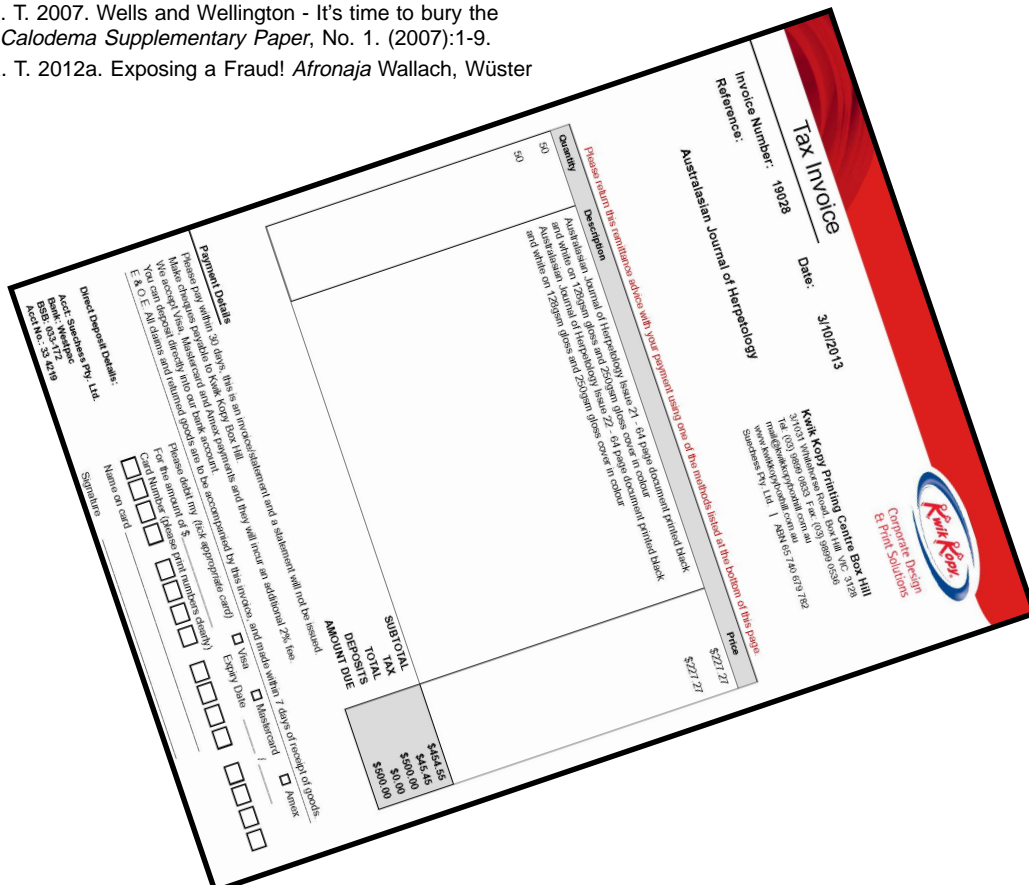
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CONFLICT OF INTEREST

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



Not in *Heloderma* ... A revised taxonomy and new genus for the Gila Monster.

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ABSTRACT

The basis of this paper is an overdue review of the taxonomy of the icon lizard the Gila Monster. While it is clearly a member of the family Helodermatidae Gray, 1837, recently obtained molecular evidence has confirmed long-standing morphological and fossil evidence that it is clearly misplaced in the genus *Heloderma* Wiegmann, 1829.

While it is astounding that no herpetologist has rectified the obvious error of placement to date, this paper does exactly that.

In accordance with the Zoological Code (Ride *et al.* 1999), the new genus *Maxhosersaurus* is created to accommodate the species originally described as *Heloderma suspectum* Cope, 1869, as well as fossil material attributed to this species taxon.

To take into account the fossil Helodermatidae material that has emerged since the original description of the family and more likely to emerge in the future, both genera *Heloderma* and *Maxhosersaurus gen. nov.* are also formally placed within a single tribe defined herein.

Keywords: Taxonomy; nomenclature; Gila Monster; Helodermatidae; *Heloderma*; *horridum*; *suspectum*; Varanidae; *Varanus*; Bryan Fry; false claims; new genus; *Maxhosersaurus*.

INTRODUCTION

The Gila Monster and Beaded Lizards (Genus *Heloderma* Wiegmann, 1829) do not need an introduction as such, due to the fact they are known globally as the only "venomous" lizards in the world. While it is suggested that they sit on the cusp between merely having toxic saliva and being venomous, the final decision in terms of which view to take is dependent on a classification of the delivery system, rather than the compounds within the saliva itself. However a discussion of the venom delivery system of these lizards is not the purpose of this paper.

An excellent account of the Gila Monster, until now known as *Heloderma suspectum* Cope, 1869 can be found in the literature, perhaps the best readily available account for most people being that within Campbell and Lamar (2004). Likewise for the so-called Beaded Lizards, until recently grouped within a single species known generally as *Heloderma horridum* (Wiegmann, 1829), with Campbell and Lamar (2004) perhaps again being the best readily available account of the detail of the group.

In 2013, Reiserer *et al.* published results of a molecular study that showed deep divergences between the two then recognized living species of *Heloderma*. Confirming the similar findings in an earlier study they wrote: "Beaded lizards and Gila monsters (*H. suspectum*) are hypothesized to have diverged from a most-recent common ancestor in the late Eocene ~35 mya (Douglas *et al.* 2010, p. 163)."

On the molecular evidence alone, there would be absolutely no question that species with such deep divergence should be

placed in separate genera. The fossil record as documented by Bogert and del

Campo in 1956 and Beck in Pianka *et al.* (2004) (p. 518) also broadly corroborates this situation.

Campbell and Lamar (2004) provide a detailed morphological account of both *Heloderma horridum* and *H. suspectum* which highlight numerous morphological differences between the two species as recognized by them in their detailed book.

On the basis of the preceding, it is clear that there is no question that *Heloderma horridum* and *H. suspectum* should not be placed in the same genus. Because *Heloderma horridum* is the type species, it remains within *Heloderma*. The species *suspectum* Cope, 1869 is the one that needs to be placed in another genus. As no name is available under the Zoological Code (Ride *et al.* 1999), one is formally defined herein for the first time.

The only vaguely logical or potentially current argument against the placement of the species *suspectum* Cope, 1869 into a new genus is the commonly raised argument against the creation of numerous monotypic genera within a given family. While I would as a matter of course reject such an argument for such deeply divergent species, the argument is now redundant after the publication of Reiserer *et al.* (2013).

These authors elevated four previously described subspecies of *Heloderma horridum* to full species status on the basis of deep

divergences spanning millions of years, between each allopatric population.

This time frame for the various species divisions was within the time range of between 9.7 and 5 million years before present for the relevant species.

With the argument relating to the potential creation of two monotypic genera within a family in effect being removed, there would in the normal course of events be no obvious dissent to my creation of a new genus within the global herpetological community.

However it is appropriate that I herein raise the inevitable response this paper will generate from a group known widely as the "truth haters" or "Wüster gang", the name coming from the ringleader of the group, Wolfgang Wüster, who is a pseudoacademic from Wales in the UK. These men will use all sorts of illegal, unethical and improper means to try to stop the use of the new nomenclature formally proposed within this paper. Their mode of operation is in fact outlined by the gang in Kaiser *et al.* (2012a, 2012b) (the second of these documents not having been written by Kaiser, even though it is referred to as being his), in turn properly dealt with by Hoser (2012b), and again by the Wüster gang in Kaiser *et al.* (2013) (this document not having been written by Kaiser, even though it is referred to and widely cited as being his), in turn properly dealt with by Hoser (2013).

The papers Hoser (2012a, Hoser 2012b and Hoser 2013) all deal with a vast number of cases of taxonomic and nomenclatural misconduct, vandalism, scientific fraud, criminal fraud, lies, dishonest and unethical practices and other serious matters committed by the Wüster gang in the period spanning 1998 to 2013.

In summary, all claims made by the Wüster gang in the follow-up to publication of this paper, should be ignored. This includes their comments in "social media" posts in places like "Twitter", "Facebook", internet chat forums, predatory "journals" and/or PRINO Journals ("peer reviewed in name only" Journals) they or their close friends exercise despotic editorial control over, tabloid news media and elsewhere.

Due to the vast body of literature published on the living members of the Helodermatidae and the fact that much of it is widely available, including on the world-wide web, including for example the highly relevant paper of Reiserer *et al.* (2013), I do not seek to rehash this readily available material herein.

Instead, the main purpose of this paper is to define the new genus according to the Rules of Zoological Nomenclature (Ride *et al.* 1999) to accommodate the species originally described by Cope as *Heloderma suspectum* Cope, 1869 to enable it to be properly named and classified by others according to its obvious phylogenetic origins.

The body of literature on lizards of the Helodermatidae is vast and key references over the last couple of centuries include the following: Aminetzach *et al.* (2009), Angeli (2005), Anzueto and Campbell (2010), Ariano-Sánchez (2006), Ariano-Sánchez and Salazar (2007, 2012, 2013), Beaman *et al.* (2006), Beck (2005), Beck and Jennings (2003), Beck and Lowe (1991), Bernstein (1999), Bogert and Del Campo (1956), Bonetti (2002), Boulenger (1885, 1981), Boundy *et al.* (2012), Campbell and Lamar (2004), Campbell and Vannini (1988), Canseco and Muñoz (2007), Cobarrubias *et al.* (2012), Cooper jr. and Arnett (2003), Cope (1869), Davis and DeNardo (2010), Degenhardt *et al.* (1996), Domínguez-Vega *et al.* (2012), Douglas *et al.* (2010), Duméril and Bibron (1836), Fischer (1882), Funk (1966), Furrer (2004), Garman (1890), Gienger and Beck (2007), Günther (1885), Hanley and Hanley (2003), Hartdegen and Chiszar (2001), Köhler (2000), Kunz (2004, 2007), Kwiatkowski *et al.* (2008), Lemos-Espinal *et al.* (2003), Liner (2007), Lock (2009), Lovich and Beaman (2007), McDiarmid (1963), Meléndez (2006), Monroy-Vilchis *et al.* (2005), Pregill *et al.* (1986), Pylon *et al.* (2013), Reiserer *et al.* (2013), Reisinger (2006a, 2006b),

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GENUS *HELODERMA* WEIGMANN, 1829.

Type species: *Trachyderma horridum* Wiegmann, 1829.

Diagnosis: Ear exposed. A gular fold. Digits with a series of transverse lamellae inferiorly. Upper surfaces uniformly tubercular; abdominal scales flat, juxtaposed. Labial shields present. Colouration is blackish brown above, spotted with yellow, the latter colour sometimes forming regular rings round the tail, (adopted from Boulenger, 1885).

Diagnosics for the separation of *Heloderma* from *Maxhosersaurus gen. nov.* is given in the description of *Maxhosersaurus gen. nov.* given below.

Distribution: Mexico, being found in the coastal areas from Oaxaca to Sonora; Sinaloa, Jalisco, Morelos, Guerrero, Chiapas, Nayarit, Michoacan, as well as Guatemala.

Content: *Heloderma horridum* (Wiegmann, 1829) (type species); *H. alvarezi* Bogert and Del Campo, 1956; *H. charlesbogerti* Campbell and Vannini, 1988; *H. exasperatum* Bogert and Del Campo, 1956.

GENUS *MAXHOSERSAURUS* GEN. NOV.

Type species: *Heloderma suspectum* Cope, 1869.

Diagnosis: Until now, the genus *Maxhosersaurus gen. nov.* would have been diagnosed as being within *Heloderma* on the basis of the characters outlined below for the new tribe (which was formerly the diagnosis for a genus including all living Helodermatidae as given by Boulenger in 1885).

However, the genus *Maxhosersaurus gen. nov.* is separated from *Heloderma* by the following suite of characters: The tubercles on the back are separated by wide granular interspaces as opposed to being close in *Heloderma*.

For *Maxhosersaurus gen. nov.* the colouration is yellowish or orange, with blackish network on the back and cross bands on the tail. By contrast the colouration of *Heloderma* is blackish brown above, spotted with yellow, the latter colour sometimes forming regular rings round the tail.

Maxhosersaurus gen. nov. are also separated from *Heloderma* by the absence of enlarged post nasal scales, versus usually two in *Heloderma*.

In *Maxhosersaurus gen. nov.* there are only one pair of infralabials in contact with the chin shields, versus two pairs in *Heloderma*.

Differences in habitat preferences also separate the two genera by microhabitat where they occur sympatrically. *Heloderma* are longer, more lanky and arboreal inclined species than *Maxhosersaurus gen. nov.*

Maxhosersaurus gen. nov. are readily separated from *Heloderma* by their proportionately shorter tail being no more than 55 per cent of the snout-vent length, versus at least 65 per cent of the snout-vent length in all four *Heloderma* species.

The tongue in *Maxhosersaurus gen. nov.* is usually black, versus pink as it is in most *Heloderma*.

Reiserer *et al.* (2013), rejected the hypothesis that there were three subspecies of *Maxhosersaurus suspectum* on the basis of molecular evidence.

In common with *Heloderma*, *Maxhosersaurus gen. nov.* are further diagnosed with the following traits: Ear exposed. A gular fold. Digits with a series of transverse lamellae inferiorly. Upper surfaces uniformly tubercular; abdominal scales flat, juxtaposed. Labial shields present.

Distribution: United States of America in the areas of south-east California, Southern Nevada, South-west Utah, Arizona, New Mexico and immediately adjacent Mexico.

Etymology: Named in honour of my cousin, Max Hoser of Campbelltown, NSW, Australia for services to herpetology.

Content: *Maxhosersaurus suspectum* (Cope, 1869) (monotypic).

TRIBE HELODERMINI TRIBE NOV.

Terminal taxon: *Trachyderma horridum* Wiegmann, 1829.

Diagnosis: Ear exposed. A gular fold. Digits with a series of transverse lamellae inferiorly. Upper surfaces uniformly tubercular; abdominal scales flat, juxtaposed. Labial shields present (adopted from Boulenger, 1885).

Distribution: United States of America in the areas of south-east California, Southern Nevada, South-west Utah, Arizona, New Mexico, south through Mexico, including being found in the coastal areas from Oaxaca to Sonora; Sinaloa, Jalisco, Morelos, Guerrero, Chiapas, Nayarit, Michoacan and into Guatemala.

Content: *Heloderma* Wiegmann, 1829; *Maxhosersaurus gen. nov.*

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CONFLICT OF INTEREST

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

Monitor Lizards reclassified with some common sense (Squamata: Sauria: Varanidae).

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ABSTRACT

Until now, most species of "Monitor Lizards" all grouped within the family Varanidae have been treated by taxonomists as being within a single genus, namely *Varanus* Merrem, 1820. This is in effect a rehash of the family name that also accommodates all the same diverse group of species.

In the face of this anomaly and the fact that this relatively ancient group of lizards distributed across a number of continental plates is clearly paraphyletic at the genus level, this paper for the first time ever presents a sensible family-wide classification for the living Varanidae.

Resurrecting named genera and/or elevating relevant named subgenera to genus level where appropriate, this paper draws on a combination of inspection of thousands of live and dead varanid specimens from all relevant parts of the world over more than 4 decades and the relevant literature to date, including photos of all described taxa and others yet undescribed to produce a current listing of the living (formally described) Varanidae, described to 2013, based on both morphological and molecular evidence.

Presented is a synopsis, except where it is necessary to define newly named groupings, species or subspecies according to the Zoological Code, for which there is an appropriately expanded coverage.

In summary, the list consists of a number of genera for which there are available names and two more named and defined herein for the first time, long recognized in the literature as highly distinct species groups. Also included are six newly named and defined subgenera for divergent Australian taxa, bringing the taxonomy and nomenclature closer to alignment with that of other reptile groups.

Two species and six subspecies from northern Australia and nearby are also formally described and named for the first time.

The living Varanidae are in turn divided into four tribes, all defined according to the Zoological Code.

The wide dissemination of this publication will no doubt eventually ensure a more realistic taxonomy and nomenclature adopted by others for the living varanids and end the lazy and inappropriate "lumping" of all species within the catch all genus *Varanus*.

Keywords: Taxonomy; nomenclature; Monitors; Varanidae; Wells; Wellington; *Odatria*; *Polydaedalus*; *Pantherosaurus*; *pulcher*; *rosenbergi*; *kuringai*; New tribes; Varaniini; Empugusiini; Shireenhosersauriini; Polydaedaliini; New genera; *Oxysaurus*; *Shireenhosersaurea*; New subgenera; *Aquativaranus*; *Kimberleyvaranus*; *Pilbaravaranus*; *Parvavaranus*; *Arborhabitiosaurus*; *Honlamus*; new species; *honlami*; *hoserae*; new subspecies; *wellsi*; *wellingtoni*; *nini*; *makhani*; *woolffi*; *hawkeswoodi*.

INTRODUCTION

Until now, most species within the family Varanidae have been treated by taxonomists as being within a single genus, namely *Varanus* Merrem, 1820. This is in effect a rehash of the family name that also accommodates all the same quite divergent species.

For many years, this was not particularly problematic, as the number of described species was relatively few.

However in the past 3 decades the number of recognized species has doubled to include well over 80 named and widely

recognized species and further unnamed species awaiting scientific description.

In the face of this anomaly and the fact that this relatively ancient group of lizards distributed across a number of continents is clearly paraphyletic at the genus level, some authors have attempted to correct the situation.

Most have been somewhat timid and created subgenera, with the clear intent of allowing other later authors to make the bold step of elevating these to genus rank, but at the same time

securing naming rights to the relevant species groups.

Ignoring the better-known herpetologists from the 1800's such as Gray, Wagler and Fitzinger who virtually randomly assigned species to newly named genera in a colonial-style flag planting exercise, it makes most sense to consider those herpetologists from the last hundred years who have taken to naming the varanid genera with a more scientific approach and within the bounds of Zoological Nomenclature.

Of the more recent (last hundred years) authors, I should make mention of two authors, Wells and Wellington, who in 1985, co-published two seminal papers (Wells and Wellington, 1983, 1985), which took a rational look at the ridiculous situation of divergent species being placed in a single genus and in response erected several genera to remedy the situation as they saw it and on the basis of the evidence before them at the time.

In terms of the long-term dismemberment of the genus *Varanus*, notable recent authors have included Böhme (2003), Mertens (1942, 1963), Wells and Wellington (1985) and authors who have in turn relied on these works.

Without doubt the most comprehensive efforts to date have been those of Böhme (2003) (updated several times in several forms since, including as Koch *et al.* 2010) and Wells and Wellington (1985). However Böhme's (2003) coverage was disabled and incomplete by his overlooking of the important Wells and Wellington papers of 1983 and 1985, which named relevant Australian species and genera. Wells and Wellington (1985), while a valiant attempt to resolve the taxonomy and nomenclature of the monitors, only looked at Australian members of the Varanidae in the context of a revision of the taxonomy of all Australia's reptiles and frogs.

However as of 2013, the unfortunate reality is that herpetological taxonomy and nomenclature has been hampered by a long-term destabilization campaign by a small group known as the Wüster gang or "truth haters", as Wüster calls his group. See Hoser (2012a, 2012b and 2013) for details, or alternatively the documents cited herein as Kaiser (2012a, 2012b), the latter actually written by Wüster based on what is written by Kaiser himself in Kaiser (2012a) and a similar version of the Wüster document cited herein as Kaiser *et al.* (2013) for the details of their activities in their own words.

As a result of the actions of the Wüster gang, including harassing authors, journal editors and the like, backed up with false claims that they represent a majority of herpetologists, which they do not, the Wells and Wellington publication of 1985 and others by these authors since, have been largely ignored by many other publishing herpetologists in effect setting back Varanid taxonomy by decades (Hoser 2007).

With the influential Wolfgang Böhme and virtually all other publishing varanid specialists continuing to place all species within the genus *Varanus*, and at best making known the existence of previously named subgenera, common usage of *Varanus* for placement purposes of all species has continued.

While such a position may be convenient for some, the stupidity of the situation of non-recognition of relevant genera is seen by the repeated need to identify given species as being within a given "species group" (e.g. Koch *et al.* 2010, 2013), noting that these groups clearly correspond to genus level units.

That the "species groups" correspond to genera is easily seen when they are plotted on molecular phylogenies produced using the relevant species as seen for example in that produced in Figure 14 of Pyron *et al.* (2013).

While it may cause pain to some to dispense with the cherished name "*Varanus*" for species of monitor lizard they have grown to love and cherish, it does unfortunately make good sense to produce a taxonomy and nomenclature that reflects the phylogeny of the Varanidae. This does of course restrict the genus *Varanus* to the relevant species, being those of the type and others closely allied to it.

Hence for the first time ever, I produce a check-list of the world's

described varanids, placing all species within appropriate genera.

Resurrecting genera or alternatively elevating the relevant named subgenera to genus level where appropriate, this paper draws on the relevant literature to produce a current listing of the living Varanidae, including over 80 species described to 2013, based on both morphological and molecular evidence, all assigned for the first time, to their correct genus level and subgenus level placements.

Presented herein the material is in the form of a synopsis or list, followed by descriptions of new genera or subgenera as necessary to define newly named groupings according to the Zoological Code (Ride *et al.* 1999) as well as two new species and six new subspecies.

In summary, the list consists of a number of genera and subgenera for which there are available names, and assigned if needed on the basis of nomenclatural priority, if and when more than one name is available.

For unnamed groupings, genera or subgenera are defined below the list in accordance with the Zoological Code (Ride *et al.* 1999). Likewise for two newly named species from Australia and six subspecies from the same general region.

The living Varanidae are also divided into four tribes, all defined according to the Zoological Code.

The wide dissemination of this publication will no doubt ensure a more realistic taxonomy and nomenclature adopted by others for the living varanids and end the lazy lumping of all species groups within the "catch all" genus *Varanus*.

Detailed summaries of the earlier taxonomy and nomenclature of the relevant species are given in some of the publications cited herein, including Böhme (2003) and Koch *et al.* (2010, 2013) and this information is not repeated here.

I do however briefly mention here that *Polydaedalus pulcher* (Leach, 1819) is recognized as a species closely related to *Polydaedalus ornatus* (Daudin, 1803), being the specimens until now referred to the latter species from west of the Dahomey Gap in Africa, readily distinguishable by their larger average size and different labial markings. Most authors, including Böhme (2003) have treated "*pulcher*" as a junior synonym of "*niloticus*".

Because the volume of material published on the living varanids is vast, it is pointless for me to cite all herein. However key publications relied upon in terms of the taxonomy and nomenclature used herein include the following: Ahl (1932), Allison (2006), Aplin *et al.* (2006), Ast (2001), Auffenberg (1981, 1988, 1994), Auffenberg *et al.* (1989), Auliya (2006), Baverstock *et al.* (1993), Bayless (2002), Bayless and Adragna (1999), Becker (1991), Becker *et al.* (1991), Bennett (1998), Bennett and Lim (1995), Bennett and Sweet (2010), Böhme (1988, 1988b, 1991a, 1991b, 1997, 2003, 2010), Böhme and Jacobs (2001), Böhme and Koch (2010), Böhme and Ziegler (1997a, 1997b, 2005, 2007), Böhme *et al.* (1994, 2002), Boulenger (1885), Brandenburg (1983), Branch (1982), Brygoo (1987), Card and Kluge (1995), Ciofi and de Boer (2004), Cogger (1975) *et seq.*, Cogger *et al.* (1983), Cota *et al.* (2008), Covacevich and Couper (1994), Daudin (1802), De Lisle (2009), Deeks (2006), Deraniyagala (1944), Doody *et al.* (2009), Doria (1874), Duméril and Bibron (1836), Dunn (1927), Dwyer (2008), Eidenmüller and Philippen (2008), Eidenmüller and Wicker (2005), Erdelen (1991), Ferner *et al.* (2000), Fitch *et al.* (2006), Foufopoulos and Richards (2007), Fuller *et al.* (1998), Gaulke (1998, 2010), Gaulke and Curio (2001), Gaulke *et al.* (2007), Good *et al.* (1993), Gray (1827, 1831, 1831-1835, 1838, 1845), Guibé (1954), Hallowell (1856), Hardwicke and Gray (1827), Harvey and Barker (1998), Heaney and Regalado (1998), Hedges and Vidal (2009), Holmes *et al.* (2010), Horn (1977, 1995), Hoser (1989, 1998, 2003), ICZN (1959, 2000), Iskandar and Mumpuni (2003), Jacobs (2002, 2003), Karunarathna *et al.* (2008), Khatiwada and Ghimire (2009), Keogh *et al.* (2001), Koch (2010), Koch and Böhme (2010), Koch *et al.* (2007, 2009,

2010a, 2010b, 2013), Lauprasert Thirakhupt (2001), Leary (1991), Leviton *et al.* (1985), Linné (Linnaeus) (1758, 1766), McCoy (2006), Merrem (1820), Mertens (1941, 1942, 1946, 1950, 1951, 1956, 1958, 1959, 1962, 1963), Meyer (1874), Müller and Schlegel (1845), Murphy *et al.* (2002), Obst (1977), Ouwens (1912), Pattiselanno *et al.* (2007), Pernetta (2009), Peters (1872), Peters and Doria (1878), Philipp and Philipp (2007), Philipp *et al.* (1999), Pianka *et al.* (2004), Pyron *et al.* (2013), Riquier (1998), Rooij (1915), Schlegel (1837-1844), Schmicking and Horn (1997), Seba (1735), Setiadi and Hamidi (2006), Setiadi *et al.* (2009), Shea and Cogger (1998), Shine *et al.* (1996, 1998), Smith (1935), Smith *et al.* (2007), Somma and Koch (2012), Sprackland (1991, 1993a, 1993b, 1994, 1999, 2009), Stanner (2011), Stejneger (1907), Storr (1980), Suzuki (2006), Sweet and Pianka (2007), Tiedemann *et al.* (1994), Traeholt (1998), Vidal and Blair Hedges (2009), Vidal *et al.* (2012), Vincent and Wilson (1999), Weijola (2010), Weijola and Sweet (2010), Wells and Wellington (1983, 1985), Welton *et al.* (2010), Weerd and Brown (2010), Wesiak (1993), Wesiak and Koch (2009), Wheeler (1998), Wiegmann (1834), Wilson and Knowles (1988), Wilson and Swan (2013), Yuwono (1998), Ziegler and Böhme (1997), Ziegler *et al.* (1998, 1999a, 1999b, 2001, 2007a, 2007b), and sources cited therein.

WELLS AND WELLINGTON'S VARANID SPECIES AND FRAUDULENT ATTEMPTS TO SUPPRESS RECOGNITION OF THEM IN BREACH OF THE ZOOLOGICAL CODE

While I do not seek to give detailed explanations herein as to which species I accept as valid in terms of the list given below, due to the fact that there is generally little dispute in such matters, I will make passing mention of my recognition of species described by Wells and Wellington (1983 and 1985) herein.

This is simply on the basis of a plea for some sense and logic (Hoser, 2007), that has been absent from sections of the taxonomic community for decades and especially so under the guidance of the truth haters in the Wüster gang.

I single out the taxa named by these authors in particular, due to a general non-use by others of the names for taxa they have properly described and named according to the Zoological Code of the time.

Wells and Wellington (1985) did in fact describe and name five well known unnamed forms within Australia, known generally to local herpetologists and in spite of this obvious fact, the use of their species names has in effect been ignored since 1985.

With myself having direct field and laboratory experience with the relevant taxa, there is no question that Wells and Wellington have correctly described unnamed forms.

That this is not an isolated opinion of myself, often incorrectly targeted by the Wüster gang as an agent for the two men. The fact is, I am not in any way an agent for Wells and Wellington as seen by my regular disagreements with sections of their Australian taxonomy.

However the non-use of the appropriate and valid Wells and Wellington names for Australian varanids is seen in the non-stop publications by others on the same taxa since 1985.

Most authors have (often under pressure from others) deliberately refused to cite the important Wells and Wellington publication of 1985, or even use the correct taxon names, thereby misleading other herpetologists and acting in breach of the Zoological Code (Ride *et al.* 1999), by deliberately creating nomenclatural instability in terms of well-known species level-taxa.

While I could mention and detail the totally reckless, and dishonest attempt to Robert Sprackland to rename the Wells and Wellington taxon, "Odatria keiththornei" Wells and Wellington, 1985, after his own wife of the time (as in "Varanus teriae" Sprackland, 1991) and then after deliberately creating nomenclatural and taxonomic instability, seeking to get the ICZN to break their own rules and reverse the fundamental priority rule

(he failed) (see Hoser 2013b for details, including ICZN references), I think it is better to refer instead to another of the lesser known Wells and Wellington taxa, the name of which has also been improperly forcibly suppressed by the Wüster gang and others in direct breach of the Zoological Code (Ride *et al.* 1999).

The species "*Pantherosaurus kuringai*" Wells and Wellington 1985, from NSW, was in fact known to be different from the nominate form of "*Varanus rosenbergi*" from Western Australia for decades and the only surprising thing about the Wells and Wellington description of 1985, was that no one else had bothered naming the taxon sooner. Put another way, the surprise was that they had to in fact describe the taxon as new, as opposed to resurrecting an earlier description.

That the taxon is valid, was confirmed by the molecular data of Smith *et al.* (2007), who even published a phylogeny to confirm the fact. Their later claim that they had found the Wells taxon (not named as such by them) was not a distinct species was not supported by the material that they themselves presented.

That these authors had engaged in a case of printed mental gymnastics and use of lies, damned lies and dodgy statistics to get their dubious claims believed by others was confirmed by Bennett and Sweet (2010), who confirmed this. In fact on the basis of the same evidence (directly citing Smith *et al.* 2007), they said of "*Varanus rosenbergi*" that "this species is in fact a complex of two or more species". They also reported that Eric Pianka another varanid expert had told them the same thing!

However if one wants to get a true idea of the dishonest and hypocritical practices used against the herpetologists Wells and Wellington by other so-called herpetologists, Smith *et al.* is a perfect place to start.

Their paper dated 20 November 2007, published by the prestigious Natural History Museum of the UK, and therefore supposedly subject to rigorous peer review, was authored by none other than Warwick Smith, Ian A. W. Scott and J. Scott Keogh from Australia.

Their crude results were a mitochondrial divergence of 8.2 per cent between the West Australian population (type for "*rosenbergi*") and the geographically isolated east Australian population, described by Wells and Wellington in 1985 as "*kuringai*").

This significant divergence, in conjunction with a known wide geographical barrier, where the species group do not occur, and known consistent morphological differences between populations would as a matter of course in herpetology, automatically qualify as two different species level taxa. However these authors had the audacity to claim it wasn't good enough and told readers to continue to refer to the east Australian specimens as "*rosenbergi*".

That these authors were engaging in gross hypocrisy and double standards is easily seen when comparing this result with those in another paper published by Keogh *et al.* in 2001, (yes the same J. Scott Keogh was the lead author). In that paper, Keogh found that a mere 3.2 per cent divergence between the python "species" recognized as *breitensteini* and that recognized as *curtus* was good enough to continue to assert that they were definitely well-defined and different species-level taxa.

Of course the only real reason that Keogh has come up with such a ridiculous result in the 2007 paper he co-authored is because he had an obsessive hatred of Richard Wells and Ross Wellington, and so chose to engage in unscientific and unethical behaviour to refuse to recognize the obvious facts that his own experimental data had shown as correctly based.

Even more disturbing is the fact that the paper of Smith *et al.* was published by university based academics in a prestigious "peer reviewed" publication. How such outrageous conclusions based on data within the same paper could have been allowed to be published shows obvious defects in any peer review or quality control at that journal. Perhaps the journal that published

Smith *et al.* could be best described as PRINO, or “Peer Reviewed In Name Only”. Unfortunately PRINO journals are particularly common in terms of herpetology. See Hoser (2013) for several prominent examples.

While talking molecular divergence and species limits for monitor species taxa, see for example Ziegler *et al.* (2007a) who recognize species within the “*indicus*” group of monitors with mitochondrial DNA divergences averaging just 1 per cent!

So if one strips out personal hatreds of authors, it would be obvious to anyone, even of pre-teen school student age, that isolated populations with a separation divergence in the order of 8.2 per cent (or at worst about 4 per cent if one engages in various kinds of “massaging” of numbers as Smith *et al.*, attempted) is better qualified than 1 or 3.2 per cent divergences to be split into different species.

As there is no sensible reason to pretend that the Wells and Wellington (1985) paper was never published, the Smith *et al.* results of 8.2 per cent sequence divergence between the NSW and West Australian “*rosenbergi*” consists of incorrect data or results or that as the Wüster gang allege, their names shouldn't be used because they are “unscientific”, being code by them, for not written by their own gang, I freely accept the validly named taxa by Wells and Wellington from 1985 and include all five of them in the list herein. This is because all are properly named well known species-level taxa on the basis of the evidence before me! All were published according to the Zoological Code of the time and the ICZN has itself ruled against the unlawful attempts to suppress the Wells and Wellington publications (see Hoser 2013b for details).

Perhaps I should also mention that the Wüster gang have successfully removed numerous Wells and Wellington taxa (even as listed synonyms) from online databases, such as the Peter Uetz managed “The reptile database” (Uetz, 2013).

At “The reptile database”, on the advice of Wolfgang Wüster, himself a man with absolutely no meaningful expertise on Australian herpetofauna, many of the quite properly named Wells and Wellington taxa simply do not get a mention.

Noting that Uetz markets his database as being a comprehensive resource for use by other herpetologists, Uetz is acting as an agent for the Wüster gang to engage in unscientific behaviour and actions in breach of the Zoological Code. The latter is due to the Wüster gang deliberately creating nomenclatural instability in terms of well-defined previously named reptile taxa, which will ultimately require intervention by the ICZN itself to stop the problem as seen already with varanid taxa (Hoser 2013).

But you will find on the same “The Reptile Database” all the “*indicus*” group species defined up to 2013 on the basis of an average of 1 per cent divergence, or for that matter the non-existent python taxa invented by Wulf Schleip in 2008 (3 non-species), for which the DNA evidence (with-held by Schleip himself in 2008, but reported by his friend O'Shea earlier in another publication) showed the alleged taxa didn't actually exist (see Hoser 2013 and sources cited therein for citations and details).

Noting the significant contribution to the systematics of varanid lizards in Australia by Wells and Wellington, it is with great pleasure that within this paper, I formally describe and name according to the Zoological Code (Ride *et al.* 1999), two new subspecies of *Euprepiosaurus indicus* (Daudin, 1802) from the Northern Territory and far north Queensland, named after each of these eminent herpetologists.

These are *Euprepiosaurus indicus wellsi* subsp. nov. and *Euprepiosaurus indicus wellingtoni* subsp. nov..

Lesser Sunda *Empagusia (Dendrovaranus) salvator* (Laurenti, 1768), until now attributed to the subspecies *E. salvator bivittatus* (Kuhl, 1820), are herein described as a new subspecies, namely *E. salvator woolfi* subsp. nov..

OTHER NEWLY NAMED VARANIDS FROM AUSTRALIA

Below I also formally name a new species of varanid from the Northern Territory, Australia, closely related to the north-west Australian species *Odatia glauerti* (Mertens, 1957), with which it has been confused until now. The new species is formally named as *Odatia hoserae* sp. nov. in recognition of the significant contributions to herpetology and wildlife conservation in general of my mother, Katrina Joan Hoser.

Another new species is named from the central east coast of Queensland, *Odatia (Honlamus) honlami* sp. nov., this species having been until now confused with the more northern species *Odatia (Honlamus) semiremex* (Peters, 1869).

Within the subgenus *Honlamus* subgen. nov., a group of Australian monitors within the genus *Odatia* Gray, 1838, I also herein formally describe and name the morphologically distinct population of *Odatia (Honlamus) mitchelli* from north-west Western Australia as a new subspecies, namely *Odatia (Honlamus) mitchelli hawkeswoodi* subsp. nov..

The wide-ranging and variable species *Odatia tristis* (Schlegel, 1839) currently has two recognized subspecies, these being the Black-headed colour variant from south-western Australia, also found across central Australia to western Queensland (*O. tristis tristis*) and a colour variant without blackening of the head and neck from southern and eastern Queensland and generally strongly ocellated dorsal patterning, *O. tristis orientalis* (Fry, 1913). The unnamed form from the top-end of the Northern Territory and the Kimberley Ranges in northwest Western Australia is of a notably different colour scheme to the other two variants and so is herein described as a new subspecies *Odatia tristis nini* subsp. nov..

The small varanid “*Varanus storri* Mertens, 1966”, has been the subject of intense study by myself ever since I caught my first specimens in the Charters Towers cemetery in May 1977.

The Mount Isa specimens are considerably different morphologically to those from the granite belt of north eastern Queensland in the vicinity of Charters Towers and Townsville, including areas of suitable habitat north and south of this general area.

They do not match the specimens described as “*Varanus storri ocreatus* Storr, 1980” from Western Australia and so are herein described as a new subspecies, *Worrellisaurus storri makhani* subsp. nov..

As an instruction to first or subsequent revisors of this work, no names proposed herein should have their spelling changed or altered in any way unless this is a mandatory requirement under the existing in force Zoological Code, as published by the ICZN. If emendation of names is in the normal course of events optional only, then the original spelling herein should be used, even if it appears to be of incorrect formation or gender.

LIVING SPECIES OF MONITOR

(presented in the four major evolutionary groupings or clades).

CLADE ONE

Tribe *Varaniini* tribe nov.

Genus *Varanus* Merrem, 1820

Type species: *Lacerta varia* Shaw, 1790.

Content: *Varanus varius* (Shaw, 1790) (type species); *V. komodoensis* Ouwens, 1912; *V. salvadorii* (Peters and Doria, 1878).

Subgenus *Papusaurus* Mertens, 1962.

Content: *Varanus (Papusaurus) salvadorii* (Peters and Doria, 1878) (monotypic).

Subgenus *Varanus* Merrem, 1820.

Type species: *Lacerta varia* Shaw, 1790.

Content: *Varanus (Varanus) varius* (Shaw, 1790) (type species); *V. (Varanus) komodoensis* Ouwens, 1912.

Genus *Pantherosaurus* Fitzinger, 1843.**Type species:** *Varanus gouldii* (Gray, 1838).**Content:** *Pantherosaurus gouldii* (Gray, 1838) (type species); *P. barryjonesi* (Wells and Wellington, 1985); *P. giganteus* (Gray, 1845); *P. kuringai* (Wells and Wellington, 1985); *P. mertensi* (Glauert, 1951); *P. panoptes* (Storr, 1980); *P. rosenbergi* (Mertens, 1957); *P. spenceri* (Lucas and Frost, 1903).**Subgenus *Aspetosaurus* Wells and Wellington, 1985.****Type species:** *Varanus spenceri* Lucas and Frost, 1903.**Content:** *Pantherosaurus (Aspetosaurus) spenceri* (Lucas and Frost, 1903) (monotypic).**Subgenus *Titanzius* Wells and Wellington, 1985.****Type species:** *Hydrosaurus giganteus* Gray, 1845.**Content:** *Pantherosaurus (Titanzius) giganteus* (Gray, 1845) (monotypic).**Subgenus *Aquativanus* subgen. nov.****Type species:** *Varanus mertensi* Glauert, 1951.**Content:** *Pantherosaurus (Aquativanus) mertensi* (Glauert, 1951) (monotypic).**Subgenus *Pantherosaurus* Fitzinger, 1843.****Type species:** *Varanus gouldii* (Gray, 1838).**Content:** *Pantherosaurus (Pantherosaurus) gouldii* (Gray, 1838) (type species); *P. (Pantherosaurus) barryjonesi* (Wells and Wellington, 1985); *P. (Pantherosaurus) kuringai* (Wells and Wellington, 1985); *P. (Pantherosaurus) panoptes* (Storr, 1980); *P. (Pantherosaurus) rosenbergi* (Mertens, 1957).**Genus *Odatria* Gray, 1838.****Type species:** *Monitor tristis* Schlegel, 1838.**Content:** *Odatria tristis* (Schlegel, 1838) (type species); *O. auffenbergi* (Sprackland, 1999); *O. glauerti* (Mertens, 1957); *O. glebopalma* (Mitchell, 1955); *O. kuranda* Wells and Wellington, 1985; *O. mitchelli* (Mertens, 1958); *O. orientalis* (Fry, 1913); *O. pengilleyi* Wells and Wellington, 1985; *O. pilbaraensis* (Storr, 1980); *O. scalaris* (Mertens, 1941); *O. semiremex* (Peters, 1869); *O. similis* (Mertens, 1958); *O. timorensis* (Gray, 1831); *O. tristis* (Schlegel, 1839); *O. hoserae* sp. nov..**Subgenus *Kimberleyvaranus* subgen. nov.****Type species:** *Varanus glebopalma* Mitchell, 1955.**Content:** *Odatria (Kimberleyvaranus) glebopalma* (Mitchell, 1955) (monotypic).**Subgenus *Pilbaravaranus* subgen. nov.****Type species:** *Varanus pilbarensis* Storr, 1980.**Content:** *Odatria (Pilbaravaranus) pilbarensis* (Storr, 1980) (monotypic).**Subgenus *Honlamus* subgen. nov.****Type species:** *Varanus (Odatria) semiremex* Peters, 1869.**Content:** *Odatria (Honlamus) semiremex* (Peters, 1869) (type species); *O. (Honlamus) honlami* sp. nov.; *O. (Honlamus) mitchelli* (Mertens, 1958).**Subgenus *Odatria* Gray, 1838.****Type species:** *Monitor tristis* Schlegel, 1838.**Content:** *Odatria (Odatria) tristis* (Schlegel, 1838) (type species); *O. (Odatria) auffenbergi* (Sprackland, 1999); *O. (Odatria) glauerti* (Mertens, 1957); *O. (Odatria) kuranda* Wells and Wellington, 1985; *O. (Odatria) orientalis* (Fry, 1913); *O. (Odatria) pengilleyi* Wells and Wellington, 1985; *O. (Odatria) scalaris* (Mertens, 1941); *O. (Odatria) similis* (Mertens, 1958); *O. (Odatria) timorensis* (Gray, 1831); *O. (Odatria) tristis* (Schlegel, 1839); *O. (Odatria) hoserae* sp. nov.**Genus *Worrellisaurus* Wells and Wellington, 1983.****Type species:** *Varanus acanthurus* Boulenger, 1885.**Content:** *Worrellisaurus acanthurus* (Boulenger, 1885) (type species); *W. bariiji* (King and Horner, 1987); *W. brachyurus* (Sternfeld, 1919); *W. brevicauda* (Boulenger, 1898); *W. bushi*(Aplin, Fitch and King, 2006); *W. caudolineatus* (Boulenger, 1885); *W. eremius* (Lucas and Frost, 1895); *W. gilleni* (Lucas and Frost, 1895); *W. kingorum* (Storr, 1980); *W. ocreatus* (Storr, 1980); *W. primordius* (Mertens, 1942); *W. storri* (Mertens, 1966).**Subgenus *Parvavaranus* subgen. nov.****Type species:** *Varanus brevicauda* Boulenger, 1898.**Content:** *Worrellisaurus (Parvavaranus) brevicauda* (Boulenger, 1898) (type species); *W. (Parvavaranus) eremius* (Lucas and Frost, 1895).**Subgenus *Arborhabitiosaurus* subgen. nov.****Type species:** *Varanus gilleni* Lucas and Frost, 1895.**Content:** *Worrellisaurus (Arborhabitiosaurus) gilleni* (Lucas and Frost, 1895) (type species); *W. (Arborhabitiosaurus) bushi* (Aplin, Fitch and King, 2006); *W. (Arborhabitiosaurus) caudolineatus* (Boulenger, 1885).**Subgenus *Worrellisaurus* Wells and Wellington, 1983.****Type species:** *Varanus acanthurus* Boulenger, 1885.**Content:** *Worrellisaurus acanthurus* Boulenger, 1885) (type species); *W. bariiji* (King and Horner, 1987); *W. brachyurus* (Sternfeld, 1919); *W. kingorum* (Storr, 1980); *W. ocreatus* (Storr, 1980); *W. primordius* (Mertens, 1942); *W. storri* (Mertens, 1966).**CLADE 2****Tribe Empugusiini tribe nov.****Genus *Empagusia* Gray, 1838.****Type species:** *Monitor flavescens* Hardwicke and Gray, 1827.**Content:** *Empagusia flavescens* (Hardwicke and Gray, 1827) (type species); *E. bengalensis* (Daudin, 1802); *E. cumingi* (Martin, 1838); *E. dumerilii* (Schlegel, 1844); *E. marmoratus* (Wiegmann, 1834); *E. nebulosus* (Gray, 1831); *E. nuchalis* (Günther, 1872); *E. palawanensis* (Koch, Gaulke and Böhme, 2010); *E. rasmusseni* (Koch, Gaulke and Böhme, 2010); *E. rudicollis* (Gray, 1845); *E. salvator* (Laurenti, 1768); *E. togianus* (Peters, 1872).**Subgenus *Dendrovaranus* Mertens, 1942.****Type species:** *Varanus rudicollis* Gray, 1845.**Content:** *Empagusia (Dendrovaranus) rudicollis* (Gray, 1845) (type species); *E. (Dendrovaranus) cumingi* (Martin, 1838); *E. (Dendrovaranus) marmoratus* (Wiegmann, 1834); *E. (Dendrovaranus) nuchalis* (Günther, 1872); *E. (Dendrovaranus) palawanensis* (Koch, Gaulke and Böhme, 2010); *E. (Dendrovaranus) rasmusseni* (Koch, Gaulke and Böhme, 2010); *E. (Dendrovaranus) salvator* (Laurenti, 1768); *E. (Dendrovaranus) togianus* (Peters, 1872).**Subgenus *Empagusia* Gray, 1838.****Type species:** *Monitor flavescens* Hardwicke and Gray, 1827.**Content:** *Empagusia (Empagusia) flavescens* (Hardwicke and Gray, 1827) (type species); *E. (Empagusia) bengalensis* (Daudin, 1802); *E. (Empagusia) dumerilii* (Schlegel, 1844); *E. (Empagusia) nebulosus* (Gray, 1831).**CLADE 3****Tribe Shireenhosersauriini tribe nov.****Genus *Shireenhosersaurea* gen. nov.****Type species:** *Monitor prasinus* Schlegel, 1839.**Content:** *Shireenhosersaurea prasinus* (Schlegel, 1839) (type species); *S. beccarii* (Doria, 1874); *S. boehmei* (Jacobs, 2003); *S. bogerti* (Mertens, 1950); *S. keithornei* (Wells and Wellington, 1985); *S. kordensis* (Meyer, 1874); *S. macraei* (Böhme and Jacobs, 2001); *S. reisingeri* (Eidenmüller and Wicker, 2005); *S. telenesetes* (Sprackland, 1991).**Genus *Oxysaurus* gen. nov.****Type species:** *Varanus indicus spinulosus* Mertens, 1941.**Content:** *Oxysaurus spinulosus* (Mertens, 1941) (monotypic).**Genus *Philippinosaurus* Mertens, 1959.****Type species:** *Varanus grayi* Boulenger, 1885.(a junior synonym of *Varanus olivaceus* Hallowell, 1856).

Content: *Philippinosaurus olivaceus* (Hallowell, 1856) (type species); *P. bitatawa* (Welton, Siler, Bennett, Diesmos, Duya, Dugay, Rico, Van Weerd and Brown, 2010); *P. mabitang* (Gaulke and Curio, 2001).

Genus Euprepiosaurus Fitzinger, 1843.

Type species: *Tupinambis indicus* Daudin, 1802.

Content: *Euprepiosaurus indicus* (Daudin, 1802) (type species); *E. cerambonensis* (Phillip, Böhme and Ziegler, 1999); *E. doreanus* (Meyer, 1874); *E. finschi* (Böhme, Horn and Ziegler, 1994); *E. jobiensis* (Ahl, 1932); *E. juxtindicus* (Böhme, Phillip, and Ziegler, 2002); *E. lirungensis* (Koch, Arida, Schmitz, Böhme and Ziegler, 2009); *E. melinus* (Böhme and Ziegler, 1997); *E. obor* (Weijola and Sweet, 2010); *E. rainerguentheri* (Ziegler, Böhme and Schmitz, 2007); *E. yuwonoi* (Harvey and Barker, 1998); *E. zugorum* (Böhme and Ziegler, 2005).

CLADE 4

Tribe Polydaedaliini tribe nov.

Genus: Polydaedalus Wagler, 1830.

Type species: *Lacerta nilotica* Linnaeus, 1766.

Content: *Polydaedalus niloticus* (Linnaeus, 1766); *P. ornatus* (Daudin, 1803); *P. pulcher* (Leach, 1819).

Genus Psammosaurus Fitzinger, 1826

Type species: *Tupinambis griseus* (Daudin, 1803).

Content: *Psammosaurus griseus* (Daudin, 1803) (monotypic).

Genus Pachysaurus Fitzinger, 1843.

Type species: *Tupinambis albicularis* Daudin, 1802.

Content: *Pachysaurus albicularis* (Daudin, 1802) (type species); *P. exanthematicus* (Bosc, 1792); *P. yemenensis* (Böhme, Joger and Schätti).

GENUS SHIRENHOSERSAUREA GEN. NOV.

Type species: *Monitor prasinus* Schlegel, 1839.

Diagnosis: The genus *Shirenhosersaurea gen. nov.* are separated from all other living varanids by the following suite of characters: The tail is only moderately compressed or not at all; there is no obvious median double keel dorsally along the tail; the tail is round in section or somewhat dorso-ventrally compressed, at the most, very slightly laterally compressed in the last half; there is a median series of transversely enlarged supraocular scales.

The genus *Shirenhosersaurea gen. nov.* is further separated from other living varanids, including the so-called “*indicus* group” (Genus *Euprepiosaurus* Fitzinger, 1843), the group it is most closely related to, by the following suite of characters: a long tail being 1.75 times the snout-vent length, that is unique among the living varanids in being prehensile (and notably not seen in Genus *Euprepiosaurus* Fitzinger, 1843), and a mainly green or black colouration (the green being unique to this genus) and particular specializations of the foot to enable grasping on branches.

In common with *Euprepiosaurus*, *Shirenhosersaurea gen. nov.* species are characterized by having relatively long snouts, tails and legs.

Distribution: The centre of distribution for the genus is the island of New Guinea and nearby regions on the northern part of the Australasian plate.

Etymology: Named in honour of my magnificent wife, Shireen Hoser, in recognition for her immense contribution to herpetology worldwide. It is with great pleasure that I can name such incredibly beautiful species of monitor in honour of her.

Content: *Shirenhosersaurea prasinus* (Schlegel, 1839) (type species); *S. beccarii* (Doria, 1874); *S. boehmei* (Jacobs, 2003); *S. bogerti* (Mertens, 1950); *S. keithornei* (Wells and Wellington, 1985); *S. kordensis* (Meyer, 1874); *S. macraei* (Böhme and Jacobs, 2001); *S. reisingeri* (Eidenmüller and Wicker, 2005); *S. telensestes* (Sprackland, 1991).

GENUS OXYSAURUS GEN. NOV.

Type species: *Varanus indicus spinulosus* Mertens, 1941.

Diagnosis: *Oxysaurus gen. nov.* monotypic for the species “*Varanus indicus spinulosus* Mertens, 1941” is readily separated from all other living varanids by the following suite of characters: A high midbody scale row count in the vicinity of 210 scales; conical and pointed nasals; pink tongue; dorsum is dark brown with rows of yellow solid spots.

Oxysaurus gen. nov. is further diagnosed by the following characteristics: attaining about 100 cm in total length, in adults; the dorsal surface is a deep chocolate brown to black, which becomes tan below. Solid spots of lime green or yellowish form four broad transverse bands on the dorsum from shoulders to hips. Each band consists of four spots and the most anterior part of vertebral spots touch middorsally. Between these bands are numerous yellowish speckles, also arranged in transverse rows, forming distinct ocelli. The head is dorsally and laterally dark, lacking any light markings. The tongue is pink for its entire length. Limbs are dark brown, slightly speckled with yellow. The tail has light thin bands, with those on the distal two thirds only about two scales wide.

The snout of *Oxysaurus gen. nov.* is distinctly shorter, broader and higher than seen in species within the genus *Euprepiosaurus*. In *Oxysaurus gen. nov.* the head is 1.56 times longer than broad and 2.03 times longer than high, versus 1.7-2.2 and 2.4-3.2 in *E. indicus* (Pianka *et al.* 2004). The tail of *Oxysaurus gen. nov.* is not as strongly compressed as in *Euprepiosaurus*. The small scaled nature of *Oxysaurus gen. nov.* (about 210 mid-body rows) readily sets this genus apart from *Euprepiosaurus*, the genus it has been traditionally confused with.

Distribution: The monotypic genus is known only from two islands in the Solomon Islands group, namely San Jorge and Santa Ysabel (Mertens 1941, Sprackland 1993b). On Santa Ysabel the species *Oxysaurus spinulosus* (Mertens 1941) is found sympatrically with *Euprepiosaurus indicus* (Daudin, 1802).

Etymology: Named in honour of my now deceased Great Dane Dog, named “*Oxyuranus*” (Oxy for short), who over an eight year period ending in 2012, assisted Snakebusters, Australia’s best reptiles shows in various capacities. This included to show children a love of all kinds of animals and also to guard the residence and facility of Snakebusters from illegal incursions by inexperienced imitators seeking to undermine and destroy the successful green business.

It was scandalous that the police-protected criminals were given immunity from prosecution by corrupt DSE officials who green-lighted them to commit any crimes they wanted. These crimes included unspeakable acts of animal cruelty, wildlife smuggling and other serious criminal offences.

In terms of his role in minimizing the commission of such offences against the Snakebusters wildlife, it is fitting that Oxy the Great Dane be honoured.

Furthermore, I note intense criticisms in the past of my naming species or genera in honour of animals, made by the animal-hating, truth-hating Wüster gang. I do not apologise at all for seeking to recognize the good works of non-human cohabitants of our biologically diverse planet.

By the way, *Oxyuranus* Kinghorn, 1923 is a well-known genus of Australasian elapid snake.

Content: *Oxysaurus spinulosus* (Mertens, 1941) (monotypic).

SUBGENUS AQUATIVARANUS SUBGEN. NOV.

Type species: *Varanus mertensi* Glauert, 1951.

Diagnosis: This subgenus within the genus *Varanus* is monotypic for the type species and is separated from all other living varanids by the following suite of characters: The tail is strongly laterally compressed, except at the base; with a distinct median double keel dorsally along the posterior half of the tail, this dorsal keel being exceptionally high; the caudal scales are

not arranged in regular rings, as in ventral scales are larger than the dorsal caudals; the nostrils are directed upwards.

The subgenus *Aquatvaranus subgen. nov.* is further diagnosed as follows: The colour is a rich dark brown to black above, with numerous scattered tiny, light cream or yellow spots. The lower lip is speckled or barred with dark grey. Lower surfaces are white to yellowish, with grey mottling on the throat and a series of blue-grey cross-bars on the chest. Head scales are moderate, regular and smooth. Nostrils on the upper part of the snout are directed upwards, about twice as far from the eye as from the tip of the snout. 150-190 scales around the middle of the body. The strongly vertically compressed tail has a high dorsal medial keel that is about one and a half times as long as the head and the body. Possesses caudal scales with low keels, not in complete rings as the lower scales are larger than the upper scales. Grows to about a metre in total length, with exceptional specimens to nearly 1.5 metres in total length.

Distribution: Waterways of wet and dry tropical Australia, including those draining south in the region west of Cape York Peninsula in Queensland. Not known from New Guinea or Irian Jaya.

Etymology: Named in reflection of the water-dwelling nature of the monotypic type species.

Content: *Pantherosaurus (Aquatvaranus) mertensi* (Glauert, 1951) (monotypic).

SUBGENUS *KIMBERLEYVARANUS SUBGEN. NOV.*

Type species: *Varanus (Odatria) glebopalma* Mitchell, 1955.

Diagnosis: The subgenus *Kimberleyvaranus subgen. nov.* within the genus *Odatria* is separated from all other living varanids by the following suite of characters: supraocular scales are subequal; the keels of the caudal scales are sometimes very strong, but never spinose; the tail is either round in section or somewhat dorsoventrally compressed, or at the very most, very slightly laterally compressed in the last half; there is no obvious median double keel dorsally along the tail; the scales on the top of the head are smooth; the tail is longer than the head and body, being well over twice as long as the head and body (unbroken and intact tail); tail pattern if present, is transversely aligned distally; the last half of the tail is a distinctive creamy white to yellow in colour; the tubercles on the lower surfaces of the feet are large and glossy being a very dark brown or black in colour.

The subgenus *Kimberleyvaranus subgen. nov.* is further defined as follows: Colouration is dorsally black with individually fawn coloured scales which form a reticulum on the flanks (where they predominate over the black) or small black centred ocelli on the midline (where black predominates). The top of the head and upper surfaces of the limbs are black with small cream or fawn flecks and spots, clustering to form larger spots on the limbs. The anterior half of the tail is mostly black above and the posterior half is a distinct creamy white to yellow in colour. The throat is white with a broad reticulum of light purplish fawn extending on to the sides of the throat, but forming bars on the lower lips. The belly and chest are white with indistinct transverse bars of light purplish fawn. The tail and limbs are creamy yellow below. Palms and soles have rounded shiny, very dark brown or black scales. The head scales are smooth, irregular and very small. The nostrils are much nearer to the tip of the snout than the eye and lateral in position. 130-170 scales around the middle of the body. Caudal scales are smooth or with low keels.

Distribution: Rocky habitats in tropical Australia from far western Queensland across to the West Kimberley in Western Australia.

Etymology: Named in reference to where the monotypic subgenus is known from and the centre of its present distribution.

Content: *Odatria (Kimberleyvaranus) glebopalma* (Mitchell, 1955) (monotypic).

SUBGENUS *PILBARAVARANUS SUBGEN. NOV.*

Type species: *Varanus pilbarensis* Storr, 1980.

Diagnosis: *Pilbaravaranus subgen. nov.* within the genus *Odatria* are separated from all other living varanids by the following suite of characters: supraocular scales are subequal; the keels of the caudal scales are sometimes very strong, but never spinose; the tail is either round in section or somewhat dorsoventrally compressed, at the very most very slightly laterally compressed in the last half; there is no obvious median double keel dorsally along the tail; the scales on the top of the head are smooth; the tail is longer than the head and body, tail pattern is irregularly and narrowly banded with dark reddish-brown and pale grey only; it is transversely aligned distally and pattern is consistent along the length of the tail; supraoculars gradually merging with larger interoculars; several ventro-lateral rows of moderately enlarged keeled scales on each side behind the vent, being more prominent in males; dorsal and caudal scales are feebly keeled; ground colour is reddish-brown; nostril latero-dorsal; snout-vent length is less than 180 cm in total.

Pilbaravaranus subgen. nov. is further diagnosed as follows: Pale to medium reddish-brown above, the head and neck being flecked with dark reddish-brown, sometimes forming irregular cross-bands on the neck. Back has pale-centred, dark brown spots tending to be aligned transversely. Limbs are spotted above. Tail is irregularly and narrowly banded with dark reddish-brown and pale grey. There is sometimes an obscure dark temporal streak. Venter is whitish with fine flecks or irregularly banded with grey. The head scales are small and smooth. The lateral-dorsal nostril faces upwards and outwards, being about half way between the eye and the tip of the snout. 110-135 scales around the mid-body. The tail is more-or-less round in cross-section without indication of a dorsal keel, being 1.7-2.1 times the length of the head and body. Dorsal and lateral caudal scales have low keels. Grows to about 50 cm in total length.

Distribution: Known only from the Pilbara region in Western Australia.

Etymology: Named in reference to the location it originates from.

Content: *Odatria (Pilbaravaranus) pilbarensis* (Storr, 1980) (monotypic).

SUBGENUS *HONLAMUS SUBGEN. NOV.*

Type species: *Varanus (Odatria) semiremex* Peters, 1869.

Diagnosis: The three species within the subgenus *Honlamus subgen. nov.*, within the genus *Odatria*, are separated from all other living varanids by the following suite of characters:

One or other of the following three suites of characters:

1/ The last two thirds of the tail are moderately laterally compressed although it is rounded at the base; there is no obvious median double keel dorsally along the tail; the dorsal colouration is grey-brown with numerous scattered blackish flecks and small spots forming a fine reticulum over the dorsal surface or alternatively a pattern of flecks (*O. honlami sp. nov.*), or:

2/ The last two thirds of the tail are moderately laterally compressed although it is rounded at the base; there is no obvious median double keel dorsally along the tail; the colouration is a dark reddish-brown in dorsal colouration with a strong pattern of reddish-brown to white ocelli aligned transversely on the body and neck, including on the lower flanks of the sides (*O. semiremex*).

3/ The tail is strongly laterally keeled, except at the base; there is a distinct median double keel dorsally along the posterior half of the tail; the caudal scales are arranged in regular rings and sometimes incomplete on the sides of the tail; the tail is at least 1.3 times as long as the head and body; scales on the upper side of the basal portion of the tail are not rugose; scales on the head and body are fairly large; 40-60 scales across the top of the head from the angle of the mouth on one side to that of the

other; 90-130 scales around the body (*O. mitchelli*).

Distribution: More or less continuously along the coastal strip of Australia from just south of Rockhampton in coastal Queensland, north to Cape York and then west to north-west Australia.

Etymology: The genus is named in honour of Mr Hon Lam, owner of the Park Orchards, Fish Cafe, for his magnificent efforts catering to the staff at Snakebusters, Australia's best reptiles displays over the best part of a decade preceding year 2013. People who work hard to give logistical support to front-line conservationists and educators should not have their efforts go unrecognized.

Content: *Odatria (Honlamus) semiremex* (Peters, 1869) (type species); *O. (Honlamus) honlami sp. nov.*; *O. (Honlamus) mitchelli* (Mertens, 1958).

SUBGENUS PARVAVARANUS SUBGEN. NOV.

Type species: *Varanus brevicauda* Boulenger, 1898.

Diagnosis: The subgenus *Parvavaranus subgen. nov.*, within the genus *Worrellisaurus*, are separated from all other living varanids by one or other of the following suites of characters:

1/ The tail is only moderately compressed or not at all; there is no obvious median double keel dorsally along the tail; the tail is round in section or somewhat dorso-ventrally compressed, at the most, very slightly laterally compressed in the last half; supraocular scales are subequal; the keels of the caudal scales are sometimes very strong, but never spinose; the tail is shorter than the head and body (*Worrellisaurus (Parvavaranus) brevicauda*), or:

2/ The tail is only moderately compressed or not at all; there is no obvious median double keel dorsally along the tail; the tail is round in section or somewhat dorso-ventrally compressed, at the most, very slightly laterally compressed in the last half; supraocular scales are subequal; the keels of the caudal scales are sometimes very strong, but never spinose; the tail is longer than the head and body; the scales on the top of the head are keeled, (*Worrellisaurus (Parvavaranus) eremius*).

Distribution: Arid areas of northern Western Australia, across the southern Northern Territory, to far western Queensland (for *Worrellisaurus (Parvavaranus) brevicauda*), or a slightly larger area, also including most of the northern two thirds of South Australia and nearby parts of inland south-east Western Australia (for *Worrellisaurus (Parvavaranus) eremius*).

Etymology: Named in reference to the small size of the component species.

Content: *Worrellisaurus (Parvavaranus) brevicauda* (Boulenger, 1898) (type species); *W. (Parvavaranus) eremius* (Lucas and Frost, 1895).

SUBGENUS ARBORHABITIOSAURUS SUBGEN. NOV.

Type species: *Varanus gilleni* Lucas and Frost, 1895.

Diagnosis: The subgenus *Arborhabitiosaurus subgen. nov.* within the genus *Worrellisaurus* are separated from all other living varanids by the following suite of characters: The tail is only moderately compressed or not at all; there is no obvious median double keel dorsally along the tail; the tail is round in section or somewhat dorso-ventrally compressed, and at the most, very slightly laterally compressed in the last half; supraocular scales are subequal; the keels of the caudal scales are sometimes very strong, but never spinose; the tail is longer than the head and body; the scales on the top of the head are smooth; the tail has longitudinal stripes or bars distally.

Distribution: Most drier parts of Australia, except the far north, the far south and the Murray/Darling basin of eastern Australia, including the dry region north of there, sometimes referred to as the "Brigalow Belt", which includes most of inland Queensland.

Etymology: Named in reflection of the tree-dwelling habits of the three widely recognized component species.

Content: *Worrellisaurus (Arborhabitiosaurus) gilleni* (Lucas

and Frost, 1895) (type species); *W. (Arborhabitiosaurus) bushi* (Aplin, Fitch and King, 2006); *W. (Arborhabitiosaurus) caudolineatus* (Boulenger, 1885).

ODATRIA HOSERAE SP. NOV.

Holotype: Specimen number R59658 from Leichhardt Mural, Death Adder Gorge, in the Northern Territory, Australia, Lat. -13.05, Long. 132.867 held at the Australian Museum in College Street, Sydney, NSW, Australia. The Australian Museum is a government owned facility that allows access to its collection holdings by herpetologists.

Diagnosis: Until now the species *Odatria hoserae sp. nov.* (within the subgenus *Odatria*) would key out as *O. glauerti* (Mertens, 1957) using published keys such as those in Cogger (1975) *et seq.*

However it is readily separated from that species by the following combination of colours. The dorsal ground colour is yellowish to rusty on the neck and shoulders, becoming blue-grey posteriorly on the trunk, grading to become black about halfway down the tail. Five to eight distinct or broken crossbands of light grey to turquoise oval spots are aligned transversely, with the colour intensifying posteriorly; these spots merge into bands on the tail base and become paler, white or bluish white rings that contrast sharply with the black distal tail. Black scales may border or outline the bands of spots posteriorly on the trunk. The pale markings present as distinct rows of spots. Limbs are dark grey or black with rows of pale yellow or white spots. The throat is white or yellow and the belly is pale grey and occasionally with indistinct crossbands. A very prominent dark temporal streak is bordered above and below by yellow or white. The iris of the eye is brown and the tongue pink. The tail is rounded in cross-section and the base is slightly depressed. Nostrils are lateral and slightly less than halfway between the tip of the snout and the eye.

By contrast, *O. glauerti* can be separated from *Odatria hoserae sp. nov.* by one or other of the following character suites: 1/ grey to tan dorsal ground colour (West Kimberley *O. glauerti*), or;

2/ pale markings on the back are confluent and therefore appear as bands (East Kimberley *O. glauerti*).

O. glauerti and *Odatria hoserae sp. nov.* are separated from all other Australasian monitors by the following suite of characteristics:

Medium adult size up to 80 cm in total length; Gracile build, with a long neck and the tail that may exceed 1.8 times the body length; a black tail with brilliant white or bluish-white rings to the tip; neck and shoulders being grey to tan or yellowish to rusty in colour, the latter colour range being applicable to *O. hoserae sp. nov.*; a prominent black temporal stripe; an unmarked yellow or white throat; palms and soles with enlarged rubbery black scales.

Sweet (1999) details further differences between *O. glauerti* and *Odatria hoserae sp. nov.*, which he calls a West Arnhemland population of *O. glauerti*, including significant ecological differences between the two species taxa.

Distribution: At the present time, the species is known only from a population on the north-west edge of the Arnhem Land Sandstone Plateau and nearby outliers.

Etymology: Named in honour of my mother, Katrina Joan Hoser, who with her husband, Len Hoser, my father helped construct what was at it's time, a world-leading varanid breeding and research facility at the family home of 60 Arterial Road, St. Ives, NSW, Australia. This was in the 1970's and 1980's, being a facility visited by many of the world's biggest names in varanid research and taxonomy.

ODATRIA HONLAMI SP. NOV.

Holotype: Specimen number J46793 at the Queensland Museum, Brisbane, Queensland, Australia, originally caught at Gladstone in central coastal Queensland, Australia, Lat. -23.9,

Long. 151.3. The Queensland Museum is a government-owned facility that allows researchers access to their collection for research purposes.

Paratypes: Paratype 1: Specimen number R17965, at the Australian Museum, Sydney, NSW, Australia from Gladstone, Queensland, Australia, Lat. -23.9, Long. 151.3. The Australian Museum is a government-owned facility that allows researchers access to their collection for research purposes.

Paratypes 2-4: Specimens numbers, R17745, R17746 and R17938 at the Australian Museum, Sydney, NSW, Australia from Yeppoon, Queensland, Australia, Lat. -23.1, Long. 150.73. The Australian Museum is a government-owned facility that allows researchers access to their collection for research purposes.

Diagnosis: The species *Odatria honlami* sp. nov., within the subgenus *Honlamus* subgen. nov. has until now been recognized as a variant of *Odatria semiremex* (Peters, 1869).

Odatria honlami sp. nov. is readily separated from *O. semiremex* by colouration. *O. honlami* sp. nov. is gray-brown in dorsal colouration with numerous scattered blackish flecks and small spots forming a fine reticulum over the dorsal surface or pattern of flecks. By contrast *O. semiremex* are dark reddish-brown in dorsal colouration and have a strong pattern of reddish-brown to white ocelli aligned transversely on the body and neck, including on the lower flanks of the sides. These distinct ocelli are not seen in *O. honlami* sp. nov.. In *O. honlami* sp. nov. the dorsal colouration is a lighter background colour covered with darker flecks conspicuously lacking the ocelli seen in *O. semiremex*. In *O. semiremex* the lower labials tend to form a pattern of brownish and creamish bars. By contrast in *O. honlami* sp. nov. the contrast between dark and light lower labials is indistinct and hard to distinguish.

Both *O. semiremex* and *O. honlami* sp. nov. are separated from all other living varanids by the following suite of characters: The last two thirds of the tail are moderately laterally compressed although it is rounded at the base; there is no obvious median double keel dorsally along the tail; the colouration is one or other of: a gray-brown in dorsal colouration with numerous scattered blackish flecks and small spots forming a fine reticulum over the dorsal surface or pattern of flecks (*O. honlami* sp. nov.), or: a dark reddish-brown in dorsal colouration with a strong pattern of reddish-brown to white ocelli aligned transversely on the body and neck, including on the lower flanks of the sides (*O. semiremex*).

A typical specimen of *O. honlami* sp. nov. is depicted at the bottom of page 431 of Wilson and Swan (2013) or Pianka *et al.* (2004) on page 462.

Typical *O. semiremex* from Weipa in far north Queensland, is depicted at the top of page 320 of Wilson and Knowles (1988).

Distribution: Known only from Coastal Queensland in the region of Gladstone north to about Yeppoon. The species *Odatria semiremex* (Peters, 1869) is known from the vicinity of Townsville, North Queensland, northwards along the coast to the western side of Cape York, as well as nearby continental off-shore islands.

Etymology: The species is named in honour of Mr Hon Lam, owner of the Park Orchards, Fish Cafe, for his magnificent efforts catering to the staff at Snakebusters, Australia's best reptiles displays over the best part of a decade preceding year 2013. People who work hard to give logistical support to front-line conservationists and educators should not have their efforts go unrecognized.

ODATRIA (HONLAMUS) MITCHELLI HAWKESWOODI SUBSP. NOV.

Holotype: Specimen number R77001 at the Western Australian Museum, Perth Western Australia, collected at Mitchell Plateau, Western Australia, Lat. -14.9, Long. 125.8. The Western Australian Museum, Perth, Western Australia is a government-owned facility that allows researchers access to their collection for research purposes.

Paratypes: Specimen numbers R77144, R77409 and R77605 at the Western Australian Museum, Perth Western Australia, collected at Mitchell Plateau, Western Australia, Lat. -14.9, Long. 125.8. The Western Australian Museum, Perth Western Australia is a government-owned facility that allows researchers access to their collection for research purposes.

Diagnosis: The subspecies *Odatria (Honlamus) mitchelli hawkeswoodi* subsp. nov. has until now been treated as a regional variant of *O. mitchelli*. Were it not for the fact that distribution of *O. mitchelli* as recognized to the current date appears to be continuous across the coastal region from the east of the Northern Territory (the nominal form) to the west Kimberley (this subspecies) (this information taken from the literature cited above), I'd have described the Kimberley variant as a full species, noting that the Kimberley variant is readily distinguished from the type form on the basis of consistent colour and morphological differences as noted by previous authors including Pianka *et al.* (2004).

Odatria (Honlamus) mitchelli hawkeswoodi subsp. nov. is most easily separated from *O. mitchelli* on the basis of colouration. In *O. mitchelli* the dorsal colouration includes a patterning of yellow spots that have enlarged to have black centres, thereby forming ocelli, some of these running more than half of the body length (usually about 90 per cent). By contrast in *O. hawkeswoodi* subsp. nov. these ocelli, if present are only visible in the region of the front legs and they are not seen more than 50 per cent down the length of the body (usually only about 10 per cent).

Overall the dorsal colouration of *O. mitchelli hawkeswoodi* subsp. nov. is greyish to greyish-brown with a dorsal pattern consisting mainly of whitish yellow flecks, each typically consisting 2 to 4 scales; the throat and side of neck are whitish yellow with the throat itself a whitish colour. By contrast, the dorsal colouration of *O. mitchelli mitchelli* is an orangeish-brown colour, with a dorsal pattern consisting of a dark grey background, overlaid with a pattern consisting of orangeish-yellow ocelli merging into one another to give the back a somewhat reticulated pattern; the throat and side of the neck are a rich orangeish-yellow in colour, with the throat itself yellow.

Both *O. mitchelli mitchelli* and *O. mitchelli hawkeswoodi* subsp. nov. are separated from all other living varanids by the following suite of characters: The tail is strongly laterally keeled, except at the base; there is a distinct median double keel dorsally along the posterior half of the tail; the caudal scales are arranged in regular rings and sometimes incomplete on the sides of the tail; the tail is at least 1.3 times as long as the head and body; scales on the upper side of the basal portion of the tail are not rugose; scales on the head and body are fairly large; 40-60 scales across the top of the head from the angle of the mouth on one side to that of the other; 90-130 scales around the body.

Distribution: Restricted to the coastal parts of the Kimberley division of Western Australia.

Etymology: Named in honour of Dr. Trevor Hawkeswood of New South Wales in recognition of his immense contribution to the biological sciences in Australia and elsewhere, most notably that of invertebrates and beetles in particular.

ODATRIA (ODATRIA) TRISTIS NINI SUBSP. NOV.

Holotype: Specimen number R13637 at the Australian Museum, Sydney, NSW, Australia, from the East Alligator River, Northern Territory, Australia, Lat. -12.23, Long. 136.88. The Australian Museum, Sydney, NSW, Australia, is a government-owned facility that allows researchers access to their collection for research purposes.

Paratype: A specimen number R12377 at the Australian Museum, Sydney, NSW, Australia, from Yirrkala, via Darwin, Northern Territory, Australia, Lat. 12.25, Long. 136.88. The Australian Museum, Sydney, NSW, Australia, is a government-owned facility that allows researchers access to their collection for research purposes.

Diagnosis: Until now this subspecies has been classified as a

variant of *Odatria (Odatria) tristis orientalis*. The subspecies *Odatria tristis nini subsp. nov.* is readily separated from *O. tristis orientalis* by colour. *O. tristis nini subsp. nov.* is characterized by an orange or yellow coloured head, including the underside, which is yellowish in colour. By contrast, *O. tristis orientalis*, is characterized by either a greyish head, or if marked (as is commonly seen in juveniles) there are white light markings on the head, as opposed to yellowish in *O. tristis nini subsp. nov.*

In *O. tristis tristis*, the head and neck are always black or dominantly blackish in colour, readily separating them from the other two subspecies. Specimens from western Queensland, intermediate in form and colour between *O. tristis tristis* and *O. tristis orientalis* are found. However at this stage, I know of no specimens intermediate in form between *O. tristis nini subsp. nov.* and either of the other subspecies.

While *O. tristis nini subsp. nov.* do have a dorsal pattern of ocelli as seen in *O. tristis orientalis*, it is considerably reduced in the subspecies *O. tristis nini subsp. nov.* as compared to *O. tristis orientalis*. Adult *O. tristis orientalis* have very distinct ocelli on the fore and hind body, however these are either faded, indistinct or absent in adult *O. tristis nini subsp. nov.*

O. tristis orientalis are characterised by a thick dark temporal streak that runs through the eye and nearly to the nostril. By contrast in *O. tristis nini subsp. nov.* the temporal streak is reduced in thickness, length and intensity and does not run half way from the eye to the nostril.

O. tristis (all subspecies) are separated from all other living varanids by the following suite of characters:

Medium adult size up to 80 cm in total length; gracile build, with a longish neck and the tail that may exceed 1.8 times the body length; the last half of the tail does not have alternate black and white bands; neck and shoulders being grey to tan or yellowish to rusty in colour or even black, a fairly prominent black temporal stripe; an unmarked yellow or white throat; supraoculars are very small, sharply differentiated from the larger interoculars; males with a ventro-lateral cluster of strong spines on each side behind the vent.

Distribution: *O. tristis nini subsp. nov.* occurs in the top end of the Northern Territory and nearby parts of north-west Western Australia including the area stretching west from the western side of the Gulf of Carpentaria and offshore islands, such as Groote Eylandt and including the entire Kimberley Ranges of Western Australia.

O. tristis orientalis appears to be confined to most of Queensland, except the far west and nearby parts of north-west NSW and also except for the wettest parts.

O. tristis tristis appears to be found in most parts of arid Australia and the wetter south-west, where specimens are particularly dark, but not including most of the Murray-Darling basin.

Etymology: Named in honour of Dara Nin, of Ringwood, Victoria, Australia, in recognition of many years of excellent work with Snakebusters, Australia's best wildlife displays. To shatter a series of lies by inexperienced and ruthless competitors in the education business (see details below), Dara got bitten by a large venomoid Death Adder in public in late 2012 in Geelong in front of an audience of hundreds of people. This proved that the snake had no venom and shattered the lie that the snake had regenerated venom and was a danger to the public.

Other than the sizeable fang cuts in his arm, Dara was, as expected, totally unharmed.

Since taking this bite to prove the safety of Snakebusters shows and displays, including that Snakebusters are alone in their market with a perfect safety record, a number of competitors have had fatal and near fatal bites from venomous snakes occurring during their dangerous reptile displays. This is because they lacked the expertise to have surgically de-venomized (venomoid) snakes.

While Snakebusters has an unmatched perfect safety record, spanning many years, the main business competitor of Snakebusters, the dysfunctional government-owned and controlled "Zoos Victoria", has an atrocious safety record involving many near fatal snake bites, mainly at Healesville Sanctuary, the majority of which have not been reported in the media. This is notable because "Zoos Victoria" are able to generate extensive favourable advertorial-type content in the tabloid papers daily as part of their government-backed advertising and self-promotion regime.

By way of example, Melbourne Zoo had a keeper killed by an elephant that was mistreated. This case of workplace manslaughter was kept out of the media and no one was charged or fined for the criminal breaches of work safety laws. Members of the public have been attacked and injured by rogue big cats and there have been a number of incidents involving escaped primates, and extreme animal cruelty at the Melbourne Zoo.

The Melbourne Zoo and the department that controls them, which regularly changes its name, and as of mid 2013 is called the "Department of Environment and Primary Industries" (DEPI) improperly sits in the improper dual role of both regulator and business competitor of Snakebusters.

In that role, they have waged an illegal and damaging war against the Snakebusters reptile education business, by acting in direct breach of the Wildlife Act, Victoria, that they are supposed to be administering since at least 2006.

The criminal activity by these people has included illegal armed raids of Snakebusters, unlawful arrests of staff at gunpoint, destruction of property, killing of live snakes, fabricated criminal charges and so on.

Dara Nin, has had to endure numerous DEPI sponsored attacks on the business and himself. He has also done an excellent job of apprehending police-protected criminals who have attempted to steal reptiles and cause criminal damage.

In 2012, he did a magnificent job of foiling a DSE approved attack by newly licenced business competitors against one of our displays at Morwell. He did this by preventing Margaret Irvine Osborne and Bana Osborne from successfully attacking a hands-on reptile display at a leisure expo. The two women are associates of protected criminals Michael Alexander and Sean McCarthy, both of whom had been allowed by police and DEPI to engage in illegal activity with immunity from protection for some years. Both men themselves run newly licenced and unsafe competing display businesses that also happen to operate regularly in breach of work safety laws in Victoria as well.

Like the dysfunctional "Zoos Victoria", McCarthy's reptile display and snake handling business, taken over from a Mr Simon Watharow, has a shocking safety record and had a number of incidents whereby a snake handler has had to be rushed to hospital after being inadvertently bitten by a highly venomous snake.

WORRELLISAURUS STORRI MAKHANI SUBSP. NOV.

Holotype: Specimen number: J32296 at the Queensland Museum, Brisbane, Australia, from Mount Isa in Queensland, Australia, Lat. -20.73, Long. 139.48. The Queensland Museum, Brisbane, Australia is a government-owned facility that allows researchers access to their collection for research purposes.

Paratype: Specimen number: J85595 at the Queensland Museum, Brisbane, Australia, from Mount Isa in Queensland, Australia, Lat. -20.73, Long. 139.48. The Queensland Museum, Brisbane, Australia is a government-owned facility that allows researchers access to their collection for research purposes.

Diagnosis: *Worrellisaurus storri makhani subsp. nov.* is readily separated from the nominate *W. storri storri* (Mertens, 1966) by colouration. The nominate form is characterized by a distinctive dark temporal streak running through the eye, being narrow between the nostril and the eye and broad beyond the eye,

where it forms a thick temporal streak running to the back of the head. By contrast in *Worrellisaurus storri makhani subsp. nov.* the same temporal streak is indistinct beyond the eye and it is not bounded by a white streak underneath, as it is in nominate *W. storri storri*.

Worrellisaurus storri ocreatus (Storr, 1980) in common with *Worrellisaurus storri makhani subsp. nov.* lacks a white lower boundary of the temporal streak beyond the eye. However *W. storri ocreatus* and nominate *W. storri storri* are readily separated from *W. storri makhani subsp. nov.* by the presence of dark flecks or spots below the temporal streak at the lower rear of the head. These are absent in *W. storri makhani subsp. nov.* or rarely present, but in contrast to the other two subspecies, these flecks or spots if present are very indistinct.

W. storri storri have white spots on dark limbs, while *W. storri ocreatus* have dark spots on orange-brown limbs. *W. storri makhani subsp. nov.* are separated from both by having orange-brown limbs with no flecks or spots or occasionally only very tiny and indistinct dark flecks.

All *W. storri* subspecies have a dorsal patterning that is in effect a matrix of darker and lighter scales, these usually being a combination of reddish-brown and grey-brown, or alternatively a yellowish or orangeish colour combined with the grey brown. Unlike the other two subspecies of *W. storri*, *W. storri makhani subsp. nov.* is diagnosed by the noticeably greater preponderance of darker scales than lighter scales on the flanks along the mid-sides of the body.

All subspecies of *W. storri* are separated from all other living varanids by the following suite of characters: A strongly spinose tail, round in section, without a median double keel along the dorsal surface, that is less than 1.8 times as long as the head and body; small adult size rarely exceeding 30 cm; a dorsal colouration that is usually reddish or orangeish brown, with numerous scattered dark brown or black scales, sometimes forming a reticulum, which is also seen sometimes on the upper surface of the limbs, with the reticulum pattern often reduced to flecks, or appearing that way, but never having a pattern of distinct ocelli; the head is usually flecked with blackish brown (see descriptions of subspecies above for the detail); lower surfaces and the lower sides of the neck are white or cream; 70-94 midbody scale rows; subequal supraocular scales

Distribution: Known only from the general vicinity of Mount Isa in far north-west Queensland.

Etymology: Named in honour of Dr. Dewanand Makhan of the Netherlands in recognition of his excellent work on the systematics of beetles.

EUPREPIOSAURUS INDICUS WELLSI SUBSP. NOV.

Holotype: A specimen from Maningrida, Northern Territory, Australia, Lat. -12.05° S, Long. 134.2167° E, specimen number R0347 at the Northern Territory Museum and Art Gallery, Darwin, NT, Australia. The Northern Territory Museum and Art Gallery, Darwin, NT, Australia, is a government owned facility that allows access to its collection holdings by herpetologists.

Paratype: A specimen at the Museum of Victoria, Melbourne, Australia, specimen number: DTD73 from Katji Lagoon, Arnhem Land, Northern Territory, Australia, Lat -12.35 S, Long. 134.78. The the Museum of Victoria, Melbourne, Australia is a government owned facility that allows access to its collection holdings by herpetologists.

Diagnosis: *Euprepisaurus indicus wellsi subsp. nov.* is similar in most respects to the nominate form of *E. indicus*. However both are separated from *E. indicus wellingtoni subsp. nov.* (from Dauar and Murray Islands, Torres Strait, Queensland) by the nature of yellow speckling on the scales of the body, being no more than two scales of yellow in any one of the yellow spots. *E. indicus wellingtoni subsp. nov.* has yellow spots on the body of varying size, but some clearly in excess of two scales per yellow spots (typically four). Exceptional to this is the base of the tail of both forms, which may have patches of yellow (usually

elongated) consisting of more than three yellow scales in sequence to form elongate markings.

The feature that most readily separates *E. indicus wellsi subsp. nov.* from the nominate form of *E. indicus* and *E. indicus wellingtoni subsp. nov.* is the large yellow patches on each of the toes on the forelimbs, consisting typically of several scales in width. By contrast in the other two subspecies the same yellow patches are reduced to tiny single scale spots.

Euprepisaurus indicus wellsi subsp. nov. is also separated from all other *E. indicus* by the fact that the intensity of whitish yellow speckling reduces as one moves down the flanks of the body. In other *E. indicus* the intensity of speckling is consistent to the lower flanks.

E. indicus wellingtoni subsp. nov. currently only known from Dauar and Murray Islands, Torres Strait, Queensland, is separated from nominate *E. indicus* and *E. indicus wellsi subsp. nov.* by distinctly larger yellow spotting on the upper body and tail, including the head proper.

In *E. indicus wellingtoni subsp. nov.* the yellow markings on the head are so large as to appear as yellow spots. Along the jawline of *E. indicus wellingtoni subsp. nov.* are corresponding yellow patches on the upper and lower labials giving the appearance of about five distinct yellow bars across the lips. This condition is not seen in other *E. indicus* subspecies. In contrast to other *E. indicus*, in *E. indicus wellingtoni subsp. nov.* yellow spots on the back are typically in clusters of four scales, almost giving the lizard an ocellated appearance. Clusters of 2 to 5 scales in large yellow spots are present on the front and hind legs of *E. indicus wellingtoni subsp. nov.* which is in stark contrast to nominate *E. indicus* and *E. indicus wellsi sp. nov.* both of which have single yellow-scale spots (surrounded by dark grey to black scales).

In nominate *E. indicus* the upper neck is dark greyish black and with heavy white flecks. By contrast in *E. indicus wellsi sp. nov.* the upper neck is dark greyish black only, or rarely with a tiny amount of white or yellow flecks.

E. indicus, including all subspecies are separated from all other living varanids by the following suite of characters: The tail is strongly laterally compressed except at the base; a distinct low to moderate median double keel dorsally is along the posterior half of the tail; caudal scales are not arranged in regular rings, as ventral caudal scales are larger than the dorsal scales; nostrils directed laterally; a series of a few distinctly broader or enlarged scales among the supraoculars; the head is 1.7-2.2 times longer than broad and 2.4-3.2 times longer than high; 110-180 scales around the middle of the body.

A living *Euprepisaurus indicus wellsi subsp. nov.* is depicted on the top of page 28 of Ziegler *et al.* (2001).

Distribution: Known only from the "top end" of the Northern Territory, Australia, where it is believed to be the only member of the *Euprepisaurus indicus* species group present.

Etymology: Named in honour of Richard Wells of Lismore in New South Wales, Australia, in recognition of a lifetime's work in herpetology in Australia, in this case with reference to his immense contribution to the systematics of the varanids in Australia, through his two publications of 1983 and 1985, namely Wells and Wellington (1983, 1985).

EUPREPIOSAURUS INDICUS WELLINGTONI SUBSP. NOV.

Type specimen: A specimen number R48078 at the Australian Museum in Sydney, NSW, Australia, from Dauar Island, Torres Strait, Queensland, Australia. The Australian Museum in Sydney, NSW, Australia, is a government owned facility that allows access to its collection holdings by herpetologists.

Diagnosis: *Euprepisaurus indicus wellingtoni subsp. nov.* currently only known from Dauar and Murray Islands, Torres Strait, Queensland, is separated from nominate *E. indicus* and *E. indicus wellsi subsp. nov.* (from the Northern Territory) by distinctly larger yellow spots on the upper body and tail,

including the head proper.

In *E. indicus wellingtoni subsp. nov.* the yellow markings on the head are so large as to appear as yellow spots. Along the jawline of *E. indicus wellingtoni subsp. nov.* are corresponding yellow patches on the upper and lower labials giving the appearance of about five distinct yellow bars across the lips. This condition is not seen in other *E. indicus* subspecies. In contrast to other *E. indicus*, in *E. indicus wellingtoni subsp. nov.* yellow spots on the back are typically in clusters of four scales, almost giving the lizard an ocellated appearance. Clusters of 2 to 5 scales in large yellow spots are present on the front and hind legs of *E. indicus wellingtoni subsp. nov.* which is in stark contrast to nominate *E. indicus* and *E. indicus wellsi sp. nov.* both of which have single yellow-scale spots (surrounded by dark grey to black scales).

In nominate *E. indicus* the upper neck is dark greyish black and with heavy white flecks. By contrast in *E. indicus wellsi sp. nov.* the upper neck is dark greyish black only, or rarely with a tiny amount of white or yellow flecks.

E. indicus wellsi subsp. nov. is similar in most respects to the nominate form of *E. indicus*. However both are separated from *E. indicus wellingtoni subsp. nov.* (from Dauar and Murray Islands, Torres Strait, Queensland) by the nature of yellow speckling on the scales of the body, being no more than two scales of yellow in any one of the yellow spots. *E. indicus wellingtoni subsp. nov.* has yellow spots on the body of varying size, but some clearly in excess of two scales per yellow spots, in this subspecies the number being typically four. Exceptional to this is the base of the tail of all forms, which may have patches of yellow (usually elongated) consisting of more than three yellow scales in sequence to form elongate markings.

The feature that most readily separates *E. indicus wellsi subsp. nov.* from the nominate form of *E. indicus* and *E. indicus wellingtoni subsp. nov.* is the large yellow patches on each of the toes on the forelimbs, consisting typically of several scales in width. By contrast in the other two subspecies the same yellow patches are reduced to tiny single scale spots.

Euprepiosaurus indicus wellsi subsp. nov. is also separated from all other *E. indicus* by the fact that the intensity of whitish yellow speckling reduces as one moves down the flanks of the body. In other *E. indicus* the intensity of speckling is consistent to the lower flanks.

E. indicus, including all subspecies are separated from all other living varanids by the following suite of characters: The tail is strongly laterally compressed except at the base; a distinct low to moderate median double keel dorsally is along the posterior half of the tail; caudal scales are not arranged in regular rings, as ventral caudal scales are larger than the dorsal scales; nostrils directed laterally; a series of a few distinctly broader or enlarged scales among the supraoculars; the head is 1.7-2.2 times longer than broad and 2.4-3.2 times longer than high; 110-180 scales around the middle of the body.

A typical specimen of *E. indicus wellingtoni subsp. nov.* is depicted at the top of page 184 of Pianka *et al.* (2004).

Distribution: Known only from Dauar and Murray Islands in Torres Strait, Queensland, Australia, where it is believed to be the only member of the *Euprepiosaurus indicus* species group present.

Etymology: Named in honour of Cliff Ross Wellington of Woy Woy in New South Wales, Australia, in recognition of a lifetime's work in herpetology in Australia, in this case with reference to his immense contribution to the systematics of the varanids in Australia, through his two publications of 1983 and 1985, namely Wells and Wellington (1983, 1985).

EMPUGUSIA (DENDROVARANUS) SALVATOR WOOLFI SUBSP. NOV.

Holotype: A specimen at the State Museum of Natural History, Stuttgart, Germany, specimen number: SMNS Herpetologie 4463, from Nusa Tenggara Barat, Sumbawa, Indonesia.

Diagnosis: The subspecies *E. salvator woolfi subsp. nov.* is similar in most respects to the subspecies, *E. salvator bivittatus* (Kuhl, 1820) with which it has been grouped until now and based on morphology, would as a matter of course be keyed out as this subspecies using existing texts on *E. salvator* subspecies (as seen for example in Pianka *et al.* 2004).

However *E. salvator bivittatus* is readily separated from *E. salvator woolfi subsp. nov.* by colouration. In *E. salvator bivittatus* the subspecies is separated from all other *E. salvator* by the presence along the sides of the neck behind the ear of a pronounced black band and under this a yellowish band, which in some cases may be divided into spots. By contrast in *E. salvator woolfi subsp. nov.* these bands are present but very indistinct. In other *E. salvator* these bands are not present.

In both nominate *E. salvator* and *E. salvator bivittatus* the generally greyish dorsal colour includes distinct large yellowish ocelli, often tending to form large blotches or bands. These are effectively absent in *E. salvator woolfi subsp. nov.* with dorsal markings tending towards speckling or flecks only, the whitish parts usually consisting of just one or two scales and never as large ocelli or large blotches as seen in nominate *E. salvator* and *E. salvator bivittatus*.

Both *E. salvator bivittatus* and *E. salvator woolfi subsp. nov.* are separated from other *E. salvator* by a labial pattern consisting of distinct alternating dark brown and lighter bars (usually 3 darker ones). In *E. salvator* this patterning is either not present or at best approaches this in a broken arrangement on the lower labials only, being two darker cross bars of irregular shape.

E. salvator and species similar to it, that being those which were until recently treated as being synonymous with it by most authors are separated from other living varanids by the following suite of characters: Nasal openings are roundish to oval and much closer to the tip of the snout than to the eye; the head is much longer (about two times) than it is broad; the long snout has a rounded tip and the tympanum is large; tail is 1.36-1.65 times the length of the snout-vent and is shorter in older specimens and longer in males; tail is also laterally compressed with a double-edged upper keel; head scales are relatively large, flat and smooth; 4-8 well-differentiated supraoculars and 48-60 scales from rictus to rictus in a straight line above head. Nuchal scales are smaller than the occipitals and the same size as or slightly larger than the dorsals. There are a total of 137-181 midbody scale rows and 80-95 ventral scale rows from the gular fold to the insertion of hind limbs. Normally on both sides, one to two well-differentiated preanal pores exist. The medium sized front limbs have strong and curved claws; the head is usually a dark grey colour and with some amount of whitish pattern.

Distribution: *E. salvator woolfi subsp. nov.* is known from the Lesser Sunda Islands of Indonesia, east of the Lombok Strait, including, Lombok, Sumbawa, Flores, Wetar, Atauro and adjacent islands, many not properly surveyed for varanids, in the northern arc.

It appears that the maritime barrier of the Lombok Strait (part of Wallace's Line) has allowed the populations east and west of the barrier to differentiate from one another through isolation, including during the most recent Pleistocene sea level falls which apparently did not cut off the Lombok Strait to join the land masses on either side.

Etymology: Named in recognition of Paul Woolf of Walloon, about 50 km west of Brisbane (by road) in Queensland, Australia, foundation president of the Herpetological Society of Queensland Incorporated (HSQI), for his contributions to herpetology, globally spanning more than 2 decades.

TRIBE VARANIINI TRIBE NOV.

Terminal taxon: *Lacerta varia* Shaw, 1790.

Now known as *Varanus varius* (Shaw, 1790).

Diagnosis: The monitors in the tribe Varaniini *tribe nov.* are separated from all other living varanids by the following suite of characters: Almost circular or oval nostrils that are closer to the

tip of the snout than the eye; a tail that may be either rounded or vertically compressed, with or without keels that is not prehensile; sharp recurved teeth in adults; importantly there are no median series of transversely enlarged supraocular scales or broadly enlarged supraoculars in any series or configuration.

Alternatively this tribe may be diagnosed by a process of eliminating the other three tribes as described in detail within this paper.

Distribution: Essentially confined to mainland Australia, this being the centre of distribution, with few species in the coldest parts of the south-east and a few species extralimital, being found on islands north of Australia, including the Lesser Sundas and New Guinea.

Content: *Varanus* Merrem, 1820 (type genus); *Pantherosaurus* Fitzinger, 1843; *Odatria* Gray, 1838; *Worrellisaurus* Wells and Wellington, 1983.

TRIBE POLYDAEDALIINI TRIBE NOV.

Terminal taxon: *Lacerta nilotica* Linnaeus, 1766.

Now known as *Polydaedalus niloticus* (Linnaeus, 1766).

Diagnosis: The three genera of monitors in the tribe Polydaedaliini *tribe nov.* are separated from all other living varanids by one or other of the following three suites of characters:

1/ Tail is laterally compressed and with a low dorsal crest; there are a total of 136-183 scales around the midbody; basic dorsal colour of adults is grey brown to olive brown with light yellow ocelli and bands on the head, back, limbs and tail; the belly and throat are paler and with black bars (*Polydaedalus* Wagler, 1830); or:

2/ Light brown to dark grey, with or without darker transverse bands on the back and tail; with or without yellow patches on the back; the nostrils are diagonal slits situated closer to the eyes than the tip of the snout; juveniles are vividly orange in colour with distinct transverse black bands on the back and tail; tail is rounded in cross-section or alternatively may be laterally compressed, especially distally and with a distinct keel on the back (*Psammosaurus* Fitzinger, 1826); or:

3/ Nares are almost equidistant between the eye and the tip of the snout and slit-shaped; large scales all over the body; stocky build, with a short tail (90-120 percent of snout-vent length) with a low double keel on the median third, and with a large head; supraoculars are not enlarged; other scales on top of the head are larger and irregularly-shaped, increasing in size and becoming more regularly oval-shaped and may or may not be flattened on the neck. Each nuchal scale is surrounded by clusters of small scales; scales on the dorsum have a pit on their smooth surface and one or two dark patches, most prominent on the hind legs and at the base of the tail; ventral scales are smooth, rectangular and regular; there are 81-103 scales around the body and 58-73 scales from the gular fold to the insertion of the hind limbs (*Pachysaurus* Fitzinger, 1843).

Distribution: Northern Africa, the Middle-east and drier parts of western Asia.

Content: *Polydaedalus* Wagler, 1830 (type genus); *Pachysaurus* Fitzinger, 1843; *Psammosaurus* Fitzinger, 1826.

TRIBE SHIREENHOSERSAURIINI TRIBE NOV.

Terminal taxon: *Monitor prasinus* Schlegel, 1839.

Now known as *Shireenhosersaurea prasinus* (Schlegel, 1839).

Diagnosis: Each of the four genera in Shireenhosersauriini *tribe nov.* are defined by one or other of the following four suites of characters:

1/ The tail is only moderately compressed or not at all; there is no obvious median double keel dorsally along the tail; the tail is round in section or somewhat dorso-ventrally compressed, at the most, very slightly laterally compressed in the last half; there is a median series of transversely enlarged supraocular scales (*Shireenhosersaurea gen. nov.*).

The genus *Shireenhosersaurea gen. nov.* is further separated from other living varanids, including the so-called "indicus group" (Genus *Euprepiosaurus* Fitzinger, 1843), the group it is most closely related to, by the following suite of characters: a long tail being 1.75 times the snout-vent length, that is unique among the living varanids in being prehensile (and notably not seen in Genus *Euprepiosaurus* Fitzinger, 1843 as described immediately below), and a mainly green or black colouration (the green being unique to this genus) and particular specializations of the foot to enable grasping on branches; or:

2/ The tail is strongly laterally compressed except at the base; a distinct low to moderate median double keel dorsally is along the posterior half of the tail; caudal scales are not arranged in regular rings, as ventral caudal scales are larger than the dorsal scales; nostrils directed laterally; a series of a few distinctly broader or enlarged scales among the supraoculars; the head is 1.7-2.2 times longer than broad and 2.4-3.2 times longer than high; 110-180 scales around the middle of the body (*Euprepiosaurus* Fitzinger, 1843); or:

3/ A high midbody scale row count in the vicinity of 210 scales; conical and pointed nasals; pink tongue; dorsum is dark brown with rows of yellow solid spots (*Oxysaurus gen. nov.*).

Oxysaurus gen. nov. is further diagnosed by the following characteristics: attaining about 100 cm in total length, in adults, the dorsal surface is a deep chocolate brown to black, which becomes tan below. Solid spots of lime green or yellowish form four broad transverse bands on the dorsum from shoulders to hips. Each band consists of four spots and the most anterior part of vertebral spots touch middorsally. Between these bands are numerous yellowish speckles, also arranged in transverse rows, forming distinct ocelli. The head is dorsally and laterally dark, lacking any light markings. The tongue is pink for its entire length. Limbs are dark brown, slightly speckled with yellow. The tail has light thin bands, with those on the distal two thirds only about two scales wide.

The snout of *Oxysaurus gen. nov.* is distinctly shorter, broader and higher than seen in species within the genus *Euprepiosaurus*. In *Oxysaurus gen. nov.* the head is 1.56 times longer than broad and 2.03 times longer than high, versus 1.7-2.2 and 2.4-3.2 in *E. indicus* (Pianka *et al.* 2004). The tail of *Oxysaurus gen. nov.* is not as strongly compressed as in *Euprepiosaurus*. The small scaled nature of *Oxysaurus gen. nov.* (about 210 mid-body rows) readily sets this genus apart from *Euprepiosaurus*, the genus it has been traditionally confused with; or:

4/ Slit-like nasal slits about halfway between the eye and the snout tip; greenish-grey, with seven or eight darker transverse bands on the body; tail is also banded transversely and laterally compressed with a dorsal crest; heads are large, light yellow and grey; claws are black, large and sharply curved and used in climbing; the teeth in young specimens are sharp, but in adults are distinctly blunt and used for the crushing of snails and similar items (*Philippinosaurus* Mertens, 1959).

Distribution: The region bounded by mainland south-east Asia to the west, then eastward to Australia in the east and including the islands between the two landmasses and islands to the north of the Australasian plate.

Content: *Shireenhosersaurea gen. nov.* (type genus); *Oxysaurus gen. nov.*; *Philippinosaurus* Mertens, 1959; *Euprepiosaurus* Fitzinger, 1843.

TRIBE EMPUGUSIINI TRIBE NOV.

Terminal taxon: *Monitor flavescens* Hardwicke and Gray, 1827.

Diagnosis: The monitors in the tribe Empugusiini *tribe nov.* are separated from all other living varanids by one or other of the following five suites of characters:

1/ Nostrils slit and closer to the tip of the snout than the eye; black, dark grey or brown in dorsal colour, with variable amounts of lighter pattern; nuchal scales are smooth, larger than mid-

dorsals and about the size of the posterior head scales; belly scales are smooth in 75-120 transverse rows (from gular fold to insertion of hind limb at its anterior edge); tail is laterally compressed with a double row of keeled scales dorsally (*E. bengalensis*; *E. nebulosus*); or:

2/ Short, broad head; transverse rows of more or less fused yellow spots on the dorsum; large and heavily keeled dorsal scales; relatively short toes and a relatively short tail (*Empagusia flavescens*); or:

3/ Enlarged scales on the neck that are not arranged in longitudinal rows; slit shaped nares closer to the eye than the snout and a brown body colour in adults (*E. dumerilii*); or:

4/ Enlarged, compressed, strongly keeled scales arranged in longitudinal rows on the neck; long narrow snout; slit shaped nares closer to the eye than the tip of the snout; black body colour (*E. rudicollis*); or:

5/ Nasal openings are roundish to oval and much closer to the tip of the snout than to the eye; the head is much longer (about two times) than it is broad; the long snout has a rounded tip and the tympanum is large; tail is 1.36-1.65 times the length of the snout-vent and is shorter in older specimens and longer in males; tail is also laterally compressed with a double-edged upper keel; head scales are relatively large, flat and smooth; 4-8 well-differentiated supraoculars and 48-60 scales from rictus to rictus in a straight line above head. Nuchal scales are smaller than the occipitals and the same size as or slightly larger than the dorsals. There are a total of 137-181 midbody scale rows and 80-95 ventral scale rows from the gular fold to the insertion of hind limbs. Normally on both sides, one to two well-differentiated preanal pores exist. The medium sized front limbs have strong and curved claws; the head is usually a dark grey colour and with some amount of whitish pattern (*E. salvator*, *E. marmoratus*; *E. nuchalis*; *E. palawanensis*; *E. rasmusseni*; *E. togianus*).

Distribution: Indonesia and southern Asia.

Content: *Empagusia* Gray, 1838.

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CONFLICT OF INTEREST

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

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A new egg-eating snake from the southern Arabian Peninsula (Squamata: Serpentes: Colubridae:Colubrinae:Boigini).

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ABSTRACT

This paper formally describes and names a new species of egg-eating snake from the Southern Arabian Peninsula. Until now the taxon had been treated as a regional variant of the Rhombic Egg-eating Snake *Dasypeltis scabra* (Linnaeus, 1758).

Keywords: Taxonomy; *Dasypeltis*; *scabra*; Rhombic Egg-eating Snake; new species; *saeizadi*; Saudi Arabia; Yemen.

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INTRODUCTION

The egg eating snakes, genus *Dasypeltis* Wagler, 1830 are a well-known group of snakes essentially confined to the African bioregion. In recent years there have been a number of taxonomic revisions involving species groups within the genus, the result being four new species named in 2006 and another in 2012. Prior to that, the most recently named widely recognized species in the genus was *Dasypeltis atra* Sternfeld, 1912.

While doing an audit of species groups of snakes found across major geographical barriers to dispersal, it became apparent that the snakes assigned to the species *Dasypeltis scabra* (Linnaeus, 1758) from the south-western part of the Arabian Peninsula, were in fact a different species to the African taxon *D. scabra*, even though it was clearly closely related and similar in form and habit.

The decision to formally name the new taxon as done according to the Zoological Code (Ride *et al.* 1999) in this paper was delayed until I was able to get relevant information from a number of Saudi Arabian specimens, which took some months longer than originally anticipated to confirm the validity of the new species.

Due to the general abundance and wide distribution of snakes in the genus *Dasypeltis*, this being 11 recognized species as of 2013 found across most parts of continental Africa, there are countless literature references to the relevant species. However in terms of

meaningful papers involving the taxonomy of the genus or the Saudi Arabian specimens in particular, the literature is relatively sparse and offered little if any significant guidance in terms of the diagnosis or identification of the species taxon described within.

Notwithstanding this, key publications relating to the various *Dasypeltis* species including the most relevant similar species, *D. scabra* and *D. abyssina* (Duméril, Bibron and Duméril, 1854), include the following: Auerbach (1987), Barnett (2001), Barnett and Emms (2005), Bates and Little (2013), Bauer and Branch (2003), Bethencourt (1897), Bianconi (1859), Blanford (1870), Bocage (1866), Boettger (1893), Bogert (1940), Böhme *et al.* (2011), Boulenger (1907), Boycott (1992), Branch (1993), Broadley (1958, 1959, 1962, 1998), Broadley and Bates (2009), Broadley and Cotterill (2004), Broadley and Howell (1991), Broadley *et al.* (2003), Chifundera (1990), Chippaux (1999, 2001), Chirio and Lebreton (2007), Cogger (1966), Duméril *et al.* (1854), Egan (2008), Fischer (1884), Gans (1957, 1959, 1960), Geniez and Guillod (2003), Geniez *et al.* (2004), Gravlund *et al.* (1998), Gray (1858), Gruber and Hellmann (1984), Hallowell (1844, 1857), Hughes (1997), Jacobsen (1988), Jackson (2008), Jackson *et al.* (2007), Jacobsen *et al.* (2010), Jan (1863), Kirchof *et al.* (2011), Kulmus (1985), Lanza (1990), Largen and Spawls (2010), LeBreton (1999), Linnaeus (1758), Lopez *et al.* (1993), Loveridge (1936a, 1936b, 1938, 1956), Malonza *et al.*

(2011), Mattison (1995, 2007), Menzies (1966), Mertens (1938, 1954), Mocquard (1887), Müller (1885), Padial (2006), Pauwels and Vande weghe (2008), Peters (1864, 1868, 1878), Pitman (1974), Pyron, Burbrink and Weins (2013), Rasmussen (1981), Razzetti and Msuya (2002), Rödel and Mahsberg (2000), Rödel *et al.* (1999), Scheurer (2007), Schillert (2004), Schleich *et al.* (1996), Schmidt (1923), Schmidt and Kunz (2005), Segniagbeto *et al.* (2011), Sinsin and Bergmans (1999), Smith (1828, 1849), Sochurek (1979), Spawls *et al.* (2004), Sternfeld (1910, 1912), Trape (2005), Trape and Mané (2000, 2004, 2006a, 2006b), Trape and Roux-Esteve (1995), Trape *et al.* (2012), Uthmüller (1934), Venchi and Sindaco (2006), Werner (1899), Witberg (2011, 2012) and sources cited therein.

DASYPELTIS SAEIZADI SP. NOV.

Holotype: A specimen at the British Museum of Natural History (now known as the Natural History Museum), London, UK, specimen number BMNH - 1987.1018, caught in Saudi Arabia.

The British Museum of Natural History (now known as the Natural History Museum), London, UK, is a government-owned facility that allows researchers access to their collection for research purposes.

Diagnosis: *Dasypeltis saeizadi sp. nov.* in Saudi Arabia has been variously assigned to the species *Dasypeltis scabra* (Linnaeus, 1758) and more recently *D. abyssina* (Duméril, Bibron and Duméril, 1854); however it is readily separated from both by the dorsal colouration.

D. scabra is coloured as follows: Bluish-grey or grey or brown and with a series of dark rhomboid patches or squares along the back, with small patches of white, or occasionally pinkish or yellow-white between the patches along the mid-dorsal line. A series of dark transverse bands runs along either flank. There are prominent v-shaped markings on the nape of the neck, the points of which may reach the top of the head. The ventral surface may be white, cream or pink. It may or may not have slightly darker stippling. The species is characterised by barring on the edges of the upper labials, the thickest of which runs into the eye.

D. abyssina is coloured as follows: Usually a plain brownish colour dorsally, with indistinct markings on the head and body and a complete absence of barring on the upper labials, or if present, it is effectively indistinct.

Dasypeltis saeizadi sp. nov. is more similar to *D. scabra* in dorsal colouration, but lacks the distinctive whitish patches interspersing the dorsal midline blotches or squares. In turn these blotches or squares tend somewhat towards being pointed at the anterior end of the body in *Dasypeltis saeizadi sp. nov.*. In contrast to the other two species *Dasypeltis saeizadi sp. nov.* has a darkening on the upper temples. Like *D. abyssina* there is a complete absence of barring on the upper labials in *Dasypeltis saeizadi sp. nov.*, or if present, it is effectively indistinct.

Distribution: Known only from the southern part of the Arabian Peninsula, this being south-western Saudi Arabia and western Yemen, being the generally hilly area, geographically located closest to the Red Sea and the horn of Africa and bound to the north by deserts.

Etymology: Named in honour of Fereshteh M. Saeizad in recognition of his excellent work involving the systematics of beetles.

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CONFLICT OF INTEREST

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

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