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## **Before it gets muddled out of existence ... A new species of Giant Salamander from Kwang Sai, Guangxi Zhuangzu, South China.**

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### **ABSTRACT**

Molecular studies in the past 2 decades have shown that the putative species *Andrias davidianus* (Blanchard, 1871), also known as the "Chinese Giant Salamander" is in fact a composite of at least 7 species, based on divergences of 1.5 MYA or greater.

As of early 2025, at least four of these species lineages have been formally named.

This paper formally names another hitherto unnamed form from Kwang Sai, Guangxi Zhuangzu, South China as *Andrias another sp. nov.* in accordance with the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999) as part of the permanent scientific record.

Correct identification and naming of species is the first and most important step towards their long-term conservation.

This is especially the case in an area of significant biodiversity such as southern China, and when faced with significant human population increases, increased economic activity with greater pressure on natural environments and when the risk of contamination with naturally allopatric forms is an ongoing threat.

**Keywords:** China; Guangxi; Giant Salamander; *Andrias*; *davidianus*; *cheni*; *jiangxiensis*; *sligoi*; new species; *another*.

### **INTRODUCTION**

The "Giant Salamander of China", has for most of the past 200 years been treated as a single wide-ranging taxon.

Populations have invariably been treated as *Andrias davidianus* (Blanchard, 1871), being the first priority name for the putative taxon.

Advances in molecular biology have in the past 20 years repeatedly shown this putative species to be composite (e.g. Liang *et al.* 2019 and Marr *et al.* 2024 and sources cited therein). Four divergent populations have available names.

These are *Andrias davidianus* (Blanchard, 1871) with a type locality of Jiangyou County, Sichuan Province, China, *Andrias sligoi* (Boulenger, 1924) with a given type locality of the Chinese mainland near Hong Kong, but apparently found mainly in Hunan and Guizhou provinces, *Andrias jiangxiensis* Lu, Wang, Chai, Yi, Peng, Murphy, Zhang, and Che, 2022, with a type locality of captive born offspring from Guanzhuang Township, Jing'an County, Jiangxi, China and *Andrias cheni* Xu, Gong, Li, Jiang, Huang, and Huang, 2023 with a type locality of Fufeng Town, Qimen County, Huangshan City, Anhui Province, China.

The Japanese species *Andrias japonicus* (Temminck, 1836), including synonyms is not a relevant taxon to this paper.

"*Triton japonicus* Temminck, 1836" is also the type species for the genus *Andrias* Tschudi, 1837.

One of the unnamed species populations occurs in Southern China in the Guangxi Zhuangzu province.

With molecular divergence indicating a split of over 3 MYA from all other species within the genus *Andrias* Tschudi, 1837 (Liang *et al.* 2019) and consistent morphological divergence, I have no hesitation in formally naming the population from Kwang Sai, Guangxi Zhuangzu, South China as *Andrias another sp. nov.* in accordance with the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999) as part of the permanent scientific record.

### **MATERIALS AND METHODS**

Specimens of all relevant named taxa and the Kwang Sai, Guangxi Zhuangzu, South China populations were audited and checked for consistent differences.

This included available museum specimens, images on photo sharing sites online and the published literature.

Consistent differences between the previously named four species and the Kwang Sai, Guangxi Zhuangzu, South China populations were noted for the purpose of preparing this formal description.

Literature relevant to the taxonomic conclusion and decision to formally name this Kwang Sai, Guangxi Zhuangzu, South China species as new included Blanchard (1871), Boulenger (1882, 1924), Chai *et al.* (2022), Chang (1935, 1936), David (1875), Duret *et al.* (2025), Gong (2023), Guibé (1950), Hara *et*

*al.* (2023), Hoogmoed (1978), Liang *et al.* (2019), Naylor (1981), Nishikawa *et al.* (2024), Raffaëlli (2022), Ride *et al.* (1999), Shu *et al.* (2021), Temminck (1836), Thireau (1986), Thorn (1868), Tschudi (1837), Turvey (2019), Van der Hoeven (1838) and sources cited therein.

## RESULTS

Due to clear genetic divergence as shown by Liang *et al.* (2019), Marr *et al.* (2024) and sources cited therein as well as consistent morphological divergences between the Kwang Sai, Guangxi Zhuangzu, South China populations and the other named living species within *Andrias* Tschudi, 1837 I have had no hesitation at all in formally naming it as a new species.

In the absence of any available name it is formally named as *Andrias another sp. nov.* in accordance with the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999) as part of the permanent scientific record.

It should be noted that no synonym names were available and if they had been they would have been used.

Unless otherwise stated the description as published below is based on adult specimens.

Spelling of the scientific name is deliberate and should not be altered.

In terms of the conservation of this species, the relevant comments in Hoser (2015a-f, 2019a-b and 2020 at page 4) apply.

## ANDRIAS ANOTHER SP. NOV.

**LSIDurn:lsid:zoobank.org:act:B32266F3-BF53-48BA-A5A3-1FB123B228FD**

**Holotype:** A preserved specimen at the USA National Museum of Natural History, Smithsonian Institution, Washington, DC, USA, NMNH Amphibians and Reptiles collection, specimen number 136018 collected from Kwang Sai, Guangxi Zhuangzu, China, Asia.

This facility allows access to its holdings.

**Diagnosis:** *Andrias another sp. nov.* is similar in most respects to *Andrias jiangxiensis* Lu, Wang, Chai, Yi, Peng, Murphy, Zhang, and Che, 2022, with a type locality of captive born offspring from Guanzhuang Township, Jing'an County, Jiangxi, China in that it has a relatively smooth head with relatively indistinct tubercles (invariably paired), including around the snout and eyes, or none obvious at all.

This contrasts with each of *Andrias davidianus* (Blanchard, 1871) with a type locality of Jiangyou County, Sichuan Province, China, *Andrias sligoi* (Boulenger, 1924) with a given type locality of the Chinese mainland near Hong Kong, but apparently found mainly in Hunan and Guizhou provinces and *Andrias cheni* Xu, Gong, Li, Jiang, Huang, and Huang, 2023 with a type locality of Fufeng Town, Qimen County, Huangshan City, Anhui Province, China, all of which have either irregularly arranged tubercles in some or all of these places, or alternatively large, obvious and arranged tubercles.

*Andrias japonicus* (Temminck, 1836) has dense and large tubercles on the head.

*A. another sp. nov.* differs from *A. jiangxiensis* by having a pinkish dorsum that is heavily peppered or marked with greyish black, versus red-brown with dark markings.

*A. another sp. nov.* has a dull brown iris versus gold in *A. jiangxiensis*.

Salamanders within the genus *Andrias* Tschudi, 1837, type species being "*Triton japonicus* Temminck, 1836" are separated from all other salamanders by the following combination of characters:

Very large size (to about 100-115 mm total length as adults) and stout build. Head strongly depressed, snout obtusely truncate; nostrils small, rounded, close to the edge of the upper lip and at the corners of the truncated snout, the internasal space being less than half of the interorbital space. Eyes small, rounded, dorso-lateral in position and without eyelid. Top of head more or less flat, with a rounded temporal protuberance above and

behind each eye. Vomerine teeth in an arched series starting between the choanae, parallel to the maxillary and premaxillary series. A thin lower labial fold starting about midway between nostril and eye to the angle of the mouth. Nasals in contact with maxilla; frontal does not enter external naris. Trunk less depressed than head, with about fifteen costal grooves, a strong vertebral groove, and strong lateral dermal folds. Legs short and flattened. Tail is roughly 59% of the body length and compressed. Dorsal tail fin extending to the trunk. Skin rough and porous, with wrinkles, folds and tubercles. Overall dorsal colour of animals is dark brown, black, greenish, orangish, reddish or pinkish. Irregularly blotched and marbled with dusky greyish-black spots or blotches. Pterygoid broad, almost in contact with base of maxilla. Hyoid arches cartilaginous. Two pairs of branchial arches. Body large, no spiracle on head; distance between nostrils less than half the distance between the eyes. Tongue large, usually with at least some tubercles on highly vascular skin and often many. Permanently aquatic.

**Distribution:** *A. another sp. nov.* is only known from the region of the type locality in Guangxi Zhuangzu, South China.

**Etymology:** *A. another sp. nov.* is named in reflection of what it is, namely another species in the genus *Andrias*. The name is chosen to draw attention to what may otherwise be an overlooked species.

**Conservation:** Other authors (e.g. Shu *et al.* 2021, Chai *et al.* 2022) have noted serious issues of translocation of specimens and hybridisation in the wild between species of *Andrias*.

Anecdotal evidence suggests that the hybrids do not do as well in the wild as would be expected and that to date few hybrid populations have actually become established.

That may not remain the case into the future.

Perhaps the greatest existential threat to *A. another sp. nov.* is the introduction of other *Andrias* species to the waterways this taxon inhabits, with the ultimate result that it may literally be hybridised out of existence (also see Hoser 2020 at page 4).

Hybrid animals are sometimes known as "mutts" and in the case of *A. another sp. nov.* it does as a pure-bred species, run the very real risk of being "muted out of existence!"

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**CONFLICT OF INTEREST**

None.

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**Well overdue ... The lizard genus *Acanthodactylus* Fitzinger, 1834 *sensu lato* is split with 11 new genera and 29 new species formally named and others resurrected from synonymy.**

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### ABSTRACT

The lizard genus *Acanthodactylus* Fitzinger, 1834 *sensu lato* of north Africa and drier southwest Asia is a well-known and often abundant group of lizards where they occur.

The genus and species taxonomy has not changed substantively for decades and yet molecular studies (e.g. Tamar *et al.* 2016, Kirchhof *et al.* 2021) have flagged deep divergence within the putative genus and likewise for the species-level taxonomy.

Available names are resurrected when applicable. When there are no available names, 11 new genera, 2 new subgenera, 29 new species and one new subspecies are erected to properly recognize the diversity of these lizards.

All are formally named in accordance with the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999) as part of the permanent scientific record.

Correct identification and naming of species is the first and most important step towards their long-term conservation.

**Keywords:** Lizard; Africa; Asia; Lacertidae; *Acanthodactylus*; *Chorodromus*; *Ctenodactylus*; *Photophilus*; *Psammoplanis*; *Taenieremias*; new genus; *Salamsahalia*; *Oleumagrilacerta*; *Albaelacerta*; *Questionthenarrative*; *Scienceneedsevidence*; *Tahaqaqminalsard*; *Biyaniyachekkarin*; *Levitergracilis*; *Dorsovareeus*; *Mariolissaurus*; *Gambellsaurea*; new subgenus; *Pseudoacanthodactylus*; *Paralevitergracilis*; new species; *isolatuus*; *immotus*; *asperacuta*; *labiialbae*; *brunneisplagas*; *albidus*; *squamaedorsalesparvae*; *obscurasmaculas*; *caeruleacauda*; *maxinehoserae*; *jvid*; *hashemiteorum*; *nonukesplease*; *always*; *continuously*; *asarule*; *yes*; *toprogress*; *absconditus*; *nonukesyet*; *domusarenialis*; *russus*; *ipsumcaeruleum*; *aurantius*; *netanyahui*; *elonmuski*; *brunniusmaculus*; *oxydentalis*; new subspecies; *mariolisi*.

### INTRODUCTION

The lizard genus *Acanthodactylus* Fitzinger, 1834 *sensu lato* of north Africa and drier southwest Asia is a well-known and often abundant group of lizards where they occur.

The genus and species taxonomy has not changed substantively for decades and yet molecular studies (e.g. Tamar *et al.* 2016, Kirchhof *et al.* 2021) have flagged deep divergence within the putative genus and likewise for the species-level taxonomy.

A review of previously published studies was undertaken with a view to identifying potentially unnamed genera and species within the putative genus *Acanthodactylus* Fitzinger, 1834 *sensu lato* (type species: *Lacerta boskiana* Daudin 1802).

Tamar *et al.* (2016) in particular laid out divergences between species groups, these same groups being morphologically

identified in Salvador (1982).

As a rule, the groups that were 10 or more million years divergent from nearest relatives, based on the phylogenetic evidence were placed into separate genera.

Available names are resurrected when applicable. When there were no available names, new genera were erected for the relevant species or species groups.

At the species-level numerous published phylogenies have flagged potentially unnamed species.

The relevant taxa were inspected to see if the divergent lineages could be morphologically separated from one another and when this was possible, unnamed species for which there were no available names to date have been formally named for the first time ever in this paper.

All relevant genera and species are formally named in accordance with the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999) as part of the permanent scientific record.

It is self-evident that correct identification and naming of species is the first and most important step towards their long-term conservation.

#### MATERIALS AND METHODS

Following the flagging of the potential species by way of molecular studies published previously and/or significant biogeographic isolation and divergence, a multidisciplinary approach was taken to confirm that the flagged populations did in fact represent divergent and identifiable species.

Available specimens, papers and photos of the relevant putative species were inspected.

They were checked for differences between other populations of the same or similar putative species in all aspects of morphology. They were also re-checked for morphological divergences and/or any obvious biogeographical barriers separating the populations. Disjunct distributions were checked for absences caused by non-collection versus absences of collection caused by absence of specimens.

However, an important feature also checked was sea barriers including at times of glacial maxima.

Noting the many thousands of years of human activities in the region, possibilities of translocation of specimens could not be discounted and was factored in the assessment.

Added to this was an assessment of climate oscillations between glacial and interglacial periods, including impacts on vegetations, drainages and habitats overall, to assess the potential creation of migratory pathways for the relevant putative species, be this along a coastal strip, through elevated habitats or across what are presently intensively altered by human activities areas.

Also assessed were habitat constraints preceding intensive human activities over the past 5K years as well as the interplay of other species including similar competing forms, including those from the same or other closely related genera.

Specimens inspected included dead and live specimens as well as images with good locality data including photo sharing sites online like "iNaturalist", "Twitter" (AKA "X"), "Flickr", "Facebook" and "Instagram".

A sweep of the published literature and museum databases, photo sharing sites and the like was done to properly ascertain relevant distributions of all known populations of the putative species and all that is currently known about them in terms of morphology, genetics, distribution and so on.

All available published literature on the genus *Acanthodactylus* Fitzinger, 1834 was reviewed.

References relevant to the taxonomic and nomenclatural decisions herein included Akiki *et al.* (2015), Al-Johany and Spellerberg (1988), Al-Sadoon *et al.* (2016), Al-Shammari and Ahmed (2012), Anderson (1896, 1901), Anderson (1999), Angel (1936), Arnold (1980, 1983, 1984, 1986), Audouin (1827), Baha El Din (2006, 2007), Bar and Haimovitch (2012), Bar *et al.* (2021), Baran *et al.* (2005), Bauer and Günther (1995), Bauer *et al.* (2017), Bellairs and Shute (1954), Bezaz *et al.* (2021), Bischoff (2007), Bischoff and Schmidler (1996), Blanford (1874), Boettger (1879, 1880, 1885), Böhme (1978), Bons (1959), Bons and Geniez (1995, 1996), Bons and Girot (1964), Boulenger (1878, 1881, 1887a, 1887b, 1887c, 1890, 1891, 1909, 1918a, 1918b, 1919a, 1919b, 1920, 1921), Brito *et al.* (2008), Burriel-Carranza *et al.* (2019, 2025), Busack (1975, 1976), Busack and Jaksic (1982), Busack and Klosterman (1987), Carretero and Llorente (1995), Carranza *et al.* (2021), Castilla *et al.* (1992), Chabanaud (1917, 1918), Chirio (2009), Chirio and Blanc (1997), Chirio and Ineich (2006), Chirio and Lebreton (2007), Cogălniceanu *et al.* (2014), Cooper Jr (2005), Cortés (1982), Corti *et al.* (2022), Crochet *et al.* (2003, 2015), Cuervo and Belliure (2013), Damadi *et al.* (2017), Das and Das (2017), Das

(2015), Daudin (1802), Disi *et al.* (2001), Doumergue (1901), Drechsler and Monrós (2019), Duméril and Bibron (1839), Eissa and El Assy (1975), Engelmann *et al.* (1993), Escoriza (2017), Fathnia *et al.* (2009), Fitzinger (1843), Fonseca *et al.* (2008, 2009), Forcart (1950), Franke (1995), Frankenberg and Werner (1992), Franzen (1998), Fresnillo *et al.* (2019), Frétey (2023), Frommer (2008), Gardner (2013), Gardner (2005), Gemel *et al.* (2019), Geniez and Foucart (1995), Geniez *et al.* (2004), Giovannotti *et al.* (2017), Goldberg (2013, 2014), Gray (1838, 1845), Guillén-Salazar *et al.* (2007), Günther (1859, 1864a, 1864b, 1903), Haas (1957), Haas and Werner (1969), Harris and Arnold (2000), Harris *et al.* (2004a, 2004b, 2009), Hawlena *et al.* (2006), Hediger (1935), Heidari (2019), Heidari and Kami (2009), Heidari *et al.* (2012, 2013), Hornby (1996), Hraoui-Bloquet *et al.* (2002), Ibrahim (2013), Jablonski *et al.* (2025), Jimenez-Cazalla (2022), Joger and Lambert (1996), Johann (1981), Jongbloed (2000), Kamali (2013, 2020), Khan (2003), Kirchhof *et al.* (2021), Kolodziej and Cenker (2010), Kurnaz and Shahin (2021), Kwet (2010), Kwet and Trapp (2014), Lahoud Hokayem *et al.* (2006), Lambert (1987), Largen and Spawls (2010), Lataste (1881), Leviton (1959), Leviton and Anderson (1967), Leviton *et al.* (1992), Lichtenstein (1823), Liz *et al.* (2022), Loveridge (1936), Malkmus (1982, 1983, 1989, 1990, 2003, 2010), Martín and Lopez (2003), Martínez del Mármol *et al.* (2019), Matschie (1893), Mediani *et al.* (2015), Meinig (1994), Meinig and Böhme (2002), Mellado and Olmedo (1990), Milne-Edwards (1829), Milto (2017, 2022), Milto *et al.* (2019), Miralles *et al.* (2020), Modry *et al.* (1999), Monard (1949), Moravec *et al.* (1999), Mozaffari *et al.* (2016, 2021), Müller (1996), Nasri *et al.* (2015), Nouria and Blanc (1998, 2003), Padial (2006), Papenfuss (1969), Patel and Vyas (2019), Perry and Dmi'el (1994), Peters (1869), Pfau (1988), Pieh (2006), Pough and Busack (1978), Psonis *et al.* (2016), Pyron *et al.* (2013), Rastegar-Pouyani (1998, 2000, 2008, 2011), Riney (1953), Rouag *et al.* (2024), Rösler and Wranik (2017), Salazar *et al.* (2007), Salvador (1982), Santos *et al.* (2024), Schätti and Gasperetti (1994), Schleich *et al.* (1996), Schlüter (2000, 2002a, 2002b, 2007a, 2007b, 2008, 2009, 2010a, 2010b, 2012, 2013a, 2013b), Schmidt (1930, 1939), Schinz (1833), Schneider (2020), Schnurrenberger (1963), Schweiger (2013), Sindaco and Jeremcenko (2008), Sindaco *et al.* (1995, 2000, 2006), Singh *et al.* (2021), Smid *et al.* (2014), Smith (1935), Spawls *et al.* (2023), Stark *et al.* (2018), Steindachner (1903), Tamar *et al.* (2014, 2016, 2017), Tornier (1899), Trape *et al.* (2012), Tristram (1885), Trutnau (1975), van der Kooij (2001), van der Kuyl *et al.* (2002), Velo-Antón *et al.* (2018, 2022), Venugopal (2010), Villa and Delfino (2019), Vyas (2007, 2011), Wagner *et al.* (2016), Werner (1894, 1896, 1917, 1919, 1929, 1931, 1936), Werner (1971, 1986, 2004), Werner and Ashkenazi (2010), Werner and Ibrahim (2012), Wilms and Hulbert (2003), Yildiz (2020), Zhang *et al.* (2023), Zulueta (1909) and sources cited therein.

Online references relied upon were most recently checked as correct in terms of content cited on 10 June 2025.

#### RESULTS

At the genus level, the following names were available.

*Acanthodactylus* Fitzinger, 1834 in Wiegmann (type species: *Lacerta boskiana* Daudin 1802)

*Chorodromus* Fitzinger, 1843 (type species: *Acanthodactylus lineomaculatus* Dumeril and Bibron 1839)

*Ctenodactylus* Fitzinger 1843 (type species: *Acanthodactylus vulgaris* Dumeril and Bibron 1839) = *A. erythrurus* Schinz, 1833

*Photophilus* Fitzinger, 1843 (type species: *Lacerta scutellata* Audouin 1829)

*Psammoplanis* Fitzinger, 1843 (type species: *Lacerta savignyi* Audouin 1829)

*Taenieremias* Boulenger, 1918 (type species: *Eremias guineensis* Boulenger 1887)

Salvador (1982) synonymised all the preceding except for *Acanthodactylus* within *Acanthodactylus* and this has been the position of most herpetologists between 1982 and 2025.

However, with deep divergences between the long-recognized species groups, it is clear that as currently recognised, *Acanthodactylus* does in fact consist of a large number of clades of genus-level divergence. That is usually taken here at 10 MYA or more.

Within this recognition of 10 MYA being genus-level divergence, all the preceding genus-level names are herein resurrected from synonymy, except for *Ctenodactylus* Fitzinger 1843 which is herein treated as a subjective junior synonym of *Chorodromus* Fitzinger, 1843 based on a divergence of less than 5 MYA between the relevant type species (Tamar *et al.* 2016).

Notwithstanding the preceding, there are a number of other until now unnamed species groups that are extremely divergent, as in more than 10 MYA from nearest relatives.

These are formally named herein as new genera.

At the species level, Tamar *et al.* (2016) also flagged numerous unnamed species.

Because inspection of specimens showed consistent differences between the various forms identified in the molecular studies, these too have been named as new species as and when warranted and in the absence of available names.

The following taxonomic and nomenclatural actions have therefore been taken.

*Acanthodactylus* Fitzinger, 1834 is herein confined to a species group of the north of Africa and the middle east.

11 new genera are formally named for the first time, all being more than 10 MYA divergent from nearest common ancestor.

Two subgenera, being divergent from other taxa by about 10 MYA are also formally named for the first time.

*A. boskiana* (Daudin 1802) is obviously a species complex and unnamed forms are formally named herein. The same applies for a number of other putative species within *Acanthodactylus sensu lato*.

In total, 29 new species and a new subspecies are formally named.

What the newly named species and genera are related to is dealt with in each description.

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

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

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

In terms of the following formal descriptions, spelling of names should not be altered in any way for any purpose unless expressly and exclusively called for by the rules governing Zoological Nomenclature as administered by the International Commission of Zoological Nomenclature (see Ride *et al.* 1999 and ICZN 2012).

Material downloaded from the internet and cited anywhere in this paper was downloaded and checked most recently as of 10 June 2025, unless otherwise stated and were accurate in terms of the context cited herein as of that date.

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

This includes the descriptions of the lizards not including pre-sloughing lizards, which are often significantly different to the usual colouration for the specimen or species, being usually more whitish or dull.

Note that there is ordinarily some sexual dimorphism between adults of species within the relevant taxa and colour changes from young to adult.

While numerous texts and references were consulted prior

to publication of this paper, the criteria used to separate the relevant species has already been spelt out and/or is done so within each formal description and does not rely on material within publications not explicitly cited herein.

The "version of record" is the printed version and not pdf version. Both are identical in all materially relevant ways except for the fact that the images in the printed version may be in black and white, as opposed to colour as seen in the pdf version.

The people who assisted with provision of photos and other materials used within this paper or for research by me are also thanked for their assistances, for which they sought nothing in return.

The use of provocative and interesting etymologies is deliberate and designed to further public interest in the relevant species, which will aid conservation outcomes and/or to highlight other matters of public importance that may otherwise be overlooked. The conservation status of the newly named taxa is thought to be stable and secure as can be in the modern world, but this is by no means certain.

Immediate recognition of and monitoring of the new taxa will be the best way to secure them into the future. Each are significant units for conservation management.

The relevant comments of Hoser (2015a-f, 2019a-b) and sources cited therein apply.

#### **ACANTHODACTYLUS ISOLATUUS SP. NOV.**

**LSIDurn:lsid:zoobank.org:act:93072F60-9483-48E3-BDB9-5E4B895F5004**

**Holotype:** A preserved specimen at the Museo Civico di Storia Naturale, Carmagnola, Turin, Italy, specimen number MCCI-R471 collected from Tassili 'n' Ajjer, Algeria.

This facility allows access to its holdings.

**Paratypes:** Six preserved specimens at the California Academy of Sciences, San Francisco, California, USA, specimen numbers CAS 138534-9 collected from Djanet on the Tassili Plateau, Algeria, Latitude 24.34 N., Longitude 9.29 E..

**Diagnosis:** *Acanthodactylus isolatuus* sp. nov. is a taxon confined to the Tassili Plateau in south-east Algeria. It is a part of the *A. boskianus* (Daudin, 1802) species group and has until now been treated as that taxon or an associated putative subspecies.

*A. isolatuus* sp. nov. is separated from all other species in the group by the following unique combination of characters:

A lack of subocular contact with the lip, an entire first supraocular, the large but relatively few (23-38) dorsal scales and a colouration in adult males consisting of five thick, strongly bordered and well-defined off white stripes running down the back, with slightly wider orangish-red interspaces, the interspaces being about twice as wide as the light lines, or not quite twice as wide, unmarked immaculate white upper labials, orange top of head, including snout, orange upper surfaces of the limbs, a greyish-yellowish-white tail, lower flanks and under surfaces may be either white, cream, beige or yellow.

The combination of the distinctive dorsal pattern and the immaculate white labials alone, separates this species from all others in the *A. boskianus* (Daudin, 1802) species complex.

The species within the *A. boskianus* (Daudin, 1802) species complex are separated from all other species within the genus *Acanthodactylus* Fitzinger, 1834 *sensu lato* by the following combination of characters:

Medium to large sized lizard species. Usually four entire supraoculars but, at times the first one is divided. Pectinate anterior border of ear opening, that is it has narrow projections or divisions set closely in a row. Keeled temporals. Slightly denticulated eyelids. Conspicuous gular fold. Three series of scales on the fingers. Ventrals arranged in 10 straight longitudinal rows. Very large, keeled, imbricate dorsals. Granular scalation on sides of the body. Moderate to intense patination of the fourth toe. Large, imbricate and sharply keeled scales on the upper surface of the tail.

Further diagnostic information for the species within the *A.*

*boskianus* (Daudin, 1802) species complex is in Salvador (1982) at pages 23-37.

Lizards within the genus *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* are separated from all other lizards by the following combination of characters:

Occipital absent. Fingers with three or four series of scales. Flat ventrals. Collar present. Toes with more or less developed pectination. Femoral pores present. Parietal foramen present.

*A. isolatuus* sp. nov. is depicted in life online at:

<https://www.inaturalist.org/observations/7364175>

and

<https://www.inaturalist.org/observations/18884467>

and

<https://www.inaturalist.org/observations/7374072>

and

<https://www.inaturalist.org/observations/154428082>

Tamar *et al.* (2016) found that *A. isolatuus* sp. nov. as defined herein diverged from nearest related species 3.4 MYA, confirming that it is in fact a hitherto unnamed species.

**Distribution:** *A. isolatuus* sp. nov. is apparently confined to the region of the Tassili Plateau, Algeria, including immediately adjacent elevated areas.

**Etymology:** The species name *A. isolatuus* sp. nov. is a reflection of the fact that this species occurs in a relatively isolated part of the central Sahara in Africa and based on the Latin word "*isolatus*". The spelling of the scientific name "*isolatuus*" is deliberate and done so (two "u's") to ensure no homonym is created.

**ACANTHODACTYLUS IMMOTUS SP. NOV.**

**LSIDurn:lsid:zoobank.org:act:A064491C-C8EB-4FB9-8044-9506EF57F2E2**

**Holotype:** A preserved specimen at the Museo Civico di Storia Naturale, Carmagnola, Turin, Italy, specimen number MCCI-R1326(1) collected from the northeast slopes of Jebel Semmama, Tunisia, Africa, Latitude 35.3181 N., Longitude 8.8522 E.

This facility allows access to its holdings.

**Paratype:** A preserved specimen at the California Academy of Sciences, San Francisco, California, USA, specimen number CAS HERP 138715 (Cleared and Stained, Skin and viscera separate) collected from the ruins of ruins of Suffetula, Sbeitla, Tunisia, Africa, Latitude 35.232667 N., Longitude 9.125333 E.

**Diagnosis:** *Acanthodactylus immotus* sp. nov. is a taxon confined to the region of Jebel Semmama, Tunisia and is a part of the *A. boskianus* (Daudin, 1802) species group. It has until now been treated as that taxon or an associated putative subspecies.

*A. immotus* sp. nov. is separated from all other species in the group by the following unique combination of characters:

A lack of subocular contact with the lip, an entire first supraocular, the large but relatively few (23-38) dorsal scales and a colouration in adult males consisting of five relatively thin, weakly bordered and poorly defined light yellow stripes running down the back, with significantly wider orangish-red interspaces, the interspaces being about twice as wide as the light lines or slightly more, upper labials are yellowish in colour with largeish grey patches, with a yellow border on the upper edge of each labial scale; brownish top of head, including snout, along with some yellow etchings of scales or patches of yellow invariably along the suture lines of scales; upper surfaces of the limbs are a combination of brown, orangish and yellow markings. The tail is indistinctly marked and a light and faded yellowish-brown colour. Lower flanks and under surfaces are whitish in colour.

The species within the *A. boskianus* (Daudin, 1802) species complex are separated from all other species within the genus *Acanthodactylus* Fitzinger, 1834 *sensu lato* by the following combination of characters:

Medium to large sized lizard species. Usually four entire supraoculars but, at times the first one is divided. Pectinate anterior border of ear opening, that is it has narrow projections or divisions set closely in a row. Keeled temporals. Slightly denticulated eyelids. Conspicuous gular fold. Three series of scales on the fingers. Ventrals arranged in 10 straight longitudinal rows. Very large, keeled, imbricate dorsals. Granular scalation on sides of the body. Moderate to intense pationation of the fourth toe. Large, imbricate and sharply keeled scales on the upper surface of the tail.

Further diagnostic information for the species within the *A. boskianus* (Daudin, 1802) species complex is in Salvador (1982) at pages 23-37.

Lizards within the genus *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* are separated from all other lizards by the following combination of characters:

Occipital absent. Fingers with three or four series of scales. Flat ventrals. Collar present. Toes with more or less developed pectination. Femoral pores present. Parietal foramen present.

*A. immotus* sp. nov. is depicted in life online at:

<https://www.inaturalist.org/observations/71511537>

and

<https://www.inaturalist.org/observations/259515220>

and

<https://www.inaturalist.org/observations/524449>

Tamar *et al.* (2016) found that *A. immotus* sp. nov. as defined herein diverged from the nearest related species 3.1 MYA, confirming that it is in fact a hitherto unnamed species.

**Distribution:** *Acanthodactylus immotus* sp. nov. is a taxon confined to the region of Jebel Semmama, Tunisia.

**Etymology:** The Latin word "*immutus*" refers to the faded dorsal colouration of adults of this species as compared to other species within the *A. boskianus* (Daudin, 1802) species complex.

**ACANTHODACTYLUS ASPERACUTE SP. NOV.**

**LSIDurn:lsid:zoobank.org:act:C9FF332C-2868-441E-9183-6E7014231207**

**Holotype:** A preserved specimen at the California Academy of Sciences, San Francisco, California, USA, specimen number CAS HERP 136557 collected from Riyadh, Al Riyadh Province, Saudi Arabia, Latitude 24.33 N., Longitude 46.44 E.

This facility allows access to its holdings.

**Paratype:** A preserved specimen at the California Academy of Sciences, San Francisco, California, USA, specimen number CAS HERP 136558 collected from Riyadh, Al Riyadh Province, Saudi Arabia, Latitude 24.33 N., Longitude 46.44 E.

**Diagnosis:** *Acanthodactylus asperacutis* sp. nov. is a taxon found from east Jordan, through most of the north two-thirds of Saudi Arabia and including, the United Arab Emirates and the west part of north Oman.

It is a part of the *A. boskianus* (Daudin, 1802) species group.

It has until now been treated as that taxon or an associated putative subspecies

*A. asperacutis* sp. nov. is separated from all other species in the group by the following unique combination of characters:

A lack of subocular contact with the lip, an entire first supraocular, the large but relatively few (23-38) dorsal scales and a colouration in adult males consisting of five relatively thin, poorly bordered and poorly defined light whitish-grey stripes running down the back, with significantly wider orangish-red interspaces, the interspaces being about twice as wide as the light lines or slightly more, upper labials are whitish in colour with yellow, brown or orange spots on them.

Upper surfaces of the limbs mainly orange, but with grey, brown and white spots or markings on the lateral edges, especially on the rear parts of the hind limbs.

The tail has spots forming stripes along the length, especially on the sides.

Lower flanks and under surfaces are whitish in colour.

Top of head is unicolour orangish brown.

The species within the *A. boskianus* (Daudin, 1802) species complex are separated from all other species within the genus *Acanthodactylus* Fitzinger, 1834 *sensu lato* by the following combination of characters:

Medium to large sized lizard species. Usually four entire supraoculars but, at times the first one is divided. Pectinate anterior border of ear opening, that is it has narrow projections or divisions set closely in a row. Keeled temporals. Slightly denticulated eyelids. Conspicuous gular fold. Three series of scales on the fingers. Ventrals arranged in 10 straight longitudinal rows. Very large, keeled, imbricate dorsals. Granular scalation on sides of the body. Moderate to intense patination of the fourth toe. Large, imbricate and sharply keeled scales on the upper surface of the tail.

Further diagnostic information for the species within the *A. boskianus* (Daudin, 1802) species complex is in Salvador (1982) at pages 23-37.

Lizards within the genus *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* are separated from all other lizards by the following combination of characters:

Occipital absent. Fingers with three or four series of scales. Flat ventrals. Collar present. Toes with more or less developed pectination. Femoral pores present. Parietal foramen present.

*A. asperacuta* sp. nov. is depicted in life online at:

<https://www.inaturalist.org/observations/19931654>

and

<https://www.inaturalist.org/observations/199087239>

and

<https://www.inaturalist.org/observations/198575875>

Tamar *et al.* (2016) found that *A. asperacuta* sp. nov. as defined herein diverged from the nearest related species 2.6 MYA, being *Acanthodactylus labiialbae* sp. nov. also described in this paper, confirming that it is in fact a hitherto unnamed species.

**Distribution:** *Acanthodactylus asperacuta* sp. nov. is a taxon found from east Jordan, through most of the north two-thirds of Saudi Arabia and including, the United Arab Emirates and the west part of north Oman.

**Etymology:** The species name "*asperacuta*" comes from the Latin words "*aspera* cute" meaning rough skin. It is a noun in apposition.

**ACANTHODACTYLUS LABIIALBAE SP. NOV.**

**LSIDurn:lsid:zoobank.org:act:0E532C5A-72F8-4437-82B2-CAFDD3FB32728**

**Holotype:** A preserved specimen at the Natural History Museum, London, United Kingdom, specimen number NHMUK ZOO 1980.572 collected from Wadi Haytum, Central Oman.

This facility allows access to its holdings.

**Diagnosis:** *Acanthodactylus labiialbae* sp. nov. is a taxon found only in the region of north-east Oman. It is most similar to and most closely related to *Acanthodactylus asperacuta* sp. nov. a species found to the immediate west.

It is a part of the *A. boskianus* (Daudin, 1802) species group. It has until now been treated as that taxon or an associated putative subspecies.

*A. labiialbae* sp. nov. is separated from all other species in the group by the following unique combination of characters:

A lack of subocular contact with the lip, an entire first supraocular, the large but relatively few (23-38) dorsal scales and a colouration in adult males consisting of five relatively thin, poorly bordered and poorly defined light whitish-grey stripes running down the back, with significantly wider orangish-red interspaces, the interspaces being about twice as wide as the light lines or slightly more, upper labials are dark brownish or orange with thick white bars along the suture edges, giving the "lips" a barred appearance, this also separating this species from

the morphologically similar *A. asperacuta* sp. nov..

Upper surfaces of the limbs mainly orange, but with grey, brown and white spots or markings on the lateral edges, especially on the rear parts of the hind limbs.

The tail does not have spots forming stripes along the length, or on the sides being brownish anteriorly, grey distally and whitish on the lower edges and underneath.

Lower flanks and under surfaces are whitish in colour.

Top of head is unicolour dull brown.

The species within the *A. boskianus* (Daudin, 1802) species complex are separated from all other species within the genus *Acanthodactylus* Fitzinger, 1834 *sensu lato* by the following combination of characters:

Medium to large sized lizard species. Usually four entire supraoculars but, at times the first one is divided. Pectinate anterior border of ear opening, that is it has narrow projections or divisions set closely in a row. Keeled temporals. Slightly denticulated eyelids. Conspicuous gular fold. Three series of scales on the fingers. Ventrals arranged in 10 straight longitudinal rows. Very large, keeled, imbricate dorsals. Granular scalation on sides of the body. Moderate to intense patination of the fourth toe. Large, imbricate and sharply keeled scales on the upper surface of the tail.

Further diagnostic information for the species within the *A. boskianus* (Daudin, 1802) species complex is in Salvador (1982) at pages 23-37.

Lizards within the genus *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* are separated from all other lizards by the following combination of characters:

Occipital absent. Fingers with three or four series of scales. Flat ventrals. Collar present. Toes with more or less developed pectination. Femoral pores present. Parietal foramen present.

*Acanthodactylus labiialbae* sp. nov. is depicted in life online at:

<https://www.inaturalist.org/observations/144289753>

and

<https://www.inaturalist.org/observations/137028482>

and

<https://www.inaturalist.org/observations/151731715>

and

<https://www.inaturalist.org/observations/258459311>

Tamar *et al.* (2016) found that *A. labiialbae* sp. nov. as defined herein diverged from the nearest related species, being *A. asperacuta* sp. nov. 2.6 MYA, confirming that it is in fact a hitherto unnamed species.

**Distribution:** *Acanthodactylus labiialbae* sp. nov. is a taxon found only in the region of north-east Oman. It is most similar to and most closely related to *Acanthodactylus asperacuta* sp. nov. a species found to the immediate west.

**Etymology:** The species name *labiialbae* comes from the Latin words meaning white stripes on the lips, in reflection of the white barring on the upper labials. The spelling of this name with two "i's" is deliberate and should not be changed.

**ACANTHODACTYLUS BRUNNEISPLAGAS SP. NOV.**

**LSIDurn:lsid:zoobank.org:act:107F1C89-DF1B-4312-823F-07E449F35787**

**Holotype:** A preserved specimen at the Museo Civico di Storia Naturale, Carmagnola, Turin, Italy, specimen number MCCI-R621 collected from Wadi Ramm, Jordan, Latitude 29.5559 N., Longitude 35.4076 E.

This facility allows access to its holdings.

**Paratypes:** 1/ A preserved specimen at the Zoologisches Forschungsinstitut und Museum Alexander Koenig, Bonn, Germany, specimen number ZFMK 21030, collected from Ma'an, 10 km south of Aqaba, Jordan., 2/ A preserved specimen at the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA, specimen number MCZ Herp R-9717 collected from Aqaba, Jordan, Latitude 29.31 N.,

Longitude 35.00 E., 3/ A preserved specimen at the California Academy of Sciences, San Francisco, California, USA, specimen number CAS HERP 140485 collected from Wadi Ramm, Jordan, Latitude 29.6 N., Longitude 35.5 E.

**Diagnosis:** *Acanthodactylus brunneisplagas* sp. nov. is a taxon found in the south of Jordan to the east of the Galilee Basin.

It is a part of the *A. boskianus* (Daudin, 1802) species group.

It has until now been treated as that taxon or an associated putative subspecies.

*A. brunneisplagas* sp. nov. is separated from all other species in the group by the following unique combination of characters:

A lack of subocular contact with the lip, an entire first supraocular, the large but relatively few (23-38) dorsal scales and a colouration in adult males consisting of five relatively thick and well defined light whitish-grey or yellow stripes running down the back, with significantly mainly brown interspaces (as opposed to the orange seen in most other species in the complex), the interspaces being about as wide as the light lines or slightly more, upper labials are white at the lower edges and brown at the top, this being consistent along the labial line.

Upper surfaces of the forelimbs are largely unmarked and brownish in colour. The upper surfaces of the hindlimbs are a combination of light yellowish-brown and dark chocolate brown to black, this being arranged in a pattern whereby the upper surface appears to be barred and the edges are mainly dark.

The tail is yellowish, with a salmon tinge, and has well-defined thick dark brown stripes on the top and sides for the anterior half of the tail, after which this fades to make the entire distal tail a light brownish colour.

Lower flanks and under surfaces are whitish in colour.

Top of head is unicolour dull brown but with obvious dark spots and peppering, particularly behind the eyes.

The species within the *A. boskianus* (Daudin, 1802) species complex are separated from all other species within the genus *Acanthodactylus* Fitzinger, 1834 *sensu lato* by the following combination of characters:

Medium to large sized lizard species. Usually four entire supraoculars but, at times the first one is divided. Pectinate anterior border of ear opening, that is it has narrow projections or divisions set closely in a row. Keeled temporals. Slightly denticulated eyelids. Conspicuous gular fold. Three series of scales on the fingers. Ventrals arranged in 10 straight longitudinal rows. Very large, keeled, imbricate dorsals. Granular scalation on sides of the body. Moderate to intense patination of the fourth toe. Large, imbricate and sharply keeled scales on the upper surface of the tail.

Further diagnostic information for the species within the *A. boskianus* (Daudin, 1802) species complex is in Salvador (1982) at pages 23-37.

Lizards within the genus *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* are separated from all other lizards by the following combination of characters:

Occipital absent. Fingers with three or four series of scales. Flat ventrals. Collar present. Toes with more or less developed pectination. Femoral pores present. Parietal foramen present.

*Acanthodactylus brunneisplagas* sp. nov. is depicted in life online at:

<https://www.inaturalist.org/observations/150411884>

and

<https://www.inaturalist.org/observations/142924081>

and

<https://www.inaturalist.org/observations/187472656>

Tamar *et al.* (2016) found that *A. brunneisplagas* sp. nov. as defined herein diverged from the nearest related species, being *A. boskianus* (Daudin, 1802) and associated closely related species 4 MYA, confirming that it is in fact a hitherto unnamed species.

**Distribution:** *Acanthodactylus brunneisplagas* sp. nov. is a taxon found in the south of Jordan to the east of the Galilee Basin.

**Etymology:** The species name *A. brunneisplagas* sp. nov. comes from the Latin words "brunneis plagas", which means "brown stripes" and is a reflection of what is seen on the dorsum of most adult specimens of the species.

**ACANTHODACTYLUS ALBIDUS SP. NOV.**

**LSIDurn:lsid:zoobank.org:act:969661B6-0C3C-4A23-A649-F0432F821A6A**

**Holotype:** A preserved specimen at the Museo Civico di Storia Naturale, Carmagnola, Turin, Italy, specimen number MCCI-R1773(1) collected from Wadi Salit, Oman, Latitude 18.96674 N., Longitude 57.5677 E.

This facility allows access to its holdings.

**Diagnosis:** *Acanthodactylus albidus* sp. nov. is a taxon in the east of Oman in the region of the type locality in an elevated area surrounded by sand dunes, south, north and west and the Arabian Sea to the east.

I do not recognise the recently proposed name "The Gulf of Wolfgang Wüster" for that body of water on the grounds the name change (backed by a global boycott of the name "Arabian Sea" engineered by one Peter Uetz) would be an act of nomenclatural vandalism, even though it is explicitly supported by Adam Britton, Wolfgang Wüster and others in their gang (see also Wüster *et al.* 2021).

*Acanthodactylus albidus* sp. nov. is a part of the *A. boskianus* (Daudin, 1802) species group.

It has until now been treated as that taxon or an associated putative subspecies.

*A. albidus* sp. nov. is separated from all other species in the group by the following unique combination of characters:

A lack of subocular contact with the lip, an entire first supraocular, the large but relatively few (23-38) dorsal scales and a colouration in adult males that is whitish as compared to all other species, with the exception of the closely related and similarly lightly coloured *A. squamaedorsalesparvae* sp. nov. of Yemen.

In *A. albidus* sp. nov. the white of the venter extends up to include almost the entire flank on each side of the body and this is effectively immaculate in that there are no blotches or markings.

From the back of the eye and along the dorsolateral edge is a fairly bold orange line formed by a series of closely spaced spots, extending to the hind leg and running along the top of it.

Top of tail is light yellow and rest is whitish.

The dorsum is whitish and with numerous orange spots, giving it an overall light orange colour.

Upper labials are immaculate ivory white. Top of head near snout is orange, between eyes is yellow to beige and back of head is also orange.

Upper surfaces of forelimbs are light orange above and white below. Upper surfaces of hind limbs are the same, except for a series of dark spots along the upper edge of the proximal part of the limb.

There are 19-26 dorsal scales, this being in line with most or all other species in the *A. boskianus* (Daudin, 1802) species group, except for *A. squamaedorsalesparvae* sp. nov. of Yemen which has 27 to 36 dorsal scales, these being of much smaller average size and readily separating *A. squamaedorsalesparvae* sp. nov. from *A. albidus* sp. nov..

The species within the *A. boskianus* (Daudin, 1802) species complex are separated from all other species within the genus *Acanthodactylus* Fitzinger, 1834 *sensu lato* by the following combination of characters:

Medium to large sized lizard species. Usually four entire supraoculars but, at times the first one is divided. Pectinate anterior border of ear opening, that is it has narrow projections or divisions set closely in a row. Keeled temporals. Slightly

denticulated eyelids. Conspicuous gular fold. Three series of scales on the fingers. Ventrals arranged in 10 straight longitudinal rows. Very large, keeled, imbricate dorsals. Granular scalation on sides of the body. Moderate to intense patination of the fourth toe. Large, imbricate and sharply keeled scales on the upper surface of the tail.

Further diagnostic information for the species within the *A. boskianus* (Daudin, 1802) species complex is in Salvador (1982) at pages 23-37.

Lizards within the genus *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* are separated from all other lizards by the following combination of characters:

Occipital absent. Fingers with three or four series of scales. Flat ventrals. Collar present. Toes with more or less developed pectination. Femoral pores present. Parietal foramen present.

*Acanthodactylus albidus* sp. nov. is depicted in life online at: <https://www.inaturalist.org/observations/284028385>

Tamar *et al.* (2016) found that *A. albidus* sp. nov. as defined herein diverged from the nearest related species, being *A. squamaedorsalesparvae* sp. nov. 2.4 MYA, confirming that it is in fact a hitherto unnamed species.

**Distribution:** *Acanthodactylus albidus* sp. nov. is a taxon in the east of Oman in the region of the type locality, Wadi Salit, Oman, Latitude 18.96674 N., Longitude 57.5677 E. being in an elevated area surrounded by sand dunes, south, north and west and the ocean to the east, these forming effective barriers to the dispersal of the species.

**Etymology:** The species name *A. albidus* sp. nov. comes from the Latin word “*albidus*”, which means “whitish in colour” and is a reflection of what is seen on the dorsum and flanks of most adult specimens of the species.

#### **ACANTHODACTYLUS SQUAMAEDORSALESPARVAE SP. NOV.**

**LSIDurn:lsid:zoobank.org:act:45751F72-F2AC-45E5-ACE5-78851A426C09**

**Holotype:** A preserved specimen at the Museo Civico di Storia Naturale, Carmagnola, Turin, Italy, specimen number MCCI-R823(3) collected from the Sa'yun Oasis, Yemen, Latitude 15.983100 N., Longitude 48.831500 E.

This facility allows access to its holdings.

**Paratype:** A preserved specimen at the Museo Civico di Storia Naturale, Carmagnola, Turin, Italy, specimen number MCCI-R824 collected from the dunes west of Shibam, Yemen, Latitude 15.9213 N., Longitude 48.6364 E.

**Diagnosis:** *Acanthodactylus squamaedorsalesparvae* sp. nov. is a taxon from the elevated parts of central Yemen surrounded by sand dunes north and east, the Gulf of Aden to the south and higher altitude hills to the west.

It is a part of the *A. boskianus* (Daudin, 1802) species group.

It has until now been treated as that taxon or an associated putative subspecies.

*A. squamaedorsalesparvae* sp. nov. and the morphologically similar *A. albidus* sp. nov. are separated from all other species in the group by the following unique combination of characters:

A lack of subocular contact with the lip, an entire first supraocular, the large but relatively few (23-38) dorsal scales and a colouration in adult males that is whitish as compared to all other species.

In *A. albidus* sp. nov. and *A. squamaedorsalesparvae* sp. nov. the white of the venter extends up to include almost the entire flank on each side of the body and this is effectively immaculate in that there are no blotches or markings.

From the back of the eye and along the dorsolateral edge is a fairly bold orange line formed by a series of closely spaced spots, extending to the hind leg and running along the top of it.

Top of tail is light yellow and rest is whitish.

The dorsum is whitish and with numerous orange spots, giving it

an overall light orange colour.

Upper labials are immaculate ivory white. Top of head near snout is orange, between eyes is yellow to beige and back of head is also orange.

Upper surfaces of forelimbs are light orange above and white below. Upper surfaces of hind limbs are the same, except for a series of dark spots along the upper edge of the proximal part of the limb.

In *A. albidus* sp. nov. there are 19-26 dorsal scales, this being in line with most or all other species in the *A. boskianus* (Daudin, 1802) species group, except for *A. squamaedorsalesparvae* sp. nov. of central Yemen which has 27 to 36 dorsal scales, these being of much smaller average size and readily separating *A. squamaedorsalesparvae* sp. nov. from *A. albidus* sp. nov. and the other species within the *A. boskianus* (Daudin, 1802) species group.

*A. squamaedorsalesparvae* sp. nov. is further separated from *A. albidus* sp. nov. in that the upper surfaces of the distal parts of the tail are a light dull yellow colour, versus white in *A. albidus* sp. nov..

The species within the *A. boskianus* (Daudin, 1802) species complex are separated from all other species within the genus *Acanthodactylus* Fitzinger, 1834 *sensu lato* by the following combination of characters:

Medium to large sized lizard species. Usually four entire supraoculars but, at times the first one is divided. Pectinate anterior border of ear opening, that is it has narrow projections or divisions set closely in a row. Keeled temporals. Slightly denticulated eyelids. Conspicuous gular fold. Three series of scales on the fingers. Ventrals arranged in 10 straight longitudinal rows. Very large, keeled, imbricate dorsals. Granular scalation on sides of the body. Moderate to intense patination of the fourth toe. Large, imbricate and sharply keeled scales on the upper surface of the tail.

Further diagnostic information for the species within the *A. boskianus* (Daudin, 1802) species complex is in Salvador (1982) at pages 23-37.

Lizards within the genus *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* are separated from all other lizards by the following combination of characters:

Occipital absent. Fingers with three or four series of scales. Flat ventrals. Collar present. Toes with more or less developed pectination. Femoral pores present. Parietal foramen present. Tamar *et al.* (2016) found that *A. squamaedorsalesparvae* sp. nov. as defined herein diverged from the nearest related species, being *A. albidus* sp. nov. 2.4 MYA, confirming that it is in fact a hitherto unnamed species.

**Distribution:** *Acanthodactylus squamaedorsalesparvae* sp. nov. is a taxon from the elevated parts of central Yemen surrounded by sand dunes north and east, the Gulf of Aden to the south and higher altitude hills to the west.

**Etymology:** The Latin words “*squamae dorsales parvae*” means “small dorsal scales”, in reference to the smaller sized dorsal scales seen in this taxon as opposed to other closely related species.

#### **ACANTHODACTYLUS OBSCURASMACULAS SP. NOV.**

**LSIDurn:lsid:zoobank.org:act:AF676453-78F4-43DC-AF75-81DDC7DD9ABA**

**Holotype:** A preserved specimen at the Steinhardt Museum of Natural History, Tel Aviv, Israel, specimen number SMNHTAU-R.8102 collected from the Arava Valley, Israel, Latitude 30.11 N., Longitude 35.16 E.

This facility allows access to its holdings.

**Paratypes:** 1/ A preserved specimen at the Florida Museum of Natural History, University of Florida in Gainesville, Florida, USA, specimen number UF Herp 13944 collected from Ein Yahav, Israel, Latitude 30.37 N., Longitude 35.12 E.

2/ A preserved specimen at the Museum of Comparative

Zoology, Harvard University, Cambridge, Massachusetts, USA, specimen number MCZ Herp R-96830 collected from Wadi Nizona (Nitzana), Israel, Latitude 30.8860 N., Longitude 34.4226 E.

3/ A preserved specimen at the Steinhardt Museum of Natural History, Tel Aviv, Israel, specimen number SMNH-TAU-R.11950 collected from the northern Negev region, Israel, Latitude 31.08 N., Longitude 34.96 E.

4/ A preserved specimen at the Steinhardt Museum of Natural History, Tel Aviv, Israel, specimen number SMNH-TAU-R.1762 collected from the southern Negev region, Israel, Latitude 30.09 N., Longitude 34.85 E.

**Diagnosis:** *Acanthodactylus obscurasmaculas* sp. nov. is a taxon found in the south of Israel to the west of the Galilee Basin. It is a part of the *A. boskianus* (Daudin, 1802) species group. It has until now been treated as that taxon or an associated putative subspecies.

*A. obscurasmaculas* sp. nov. is separated from all other species in the group by the following unique combination of characters:

A lack of subocular contact with the lip, an entire first supraocular, the large but relatively few (23-38) dorsal scales and a colouration in adult males consisting of five usually thin and indistinct white or grey stripes running down the back, with significantly numerous small and distinct brown or blackish spots or blotches running along the orangish interspaces.

This includes on the flank and even the yellowish coloured lower flank of the body.

Tail is light orange above and light yellow on the sides. On both top and sides of the tail is a series of smallish and closely spaced blackish brown spots of irregular shape, running all or most of the length of the tail.

Upper surfaces of the forelimbs are light orange in colour (no spots of markings).

The upper surfaces of the hindlimbs are light orange and with numerous dark brownish-black spots, these being mainly on the upper and rear lateral surfaces. Toes are unmarked.

Top of head is dull orange-brown and with numerous scattered dark spots, both anterior to and posterior to the eyes. Labials are usually but not always white, but with a slight orangish tinge at the etchings. Some specimens have greyish labials with lighter edges.

The species within the *A. boskianus* (Daudin, 1802) species complex are separated from all other species within the genus *Acanthodactylus* Fitzinger, 1834 *sensu lato* by the following combination of characters:

Medium to large sized lizard species. Usually four entire supraoculars but, at times the first one is divided. Pectinate anterior border of ear opening, that is it has narrow projections or divisions set closely in a row. Keeled temporals. Slightly denticulated eyelids. Conspicuous gular fold. Three series of scales on the fingers. Ventrals arranged in 10 straight longitudinal rows. Very large, keeled, imbricate dorsals. Granular scalation on sides of the body. Moderate to intense patination of the fourth toe. Large, imbricate and sharply keeled scales on the upper surface of the tail.

Further diagnostic information for the species within the *A. boskianus* (Daudin, 1802) species complex is in Salvador (1982) at pages 23-37.

Lizards within the genus *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* are separated from all other lizards by the following combination of characters:

Occipital absent. Fingers with three or four series of scales. Flat ventrals. Collar present. Toes with more or less developed pectination. Femoral pores present. Parietal foramen present.

*Acanthodactylus obscurasmaculas* sp. nov. is depicted in life online at:

<https://www.inaturalist.org/observations/231572592> and

<https://www.inaturalist.org/observations/106320493> and

<https://www.inaturalist.org/observations/150523952> and

<https://www.inaturalist.org/observations/70600799> and

<https://www.inaturalist.org/observations/29655132>

Tamar *et al.* (2016) found that *A. obscurasmaculas* sp. nov. as defined herein diverged from the nearest related species, being *A. boskianus* (Daudin, 1802) and associated closely related species 2.6 MYA, confirming that it is in fact a hitherto unnamed species.

**Distribution:** *Acanthodactylus obscurasmaculas* sp. nov. is a taxon found in the south of Israel to the west of the Galilee Basin.

**Etymology:** The species name *A. obscurasmaculas* sp. nov. comes from the Latin words "obscuras maculas", which means "dark spots" and is a reflection of what is seen on the dorsum of most adult specimens of the species.

**PSEUDOACANTHODACTYLUS SUBGEN. NOV.**

LSIDurn:lsid:zoobank.org:act:F6E987AB-1C5C-45D7-A81A-84E2845A0411

**Type species:** *Acanthodactylus* (*Pseudoacanthodactylus*) *caeruleacauda* sp. nov. (this paper).

**Diagnosis:** The species within the subgenus *Pseudoacanthodactylus* subgen. nov. are readily separated from all other species within the genus *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* by the following combination of characters: Relatively small species of moderate build with a fairly pointed snout, supraocular scales often intact (although first and fourth may be broken into a number of sections), subocular nearly always separated from lip, usually four but occasionally five upper labial scales anterior to subocular. Dorsal scales coarse, keeled and imbricate posteriorly, 25-38 at mid-body, 8-12 between hind legs, flank scales smaller than middorsals; ventral scales arranged in straight lines, a maximum of 10 or 12 across belly; usually three rows of scales on fingers but indications of an irregular fourth row occasionally present and subdigital lamellae with one or more keels; pectination on toes moderate. Juveniles with a usually simple mid-dorsal stripe formed from the occipital bands, two or three pairs of lateral stripes and a red-pigmented tail; adults often retain mid-dorsal stripe but other stripes may become broken up or replaced by dappling. Premaxilla not abruptly narrowed, typically 24 or 25 presacral vertebrae in males and 25 in females, fifth sternal rib usually intact. Hemipenis with a single lobe, medial section of armature absent or reduced to a thread, lateral clavula flat but edges folded upwards.

Differs from sympatric species in the nominate subgenus *Acanthodactylus* with which they are often confused, in smaller adult size, single-lobed hemipenis lacking medial section of armature, shorter head, usually simple mid-dorsal stripe, range of adult patterns and a usually higher number of dorsal scales at mid-body (modified from Arnold 1980).

Lizards within the genus *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* are separated from all other lizards by the following combination of characters:

Occipital absent. Fingers with three or four series of scales. Flat ventrals. Collar present. Toes with more or less developed pectination. Femoral pores present. Parietal foramen present.

Tamar *et al.* (2016) found that the species within the subgenus *Pseudoacanthodactylus* subgen. nov. diverged from those in the nominate subgenus 9.9 MYA, confirming genus-level division is warranted.

I have taken the conservative position and recognised the relevant assemblage as a subgenus only.

**Distribution:** Saudi Arabia, Oman, Yemen, Israel, Syria, Jordan and Iraq. The centre of distribution is clearly the Arabian

Peninsula.

**Content:** *Acanthodactylus* (*Pseudoacanthodactylus*) *caeruleacauda* sp. nov. (this paper) (type species); *A. (Pseudoacanthodactylus) felcis* Arnold, 1980; *A. (Pseudoacanthodactylus) maxinehoserae* sp. nov.; *A. (Pseudoacanthodactylus) opheodurus* Arnold, 1980.

**ACANTHODACTYLUS (PSEUDOACANTHODACTYLUS) CAERULEACAUDA SP. NOV.**

**LSIDurn:**lsid:zoobank.org:act:E74092A9-F085-403A-AC6F-C4617C834542

**Holotype:** A preserved specimen at the Museum of Natural History, London, UK, Herpetology Collection specimen number BMNH 1977.1148 collected from Wadi Anshayr, east of Mirbat, Oman, Latitude 17.00 N., Longitude 54.45 E.

This facility allows access to its holdings.

**Paratypes:** 1/ Two preserved specimens at the Museum of Natural History, London, UK, Herpetology Collection specimen numbers BMNH 1977.1149 and BMNH 1977.1150 both collected from Wadi Anshayr, east of Mirbat, Oman, Latitude 17.00 N., Longitude 54.45 E., 2/ A preserved specimen at the California Academy of Sciences, San Francisco, California, USA, specimen number CAS HERP 227582 collected from 1.8 km N (by Salalah Rd) of Mirabat, Dhofar, Oman, Latitude 17.00336 N., Longitude 54.42102 E., 3/ Two preserved specimens at the California Academy of Sciences, San Francisco, California, USA, specimen numbers CAS HERP 227595 and CAS HERP 227596, both collected from 23 km west by road of Agdorat, 132 km west by road of Salalah, Dhofar, Oman, Latitude 16.5065 N., Longitude 53.2285 E. at 1095 metres ASL.

**Diagnosis:** Until now, *Acanthodactylus caeruleacauda* sp. nov. has been treated as an eastern population of *A. felcis* Arnold, 1980, with a type locality of 'Hadhramaut', Republic of South Yemen (collected on T. Bent's 1893-4 expedition to Hadhramaut, this specimen may have been taken in Wadi Hadhramaut itself between Havnim and Shibam or on the way back to the coast at Shihir): B MNH 97.3.11.65 (J. Anderson) (copied from Arnold, 1980).

*A. caeruleacauda* sp. nov. appears to be confined to south-west Oman near the coast, where it is locally abundant in areas of suitable habitat, this being areas of hard soils, but not sandy areas.

*A. caeruleacauda* sp. nov. is readily separated from *A. felcis* by the following characters: Young specimens have a bold pattern of dark longitudinal stripes. The one on the mid-line is narrow and appears to be derived from the occipital bands and bifurcates anteriorly; there are also three pairs of lateral stripes (parietal, temporal and maxillary), the first two being broad. This pattern is either faded, weak or absent in young *A. felcis*.

In adults, there is minimal keeling in the dorsal scales, versus strong in *A. felcis*.

*A. caeruleacauda* sp. nov. and *A. felcis* are separated from all other species of *Acanthodactylus* Fitzinger, 1834 *sensu lato* by the following unique combination of characters: Relatively small species of *Acanthodactylus* (up to 62 mm from snout to vent) of moderate build with a fairly pointed snout, supraocular scales often intact (although first and fourth may be broken into two or more sections), subocular separated from lip, four upper labial scales anterior to the subocular. Dorsal scales coarse, keeled and imbricate posteriorly, 33-42 at mid-body, 9-12 between hind legs, flank scales smaller than mid-dorsals; ventral scales arranged in straight lines, usually a maximum of eight across belly (rarely 10); three rows of scales on fingers, their subdigital lamellae unicate; pectination on toes moderate. Juveniles with a mid-dorsal stripe formed from the occipital bands which bifurcates anteriorly, usually three pairs of lateral stripes and a blue tail; adults may retain this basic pattern or it may become broken up.

Premaxilla not abruptly narrowed, typically 24 presacral vertebrae in males and 25 in females, fifth

sternal rib usually intact. Hemipenis with a single lobe, medial section of armature absent or reduced to a thread, lateral clavula flat but edges folded upwards.

Both *A. caeruleacauda* sp. nov. and *A. felcis* are separated from all other species within the subgenus *Pseudoacanthodactylus* gen. nov. by having a usually lower transverse ventral scale count, bifurcating middorsal stripe and blue tail in young and sub-adults; also mid-body dorsal scale count tends to be higher, scales on tibia smaller and mid-dorsal scales on tail base arc are not clearly expanded.

Both *A. caeruleacauda* sp. nov. and *A. felcis* are separated from the sympatric *A. boskianus* (and most associated species), with which it is often confused, in smaller adult size, single-lobed hemipenis lacking medial section of armature, shorter head, usually simple mid-dorsal stripe, range of adult patterns and usually a higher number of dorsal scales at mid-body.

Lizards within the genus *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* are separated from all other lizards by the following combination of characters:

Occipital absent. Fingers with three or four series of scales.

Flat ventrals. Collar present. Toes with more or less developed

pectination. Femoral pores present. Parietal foramen present.

*Acanthodactylus caeruleacauda* sp. nov. is depicted in life online at:

<https://www.inaturalist.org/observations/126863329>

and

<https://www.inaturalist.org/observations/144593580>

and

<https://www.inaturalist.org/observations/10124903>

and

<https://www.inaturalist.org/observations/9920103>

**Distribution:** *A. caeruleacauda* sp. nov. appears to be confined to south-west Oman near the coast, where it is locally abundant in areas of suitable habitat, this being areas of hard soils, not sandy areas.

**Etymology:** *A. caeruleacauda* sp. nov. has its name taken from the Latin words "caerulea cauda", which means blue tail, which is a distinguishing diagnostic feature of young specimens of this taxon and the closely related *A. felcis* Arnold, 1980.

**ACANTHODACTYLUS (PSEUDOACANTHODACTYLUS) MAXINEHOSERA SP. NOV.**

**LSIDurn:**lsid:zoobank.org:act:6A258991-3694-4B95-A5B3-C4AECB26EE3C

**Holotype:** A preserved specimen at the Zoological Museum, Hebrew University of Jerusalem, Israel, specimen number HJ. R19189 collected from Timna valley, Arava Desert (30 km north of Eilat), Israel, Latitude 29.4716 N., Longitude 34.5920 E.

This facility allows access to its holdings.

**Paratype:** A preserved specimen at the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA, specimen number MCZ Herp R-67596 collected from the Negev Desert, Israel.

**Diagnosis:** Until now, *Acanthodactylus maxinehoserae* sp. nov. has been treated as a western population of *A. opheodurus* Arnold, 1980, with a type locality of Jazir Coast, Oman, Latitude 18.40 N., Longitude 16.40 E., (BMNH 1969.314 collected 16 Feb 1968 by G. Popov) (copied from Arnold, 1980).

*A. maxinehoserae* sp. nov. is a taxon apparently confined to the arid hard soiled areas of the Galilee basin and slightly west, whereas *A. opheodurus* occupies the regions east of the sand dunes east of this area, this including most of the Arabian Peninsula and nearby Iraq.

*A. maxinehoserae* sp. nov. is separated from *A. opheodurus* by the fact that the orange spots on the brown of the back are well-defined, versus not so in *A. opheodurus*, the lower flank has a series of white spots over brown, versus a near continuous zone of white, bounded by brown in *A. opheodurus* and the white on

the upper surfaces of the hind limbs forms into spots rather than stripes, the latter being the case in *A. opheodurus*.

Both *A. maxinehoserae* sp. nov. and *A. opheodurus* are separated from all other species within *Acanthodactylus* Fitzinger, 1834 *sensu lato* by the following unique combination of characters:

A relatively small species of moderate build with a fairly pointed snout, supraocular scales often intact (although first and fourth may be broken into a number of sections), subocular nearly always separated from lip, usually four but occasionally five upper labial scales anterior to subocular. Dorsal scales coarse, keeled and imbricate posteriorly, 25-38 at mid-body, 8-12 between hind legs, flank scales smaller than middorsals; ventral scales arranged in straight lines, a maximum of 10 or 12 across belly; usually three rows of scales on fingers but indications of an irregular fourth row occasionally present and subdigital lamellae with one or more keels; pectination on toes moderate. Juveniles with a usually simple mid-dorsal stripe formed from the occipital bands, two or three pairs of lateral stripes and a red pigmented tail; adults often retain mid-dorsal stripe but other stripes may become broken up or replaced by dappling. Premaxilla not abruptly narrowed, typically 24 or 25 presacral vertebrae in males and 25 in females, fifth sternal rib usually intact. Hemipenis with a single lobe, medial section of armature absent or reduced to a thread, lateral clavula flat but edges folded upwards.

Both *A. maxinehoserae* sp. nov. and *A. opheodurus* are separated from the sympatric *A. boskianus* (and most associated species), with which it is often confused, in smaller adult size, single-lobed

hemipenis lacking medial section of armature, shorter bead, usually simple mid-dorsal stripe, range of adult patterns and usually higher number of dorsal scales at mid-body.

Both *A. maxinehoserae* sp. nov. and *A. opheodurus* are separated from all other species within the subgenus *Pseudoacanthodactylus* subgen. nov. by a usually higher transverse ventral scale count, without a bifurcating middorsal stripe and no blue tail in young and sub-adults; also mid-body dorsal scale counts tend to be lower, scales on tibia larger and mid-dorsal scales on the tail base arc are clearly expanded.

*Acanthodactylus maxinehoserae* sp. nov. is depicted in life online at:

<https://www.inaturalist.org/observations/236967680>

and

<https://www.inaturalist.org/observations/196224387>

and

<https://www.inaturalist.org/observations/180875885>

*A. opheodurus* is depicted in life online at:

<https://www.inaturalist.org/observations/58394377>

and

<https://www.inaturalist.org/observations/98564459>

and

<https://www.inaturalist.org/observations/255049700>

Tamar *et al.* (2016) found that *A. maxinehoserae* sp. nov. as defined herein diverged from the nearest related species, being *A. opheodurus* Arnold, 1980 1.9 or 2.4 MYA, confirming that it is in fact a hitherto unnamed species.

**Distribution:** *A. maxinehoserae* sp. nov. is a taxon apparently confined to the arid hard soiled areas of the Galilee basin and slightly west, whereas *A. opheodurus* occupies the regions east of the sand dunes east of this area, this including most of the Arabian Peninsula and nearby Iraq.

**Etymology:** The species *A. maxinehoserae* sp. nov. is named in honour of my cousin, Maxine Hoser, of Israel, (formerly Margate, UK) in recognition of her services to herpetology.

#### **SALAMSAHALIA GEN. NOV.**

**LSIDurn:lsid:zoobank.org:act:1D730FCD-178A-4FF2-A3B3-27B48A1FD5DE**

**Type species:** *Salamsahalia jvid* sp. nov. (this paper).

**Diagnosis:** The species within this genus, include some but not all members of the so-called "*Acanthodactylus cantoris* group" as defined by Salvador (1982).

Species within *Salamsahalia* gen. nov. are separated from all other species within *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* by the following unique combination of characters:

A swollen snout, the subocular separated from the lip, four supraoculars, four series of scales on the fingers, pectinate ear opening, eyelids and toes, 8-10 non-autotomic vertebrae in males and 7-10 non-autotomic vertebrae in females, and one or other of the following suites of characters:

1/ Four rows of scales on the fingers, temporal scales keeled, subocular wedged among 4th, 5th and 6th supralabials, ventrals arranged in oblique longitudinal series, dorsal scales relatively large, scales on sides of the dorsum are equal to those on central dorsum, scales on the upperside of the tail are large and strongly keeled, ear opening with scarce pectination (*Salamsahalia jvid* sp. nov., *S. arabicus* (Boulenger, 1919)) or, 2/ Four rows of scales on the fingers, temporal scales keeled, subocular wedged among 4th, 5th and 6th supralabials, ventrals arranged in straight longitudinal series, first supraocular divided, (*S. haasi* (Leviton and Anderson, 1967)).

Lizards within the genus *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* are separated from all other lizards by the following combination of characters:

Occipital absent. Fingers with three or four series of scales. Flat ventrals. Collar present. Toes with more or less developed pectination. Femoral pores present. Parietal foramen present. Tamar *et al.* (2016) found that the species within *Salamsahalia* gen. nov. as defined herein diverged from the nearest related species, being those within the genus *Oleumagrilacerta* gen. nov. (type species *Oleumagrilacerta hashemiteorum* sp. nov. as defined herein 10.8 MYA confirming that it is in fact best treated as a hitherto unnamed genus.

**Distribution:** Saudi Arabia, Oman, Yemen, United Arab Emirates.

**Etymology:** The word "salam" means peace in Arabic and the word "sahalia" means lizard in Arabic, giving the genus name a direct translation as "peace lizard".

**Content:** *Salamsahalia jvid* sp. nov. (type species) (this paper); *S. arabicus* (Boulenger, 1919); *S. haasi* (Leviton and Anderson, 1967).

#### **SALAMSAHALIA JVID SP. NOV.**

**LSIDurn:lsid:zoobank.org:act:70826C39-EDB3-430C-BE0A-C468237B7E69**

**Holotype:** A preserved specimen at the Museo Civico di Storia Naturale, Carmagnola, Turin, Italy, specimen number MCCI-R819 collected from Bir Ali, Yemen, Latitude 14.0247 N., Longitude 48.3452 E.

This facility allows access to its holdings.

**Diagnosis:** Until now *Salamsahalia jvid* sp. nov. has been treated as an eastern population of "*Acanthodactylus arabicus* Boulenger, 1919", also herein placed in the new genus *Salamsahalia* gen. nov..

*Salamsahalia jvid* sp. nov. is readily separated from *S. arabicus* (type locality of Aden, south Yemen) by being a lizard with brown and red stripes on the dorsum, versus black and yellow in *S. arabicus*; having a tail that is yellow on top with a thick well-defined brown stripe down each side, no dark stripe running down the top of the tail and yellow distally, versus a dark stripe running down the anterior of the tail, otherwise yellow, with a poorly defined dark stripe down either side of the tail and the distal half uniformly green in colour in *S. arabicus*; upper

surfaces of limbs are a combination of brown and dull orange, versus a well-defined combination of black and yellow in *S. arabicus*; top of head with dark peppering versus top of head with large even, well-defined dark markings in *S. arabicus*.

*Salamsahalia jvid sp. nov.* and *S. arabicus* (Boulenger, 1919) are separated from all other species within *Acanthodactylus* Fitzinger, 1834 *sensu lato* by the following unique combination of characters:

A swollen snout, the subocular separated from the lip, four supraoculars, four series of scales on the fingers, pectinate ear opening, eyelids and toes, 8-10 non-autotomic vertebrae in males and 7-10 non-autotomic vertebrae in females; four rows of scales on the fingers, temporal scales keeled, subocular wedged among 4th, 5th and 6th supralabials, ventrals arranged in oblique longitudinal series, dorsal scales relatively large, scales on sides of the dorsum are equal to those on central dorsum, scales on the upperside of the tail are large and strongly keeled, ear opening with scarce pectination.

The other species in the genus *Salamsahalia gen. nov.* is *S. haasi* (Leviton and Anderson, 1967) and it is separated from all other species within *Acanthodactylus* Fitzinger, 1834 *sensu lato* by the following unique combination of characters:

A swollen snout, the subocular separated from the lip, four supraoculars, four series of scales on the fingers, pectinate ear opening, eyelids and toes, 8-10 non-autotomic vertebrae in males and 7-10 non-autotomic vertebrae in females; four rows of scales on the fingers, temporal scales keeled, subocular wedged among 4th, 5th and 6th supralabials, ventrals arranged in straight longitudinal series, first supraocular divided.

*Salamsahalia jvid sp. nov.* is depicted in life online at: <https://www.inaturalist.org/observations/1213507>

*Salamsahalia arabicus* is depicted in life online at: <https://www.inaturalist.org/observations/1213512>

Tamar *et al.* (2016) found that *Salamsahalia jvid sp. nov.* as defined herein diverged from the nearest related species, being *S. arabicus* as defined herein 4.3 MYA, confirming that it is in fact a hitherto unnamed species.

**Distribution:** *Salamsahalia jvid sp. nov.* is only known from the region of the type locality Bir Ali, Yemen, near the Gulf of Aden. *S. arabicus* is found in the vicinity of Aden (to the west) and north-west of there in Yemen.

**Etymology:** The word "jvid" is Arabic for "good". When tied in with the genus etymology, the full name for the taxon says "peace lizard is good" being a relevant comment in this war-torn part of the world.

#### OLEUMAGRILACERTA GEN. NOV.

**LSIDurn:lsid:zoobank.org:act:569B10CD-03B9-4F63-9A7D-5DC632DA8057**

**Type species:** *Oleumagrilacerta hashemiteorum sp. nov.* (this paper).

**Diagnosis:** The species within this genus, include some but not all members of the so-called "*Acanthodactylus cantor* group" as defined by Salvador (1982).

Species within *Oleumagrilacerta gen. nov.* are separated from all other species within *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* by the following unique combination of characters:

Four rows of scales on the fingers; temporal scales keeled; subocular wedged among 4th and 5th supralabials; ventrals arranged in 12 straight longitudinal series.

In this genus (*Oleumagrilacerta gen. nov.*) males and females have 10 non-autotomic vertebrae, versus 8 or less in all other members of the so-called "cantoris" group of species as defined by Salvador (1982).

Lizards within the genus *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* are separated from all other lizards by the following combination of characters:

Occipital absent. Fingers with three or four series of scales.

Flat ventrals. Collar present. Toes with more or less developed pectination. Femoral pores present. Parietal foramen present. Tamar *et al.* (2016) found that the species within *Salamsahalia gen. nov.* as defined within this paper diverged from the nearest related species, being those within the genus *Oleumagrilacerta gen. nov.* (type species *Oleumagrilacerta hashemiteorum sp. nov.*) as defined herein 10.8 MYA and are both more divergent from all other taxa, confirming that they are in fact best treated as a hitherto unnamed genera.

**Distribution:** Saudi Arabia, United Arab Emirates, Jordan.

**Etymology:** The words "Oleu magri lacerta" means "oil field lizard" in Arabic, which reflects the general region two of three species occur and what they are.

The genus name is a noun in apposition.

**Content:** *Oleumagrilacerta hashemiteorum sp. nov.* (type species) (this paper); *O. gongrorhynchatus* (Leviton and Anderson, 1967); *O. tilburyi* (Arnold, 1986).

#### OLEUMAGRILACERTA HASHEMITEORUM SP. NOV.

**LSIDurn:lsid:zoobank.org:act:01D5F454-A85B-496E-9D06-0B6C6888FDBE**

**Holotype:** A preserved specimen at the National Museum (Natural History), Prague, Czech Republic, specimen number NMP6V70599 collected from Al Muddawara, Jordan, Latitude 29.3319 N., Longitude 36.0240 E.

This facility allows access to its holdings.

**Paratypes:** 1/ A preserved specimen at the National Museum (Natural History), Prague, Czech Republic, specimen number NMP6V70868 collected from Al Muddawara, Jordan, Latitude 29.3319 N., Longitude 36.0240 E., 2/ A preserved specimen at the Natural History Museum (London), United Kingdom, specimen number NHMUK ZOO 1998.201-202 collected from Al Muddawara, Jordan, Latitude 29.3319 N., Longitude 36.0240 E.

**Diagnosis:** *Oleumagrilacerta hashemiteorum sp. nov.* has until now been treated as a western population of "*Acanthodactylus tilburyi*" Arnold, 1986, with holotype BMNH 1985.1273 collected at Nafud as Sirr, Saudi Arabia, Latitude 26.11 N., Longitude 44.19 E, now placed in the genus *Oleumagrilacerta* as defined in this paper.

*O. hashemiteorum sp. nov.* is readily separated from the morphologically similar species *O. tilburyi* by having a dorsum that is reddish in colour, versus yellow brown in *O. tilburyi*; a more-or-less unicoloured upper surface of the head, versus one with contrasting colours in *O. tilburyi* and whitish upper surfaces of the feet, versus yellowish in *O. tilburyi*.

The two species *O. hashemiteorum sp. nov.* and *O. tilburyi* are separated from all other species within *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* by the following unique combination of characters:

A relatively small and slender species with a fairly pointed snout, supraocular scales more or less intact, subocular separated from lip, five upper labial scales anterior to centre of eye, ear opening not restricted dorsally. Dorsal scales keeled and somewhat imbricate, 41-57 at mid-body, 18-24 between hind legs; ventral scales tessellated, 15-19 in longest row across belly; four rows of scales on fingers and subdigital lamellae with a single well developed keel but indications of others towards tips of fingers; pectination on digits strong. dorsum dappled with spots of irregular shapes that sometimes merge, a dark dorsolateral stripe present, usually with a paler one above and below it; adults less contrastingly coloured than juveniles; young animals and some females with a red pigmented tail. Premaxilla abruptly narrowed, with about seven teeth, usually 24 presacral vertebrae in males and 25 in females, fifth sternal rib usually intact. Hemipenis with a single lobe, medial section of armature absent, lateral clavula narrow with its edges folded upwards (modified from Arnold, 1986).

Species within *Oleumagrilacerta gen. nov.* are separated from all other species within *Acanthodactylus* Fitzinger in Wiegmann,

1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* by the following unique combination of characters:

Four rows of scales on the fingers; temporal scales keeled; subocular wedged among 4th and 5th supralabials; ventrals arranged in 12 straight longitudinal series.

Lizards within the genus *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* are separated from all other lizards by the following combination of characters:

Occipital absent. Fingers with three or four series of scales. Flat ventrals. Collar present. Toes with more or less developed pectination. Femoral pores present. Parietal foramen present.

Tamar *et al.* (2016) found that the species within *Salamsahalia gen. nov.* as defined within this paper diverged from the nearest related species, being those within the genus *Oleumagrilacerta gen. nov.* (type species *Oleumagrilacerta hashemiteorum sp. nov.*) as defined herein 10.8 MYA and are both more divergent from all other taxa, confirming that they are in fact best treated as a hitherto unnamed genera.

**Distribution:** *Oleumagrilacerta hashemiteorum sp. nov.* is only known from the type locality and adjacent north-west Saudi Arabia.

**Etymology:** The species *O. hashemiteorum sp. nov.* is named in recognition of the Hashemite family, believed to have a common ancestry with prophet Muhammad and founding ruling dynasties in countries of the eastern Mediterranean, in particular Jordan, which is from where this species occurs.

#### ALBAELACERTA GEN. NOV.

LSIDurn:lsid:zoobank.org:act:B8BC6D5F-69A3-4B1D-8180-49761CB2D250

**Type species:** *Albaelacerta nonukesplease sp. nov.* (this paper)

**Diagnosis:** Lizards in the genus *Albaelacerta gen. nov.* are readily separated from all other species within *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* by one or other of the following combinations of characters:

1/ Four rows of scales on the fingers; temporal scales keeled; subocular wedged among 4th, 5th and 6th supralabials; ventrals arranged in oblique longitudinal series; dorsal scales are relatively large; scales on sides of dorsum equal to those on central dorsum; scales on upper side of tail large and strongly keeled; ear opening with strong pectination; dorsal scales large (*Albaelacerta nonukesplease sp. nov.* and *A. cantor*is (Günther, 1864)), or:

2/ Four rows of scales on the fingers; temporal scales unkeeled; ventrals arranged in 10 straight longitudinal rows (*A. masirae* (Arnold, 1980)).

Lizards within the genus *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* are separated from all other lizards by the following combination of characters:

Occipital absent. Fingers with three or four series of scales. Flat ventrals. Collar present. Toes with more or less developed pectination. Femoral pores present. Parietal foramen present.

Tamar *et al.* (2016) found that the species within *Albaelacerta gen. nov.* as defined within this paper diverged from the nearest related species, being those within the genera *Oleumagrilacerta gen. nov.* (type species *Oleumagrilacerta hashemiteorum sp. nov.*) as defined herein (this paper) and *Salamsahalia gen. nov.* (type species *Salamsahalia jvid sp. nov.*) as defined within this paper 14.4 MYA confirming that it is best treated as a hitherto unnamed genus.

**Distribution:** West India, Pakistan, Afghanistan west to include states of the Persian Gulf.

**Etymology:** "albae lacerta" means white spotted lizard in Latin, which accurately describes the dorsum of most specimens.

**Content:** *Albaelacerta nonukesplease sp. nov.* (type species) (this paper); *A. cantor*is (Günther, 1864); *A. masirae* (Arnold, 1980).

#### ALBAELACERTA NONUKESPLEASE SP. NOV.

LSIDurn:lsid:zoobank.org:act:52E76B3F-A365-4201-A4F8-381FCD724948

**Holotype:** A preserved specimen at the Reptiles and Amphibians Collection, National Museum of Natural History, Smithsonian Institution, Washington, DC, USA, specimen number USNM 148673 collected from near Khash, Baluchistan, Iran, Latitude 28.2214 N., Longitude 61.2139 E.

This facility allows access to its holdings.

**Paratypes:** Two preserved specimens at the Reptiles and Amphibians Collection, National Museum of Natural History, Smithsonian Institution, Washington, DC, USA, specimen numbers USNM 148674 and USNM 148675 both collected from near Khash, Baluchistan, Iran, Latitude 28.2214 N., Longitude 61.2139 E.

**Diagnosis:** *Albaelacerta nonukesplease sp. nov.* has until now been treated as a population of *A. cantor*is (Günther, 1864), type locality being the Pakistani town of Rasool Nagar (formerly called Ramnagar), Latitude 32.33 N., Longitude 73.78 E., previously placed in the genus *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*). Both species and the closely related *A. masirae* (Arnold, 1980) of the Persian Gulf are all herein placed in the new genus *Albaelacerta gen. nov.*

*A. nonukesplease sp. nov.* specimens are separated from *A. cantor*is by having a dorsal colour pattern dominated by five thick and well-defined yellow stripes, versus one that is dominated by faded white lines and instead with prominent white spots in the orange-brown interspaces (in *A. cantor*is).

The white spots in the orange-brown interspaces are faded and indistinct in *A. nonukesplease sp. nov.*

Head of *A. nonukesplease sp. nov.* is blackish brown, versus light brown in *A. cantor*is. Upper surfaces of limbs in *A. nonukesplease sp. nov.* are blackish with prominent yellow circles on them, versus brownish with indistinct markings in *A. cantor*is. Distal end of tail is yellowish, versus whitish grey in *A. cantor*is.

Both *A. nonukesplease sp. nov.* and *A. cantor*is are separated from all other species within *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*) by the following unique combination of characters:

Four rows of scales on the fingers; temporal scales keeled; subocular wedged among 4th, 5th and 6th supralabials; ventrals arranged in oblique longitudinal series; dorsal scales are relatively large; scales on sides of dorsum equal to those on central dorsum; scales on upperside of tail large and strongly keeled; ear opening with strong pectination; dorsal scales large.

The other species in the genus *Albaelacerta gen. nov.*, namely *A. masirae* (Arnold, 1980) of the Persian Gulf is separated from all other species within *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*) by the following unique combination of characters:

Four rows of scales on the fingers; temporal scales unkeeled; ventrals arranged in 10 straight longitudinal rows.

Lizards within the genus *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* are separated from all other lizards by the following combination of characters:

Occipital absent. Fingers with three or four series of scales.

Flat ventrals. Collar present. Toes with more or less developed pectination. Femoral pores present. Parietal foramen present.

Tamar *et al.* (2016) found that the species within *Albaelacerta gen. nov.* as defined within this paper diverged from the nearest related species, being those within the genera *Oleumagrilacerta gen. nov.* (type species *Oleumagrilacerta hashemiteorum sp. nov.*) as defined herein and *Salamsahalia gen. nov.* (type species *Salamsahalia jvid sp. nov.*) as defined within this paper 14.4 MYA confirming that it is best treated as a hitherto unnamed genus.

**Distribution:** Eastern Iran, generally near the type locality and

towards the coast to the south.

**Etymology:** The species name for *A. nonukesplease sp. nov.* is a direct take of the words "no nukes please" with reference to a plea to the Jihadist Iranian government to stop their plans to build nuclear weapons to destroy Israel, before the Israeli and/or American government decides to stop the Iranians getting nuclear weapons by force.

The money spent by the Iranian government on creating nuclear weapons would be better spent improving the lives and welfare of both the Iranian human population and the wildlife within the nation's borders.

#### QUESTIONTHENARRATIVE GEN. NOV.

LSIDurn:lsid:zoobank.org:act:833125C2-584F-4035-97CB-9ABF46CDC870

**Type species:** *Questionthenarrative always sp. nov.* (this paper).

**Diagnosis:** Lizards in the genus *Questionthenarrative gen. nov.* are readily separated from all other species within *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* by the following combination of characters:

4 rows of scales on the fingers; temporal scales keeled; subocular wedged among 4th, 5th and 6th supralabials; ventrals arranged in oblique longitudinal series, and one or other of the following suites of characters:

A/ Scales on the sides of dorsum double the size of those on central dorsum (*Q. always sp. nov.*, *Q. constantly sp. nov.*, *Q. schmidt* (Haas 1957)), or,

B/ Scales on sides of dorsum equal to those on central dorsum; scales on upperside of tail large; ear opening with strong pectination; dorsal scales small (*Q. blanfordi* (Boulenger, 1919), *Q. asarule sp. nov.*, *Q. continuously sp. nov.*).

Lizards within the genus *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* are separated from all other lizards by the following combination of characters:

Occipital absent. Fingers with three or four series of scales. Flat ventrals. Collar present. Toes with more or less developed pectination. Femoral pores present. Parietal foramen present.

Tamar *et al.* (2016) found that the species within *Questionthenarrative gen. nov.* as defined within this paper diverged from the nearest related genus *Scienceneedsevidence gen. nov.* as defined within this paper 12.6 MYA confirming that it is best treated as a hitherto unnamed genus.

**Distribution:** South Iran, South Iraq, South Afghanistan, South-west Pakistan, Oman, United Arab Emirates, Saudi Arabia, Kuwait, Qatar, Jordan, probably Syria,

**Etymology:** The genus *Questionthenarrative gen. nov.* is named as a direct take of the English words "Question the narrative" as advice relevant to many things. This is including the politics in the region and also more relevantly the fake science and fake narratives widely peddled by the Wolfgang Wüster / Adam Britton gang of criminals, sex deviants and taxonomic vandals with respect to taxonomy, nomenclature and their own ethically repugnant activities (as outlined in Wüster *et al.* 2021).

**Content:** *Questionthenarrative always sp. nov.* (type species) (this paper); *Q. asarule sp. nov.* (this paper); *Q. blanfordi* (Boulenger, 1919); *Q. constantly sp. nov.* (this paper); *Q. continuously sp. nov.* (this paper); *Q. schmidt* (Haas 1957).

#### QUESTIONTHENARRATIVE ALWAYS SP. NOV.

LSIDurn:lsid:zoobank.org:act:4A0253BD-A61B-47D5-BB06-7C3F3E2FC2CB

**Holotype:** A preserved specimen at the Museum of Natural History, London, UK, Specimen number NHMUK ZOO 1976.1303 collected from Wadi Rum, Jordan, Latitude 29.5559 N., Longitude 35.4076 E.

This facility allows access to its holdings.

**Paratype:** A preserved specimen at the Museum of Natural History, London, UK, Specimen number A preserved specimen at

the Museum of Natural History, London, UK, Specimen number NHMUK ZOO 1976.1303 collected from Jordan.

**Diagnosis:** Until now the two species *Questionthenarrative always sp. nov.* and *Q. constantly sp. nov.* have been treated as divergent populations of "*Acanthodactylus cantoris schmidt* Haas, 1957" that has been treated as a full species in recent years and also is herein transferred to the genus *Questionthenarrative gen. nov.*

The three species *Questionthenarrative always sp. nov.*, *Q. constantly sp. nov.* and *Q. schmidt* are readily separated from one another as follows:

*Questionthenarrative always sp. nov.* of Jordan and immediately adjacent west Saudi Arabia is light orange in colour and with well-defined white spots on the dorsum. The rings on the tail seen in both (*Q. constantly sp. nov.* and *Q. schmidt*) are in this species closely spaced, but reduced in intensity and with ill-defined borders so as to make them effectively absent.

Spots on the back of the head are small in size, irregular in shape and dark brown.

*Q. constantly sp. nov.* of south-west Iran is dark orange in colour with smallish bold yellow spots on the dorsum and upper flank.

Dark rings on the tail are closely spaced, moderately wide and well defined.

Spots on the back of the head are moderate in size, similar in shape to one another and yellow in colour as is seen on the rest of the dorsum.

*Q. schmidt* of Kuwait, UAE, Oman and nearby parts of Saudi Arabia is a washed out light beige colour on top and the upper flanks. The spots on the dorsum are expanded in size so that they almost touch one another, giving the back a faded and somewhat reticulated pattern. The edges of the spots are dull and ill defined and the colour contrast between these and the interspaces is slight. The spots themselves are a dull whitish colour and the interspace areas a dull beige colour. Dark rings on the tail are well spaced, reduced in size and width and ill defined.

There are tiny ill-defined spots on the back of the head that are brown in colour.

The three preceding species (*Questionthenarrative always sp. nov.*, *Q. constantly sp. nov.* and *Q. schmidt*) are separated from all other species within the genus *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* by the following combination of characters:

Species of variable size. Pointed snout. First, second, and third supraoculars large; fourth usually divided into two.

Five supralabials anterior to the subocular. Subocular not in contact with the upper lip and wedged among 4th, 5th, and 6th supralabial. Two keeled supratemporals. Temporals sharply keeled. Ear opening with distinct anterior pectination. Scales on the sides of the posterior dorsum double the size of those in the center of the dorsum and those on the sides of the body. 32 to 54 dorsals across the midbody. Ventrals arranged in 14 or 16 oblique longitudinal rows with the outer rows consisting of pointed scales. Fingers present four series of scales while toes are strongly pectinate. Reticulate color pattern in both young and adults.

The other three species within the genus *Questionthenarrative gen. nov.* (*Q. blanfordi* (Boulenger, 1919), *Q. asarule sp. nov.* and *Q. continuously sp. nov.*) are separated from all other species within *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* by the following combination of characters:

4 rows of scales on the fingers; temporal scales keeled; subocular wedged among 4th, 5th and 6th supralabials; ventrals arranged in oblique longitudinal series, scales on sides of dorsum equal to those on central dorsum; scales on upperside of tail large and strongly; ear opening with strong pectination; dorsal scales small.

Lizards within the genus *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*),

*sensu lato* are separated from all other lizards by the following combination of characters:

Occipital absent. Fingers with three or four series of scales. Flat ventrals. Collar present. Toes with more or less developed pectination. Femoral pores present. Parietal foramen present. Tamar *et al.* (2016) found that the species *Questionthenarrative always sp. nov.* as defined in this paper and *Q. schmidtii* diverged from one another 3.5 MYA confirming species level divergence. The species *Q. constantly sp. nov.* diverged from the other two species more than 1.5 MYA.

Tamar *et al.* (2016) found that the species within *Questionthenarrative gen. nov.* as defined within this paper diverged from the nearest related genus *Scienceneedsevidence gen. nov.* as defined within this paper 12.6 MYA confirming that it is best treated as a hitherto unnamed genus.

Live *Questionthenarrative always sp. nov.* from the type locality is depicted in life online at:

<https://www.lacerta.de/AS/Bildarchiv.php?Genus=49&Species=260&Kind=1&Regioid=597&Regio=Jordan>

Live *Questionthenarrative always sp. nov.* from the type locality is also depicted in life online at:

<https://www.inaturalist.org/observations/265599904>

and

<https://www.inaturalist.org/observations/248450365>

and

<https://www.inaturalist.org/observations/208581563>

and

<https://www.inaturalist.org/observations/151305380>

Live *Questionthenarrative constantly sp. nov.* is depicted in life online at:

<https://www.inaturalist.org/observations/106477894>

Live *Questionthenarrative schmidtii* is depicted in life online at:

<https://www.inaturalist.org/observations/41821367>

and

<https://www.inaturalist.org/observations/63311848>

**Distribution:** *Questionthenarrative always sp. nov.* appears to be confined to Jordan and immediately adjacent parts of Saudi Arabia.

**Etymology:** The species name "always" refers to what one should do with respect of the genus name "question the narrative" and as scientific principle, the "narrative" should always be questioned and if need be, the narrative should be challenged.

**QUESTIONTHENARRATIVE CONSTANTLY SP. NOV.**

**LSIDurn:** [lsid:zoobank.org:act:1F3EC1C3-7C26-4271-B89F-237DDE4C27EC](https://zoobank.org/act:1F3EC1C3-7C26-4271-B89F-237DDE4C27EC)

**Holotype:** A preserved specimen at the Razi University Zoological Museum, Kermanshah, Iran (RUZM), specimen number RUZM 65 collected from Fake, southern Ilam, Ilam Province, southern Ilam, Iran, Latitude 32.14562 N., Longitude 47.43545 E.

**Paratypes:** 12 preserved specimens at the Razi University Zoological Museum, Kermanshah, Iran (RUZM), being 1/ Specimen numbers RUZM 48-54, 64 all collected from Albaji, Khuzistan Province, Iran, Latitude 31.30387 N., Longitude 48.37419 E. and 2/ Specimen numbers RUZM 66-69 all collected from Fake, southern Ilam, Ilam Province, southern Ilam, Iran, Latitude 32.14562 N., Longitude 47.43545 E.

**Diagnosis:** Until now the two species *Questionthenarrative always sp. nov.* and *Q. constantly sp. nov.* have been treated as divergent populations of "*Acanthodactylus cantoris schmidtii* Haas, 1957" that has been treated as a full species in recent years and also is herein transferred to the genus *Questionthenarrative gen. nov.*

The three species *Questionthenarrative always sp. nov.*, *Q. constantly sp. nov.* and *Q. schmidtii* are readily separated from one another as follows:

*Questionthenarrative always sp. nov.* of Jordan and immediately adjacent west Saudi Arabia is light orange in colour and with well-defined white spots on the dorsum. The rings on the tail seen in both (*Q. constantly sp. nov.* and *Q. schmidtii*) are in this species closely spaced, but reduced in intensity and with ill-defined borders so as to make them effectively absent.

Spots on the back of the head are small in size, irregular in shape and dark brown.

*Q. constantly sp. nov.* of south-west Iran is dark orange in colour with smallish bold yellow spots on the dorsum and upper flank. Dark rings on the tail are closely spaced, moderately wide and well defined.

Spots on the back of the head are moderate in size, similar in shape to one another and yellow in colour as is seen on the rest of the dorsum.

*Q. schmidtii* of Kuwait, UAE, Oman and nearby parts of Saudi Arabia is a washed out light beige colour on top and the upper flanks. The spots on the dorsum are expanded in size so that they almost touch one another, giving the back a faded and somewhat reticulated pattern. The edges of the spots are dull and ill-defined and the colour contrast between these and the interspaces is slight. The spots themselves are a dull whitish colour and the interspace areas a dull beige colour. Dark rings on the tail are well spaced, reduced in size and width and ill defined. There are tiny ill-defined spots on the back of the head that are brown in colour.

The three preceding species (*Questionthenarrative always sp. nov.*, *Q. constantly sp. nov.* and *Q. schmidtii*) are separated from all other species within the genus *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* by the following combination of characters:

Species of variable size. Pointed snout. First, second, and third supraoculars large; fourth usually divided into two. Five supralabials anterior to the subocular. Subocular not in contact with the upper lip and wedged among 4th, 5th, and 6th supralabial. Two keeled supratemporals. Temporals sharply keeled. Ear opening with distinct anterior pectination. Scales on the sides of the posterior dorsum double the size of those in the center of the dorsum and those on the sides of the body. 32 to 54 dorsals across the midbody. Ventrals arranged in 14 or 16 oblique longitudinal rows with the outer rows consisting of pointed scales. Fingers present four series of scales while toes are strongly pectinate. Reticulate color pattern in both young and adults.

The other three species within the genus *Questionthenarrative gen. nov.* (*Q. blanfordi* (Boulenger, 1919), *Q. asarule sp. nov.* and *Q. continuously sp. nov.*) are separated from all other species within *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* by the following combination of characters:

4 rows of scales on the fingers; temporal scales keeled; subocular wedged among 4th, 5th and 6th supralabials; ventrals arranged in oblique longitudinal series, scales on sides of dorsum equal to those on central dorsum; scales on upperside of tail large and strongly; ear opening with strong pectination; dorsal scales small.

Lizards within the genus *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* are separated from all other lizards by the following combination of characters:

Occipital absent. Fingers with three or four series of scales. Flat ventrals. Collar present. Toes with more or less developed pectination. Femoral pores present. Parietal foramen present. Tamar *et al.* (2016) found that the species *Questionthenarrative always sp. nov.* as defined in this paper and *Q. schmidtii* diverged from one another 3.5 MYA confirming species level divergence. The species *Q. constantly sp. nov.* diverged from the other two species more than 1.5 MYA.

Tamar *et al.* (2016) found that the species within

*Questionthenarrative* gen. nov. as defined within this paper diverged from the nearest related genus *Scienceneedsevidence* gen. nov. as defined within this paper 12.6 MYA confirming that it is best treated as a hitherto unnamed genus.

Live *Questionthenarrative* *always* sp. nov. from the type locality is depicted in life online at:

<https://www.inaturalist.org/observations/265599904>

and

<https://www.inaturalist.org/observations/248450365>

and

<https://www.inaturalist.org/observations/208581563>

and

<https://www.inaturalist.org/observations/151305380>

and

<https://www.lacerta.de/AS/Bildarchiv.php?Genus=49&Species=260&Kind=1&Regid=597&Regio=Jordan>

Live *Questionthenarrative* *constantly* sp. nov. is depicted in life online at:

<https://www.inaturalist.org/observations/106477894>

Live *Questionthenarrative* *schmidtii* is depicted in life online at:

<https://www.inaturalist.org/observations/41821367>

and

<https://www.inaturalist.org/observations/63311848>

**Distribution:** *Questionthenarrative* *constantly* sp. nov. appears to be confined to south-west Iran.

**Etymology:** The species name "constantly" refers to what one should do with respect of the genus name "question the narrative" and as scientific principle, the "narrative" should always be questioned and this action should be repeated constantly and if need be, the narrative should be challenged.

**QUESTIONTHENARRATIVE CONTINUOUSLY SP. NOV.**

**LSIDurn:lsid:zoobank.org:act:FECA6929-FA54-49B0-BB30-4CB023B0CD36**

**Holotype:** The live male specimen depicted on page 25 in Fig.1 of Gardner (2005), the full reference being:

Garner, Drew 2005. Blanford's fringe-toed lizard (Lacertidae: *Acanthodactylus blanfordii* Boulenger, 1918): a new species record for the United Arab Emirates. *Tribulus* 15(2) Autumn/Winter 2005:25-26.

The specimen was collected at Kalba, United Arab Emirates (UAE).

**Paratype:** The live female specimen depicted on page 25 in Fig.2 of Gardner (2005), the full reference being:

Garner, Drew 2005. Blanford's fringe-toed lizard (Lacertidae: *Acanthodactylus blanfordii* Boulenger, 1918): a new species record for the United Arab Emirates. *Tribulus* 15(2) Autumn/Winter 2005:25-26.

The specimen was collected at Kalba, United Arab Emirates (UAE).

**Diagnosis:** Until now, both *Questionthenarrative* *continuously* sp. nov. from the United Arab Emirates as well as northern Oman and *Q. asarule* sp. nov. from eastern Iran, away from the coast, have been treated as divergent populations of "*Acanthodactylus cantoris* var *blanfordii* Boulenger, 1919" from eastern southern coastal Iran.

The latter taxon has more recently been treated as a full species and is herein transferred to the new genus *Questionthenarrative* gen. nov.

The three species are readily separated from one another as follows:

*Q. continuously* sp. nov. males are boldly marked with yellow lines down the back, orange interspaces and a series of reasonably distinct yellow spots or bars within the interspaces. Upper flank is dark brown with bold orange spots within the line. Below this dark brown line is a well-defined whitish line along the mid flank. Below this the lower flank starts of dark, fading to white towards the venter.

Upper surfaces of the hind limbs are brown with very distinct somewhat irregularly shaped white or light cream spots. Only the lower part of the side of the tail is white in colour.

Upper parts of the tail are brown in colour with numerous evenly arranged small white spots and flecks, which are similar in form on most of the flank areas of the tail (the sides).

Upper labials are mainly peppered or dark grey.

*A. blanfordii* males are a more washed-out colouration on top with the yellow lines down the back only semi-distinct, the interspaces with orange spots that are barely noticeable (as in they are blurred).

Upper flank is light brown with faded yellow-orange spots. Below this is a barely defined whitish line along the mid-flank, with limited darker pigment below, which rapidly fades to the whitish venter.

Upper surfaces of the hind limbs are greyish brown with semi distinct irregularly shaped spots and patches of orange.

More than half the side of the tail is white in colour.

The tail is yellowish on top, grading to a dark edge on the upper part of the side of the tail.

Upper labials are mainly white or cream.

*Q. asarule* sp. nov. males are quite different to the two preceding species. The dorsum and most of the flanks are a generally dull orange colour interspersed with dull greyish blue barely distinct blotches or markings. The white line along the mid flank is reasonably thick, but poorly defined and broken in parts. Snout and upper labials are bluish grey.

Tail is without obvious markings on top, although the dark of the upper flank is obvious.

Upper surfaces of the hind limbs are dark brown with barely noticeable light brown markings.

The sides of the tail are also mainly dark in colour.

The three preceding species within the genus *Questionthenarrative* gen. nov. being *Q. blanfordii* (Boulenger, 1919), *Q. asarule* sp. nov. and *Q. continuously* sp. nov. are separated from all other species within *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* by the following combination of characters: 4 rows of scales on the fingers; temporal scales keeled; subocular wedged among 4th, 5th and 6th supralabials; ventrals arranged in oblique longitudinal series, scales on sides of dorsum equal to those on central dorsum; scales on upper side of tail large and strongly; ear opening with strong pectination; dorsal scales small.

The other three species within the genus *Questionthenarrative* gen. nov. being *Questionthenarrative* *always* sp. nov., *Q. constantly* sp. nov. and *Q. schmidtii* are separated from all other species within the genus *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* by the following combination of characters: Species of variable size. Pointed snout. First, second, and third supraoculars large; fourth usually divided into two. Five supralabials anterior to the subocular. Subocular not in contact with the upper lip and wedged among 4th, 5th, and 6th supralabial. Two keeled supratemporals. Temporals sharply keeled. Ear opening with distinct anterior pectination. Scales on the sides of the posterior dorsum double the size of those in the center of the dorsum and those on the sides of the body. 32 to 54 dorsals across the midbody. Ventrals arranged in 14 or 16 oblique longitudinal rows with the outer rows consisting of pointed scales. Fingers present four series of scales while toes are strongly pectinate. Reticulate color pattern in both young and adults.

Tamar *et al.* (2016) found that *Questionthenarrative* *continuously* sp. nov. as defined herein, diverged from the type form of *Q. blanfordii* from south-east Iran 3.6 MYA confirming species level separation.

It is believed that *Q. asarule* sp. nov. has a similar divergence from the other two species.

Tamar *et al.* (2016) found that the species within *Questionthenarrative gen. nov.* as defined within this paper diverged from the nearest related genus *Scienceneedsevidence gen. nov.* as defined within this paper 12.6 MYA confirming that it is best treated as a hitherto unnamed genus.

*Q. continuously sp. nov.* is depicted in life online at:

<https://www.flickr.com/photos/priscillava/14440630941>

and

<https://www.flickr.com/photos/priscillava/14443988135/>

and

<https://www.inaturalist.org/observations/258351959>

and

<https://www.inaturalist.org/observations/258351960>

**Distribution:** *Q. continuously sp. nov.* is a taxon known only from the United Arab Emirates and northern Oman.

**Etymology:** The species name “continuously” refers to what one should do with respect of the genus name “question the narrative” and as scientific principle, the “narrative” should always be questioned and this action should be repeated continuously and if need be, the narrative should be challenged.

#### QUESTIONTHENARRATIVE ASARULE SP. NOV.

**LSID**Durn:lsid:zoobank.org:act:A7F1B798-9203-41F6-A558-B4BFB0521C24

**Holotype:** A preserved specimen at the Razi University Zoological Museum, Kermanshah, Iran (RUZM), specimen number RUZM 8 collected from the Bampoor to Bazman Road, Sistan and Baluchestan Province, Iran, Latitude 25.15079 N., Longitude 60.49131 E.

**Paratypes:** Three preserved specimens at the Razi University Zoological Museum, Kermanshah, Iran (RUZM), specimen numbers RUZM 5, RUZM 7 and RUZM 9 all collected from locations along the Bampoor to Bazman Road, Sistan and Baluchestan Province, Iran.

**Diagnosis:** Until now, both *Questionthenarrative continuously sp. nov.* from the United Arab Emirates as well as northern Oman and *Q. asarule sp. nov.* from eastern Iran, away from the coast, have been treated as divergent populations of “*Acanthodactylus cantoris var blanfordii* Boulenger, 1919” from eastern southern coastal Iran.

The latter taxon has more recently been treated as a full species and is herein transferred to the new genus *Questionthenarrative gen. nov.*

The three species are readily separated from one another as follows:

*Q. continuously sp. nov.* males are boldly marked with yellow lines down the back, orange interspaces and a series of reasonably distinct yellow spots or bars within the interspaces.

Upper flank is dark brown with bold orange spots within the line.

Below this dark brown line is a well-defined whitish line along the mid flank. Below this the lower flank starts of dark, fading to white towards the venter.

Upper surfaces of the hind limbs are brown with very distinct somewhat irregularly shaped white or light cream spots. Only the lower part of the side of the tail is white in colour.

Upper parts of the tail are brown in colour with numerous evenly arranged small white spots and flecks, which are similar in form on most of the flank areas of the tail (the sides).

Upper labials are mainly peppered or dark grey.

*A. blanfordi* males are a more washed-out colouration on top with the yellow lines down the back only semi-distinct, the interspaces with orange spots that are barely noticeable (as in they are blurred).

Upper flank is light brown with faded yellow-orange spots. Below this is a barely defined whitish line along the mid-flank, with limited darker pigment below, which rapidly fades to the whitish venter.

Upper surfaces of the hind limbs are greyish brown with semi distinct irregularly shaped spots and patches of orange.

More than half the side of the tail is white in colour.

The tail is yellowish on top, grading to a dark edge on the upper part of the side of the tail.

Upper labials are mainly white or cream.

*Q. asarule sp. nov.* males are quite different to the two preceding species. The dorsum and most of the flanks are a generally dull orange colour interspersed with dull greyish blue barely distinct blotches or markings. The white line along the mid flank is reasonably thick, but poorly defined and broken in parts. Snout and upper labials are bluish grey.

Tail is without obvious markings on top, although the dark of the upper flank is obvious.

Upper surfaces of the hind limbs are dark brown with barely noticeable light brown markings.

The sides of the tail are also mainly dark in colour.

The three preceding species within the genus *Questionthenarrative gen. nov.* being *Q. blanfordi* (Boulenger, 1919), *Q. asarule sp. nov.* and *Q. continuously sp. nov.* are separated from all other species within *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* by the following combination of characters:

4 rows of scales on the fingers; temporal scales keeled; subocular wedged among 4th, 5th and 6th supralabials; ventrals arranged in oblique longitudinal series, scales on sides of dorsum equal to those on central dorsum; scales on upper side of tail large and strongly; ear opening with strong pectination; dorsal scales small.

The other three species within the genus *Questionthenarrative gen. nov.* being *Questionthenarrative always sp. nov.*, *Q. constantly sp. nov.* and *Q. schmidtii* are separated from all other species within the genus *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* by the following combination of characters:

Species of variable size. Pointed snout. First, second, and third supraoculars large; fourth usually divided into two.

Five supralabials anterior to the subocular. Subocular not in contact with the upper lip and wedged among 4th, 5th, and 6th supralabial. Two keeled supratemporals. Temporals sharply keeled. Ear opening with distinct anterior pectination. Scales on the sides of the posterior dorsum double the size of those in the center of the dorsum and those on the sides of the body. 32 to 54 dorsals across the midbody. Ventrals arranged in 14 or 16 oblique longitudinal rows with the outer rows consisting of pointed scales. Fingers present four series of scales while toes are strongly pectinate. Reticulate color pattern in both young and adults.

Tamar *et al.* (2016) found that *Questionthenarrative continuously sp. nov.* as defined herein, diverged from the type form of *Q. blanfordi* from south-east Iran 3.6 MYA confirming species level separation.

It is believed that *Q. asarule sp. nov.* has a similar divergence from the other two species.

Tamar *et al.* (2016) found that the species within *Questionthenarrative gen. nov.* as defined within this paper diverged from the nearest related genus *Scienceneedsevidence gen. nov.* as defined within this paper 12.6 MYA confirming that it is best treated as a hitherto unnamed genus.

**Distribution:** *Questionthenarrative asarule sp. nov.* is a taxon known only from eastern Iran, away from the coast in a region generally north of Bampoor, Iran and within 100 km of this location.

**Etymology:** The species name “asarule” refers to what one should do with respect of the genus name “question the narrative” and as scientific principle, the “narrative” should as a rule be questioned and this action should be repeated continuously and if need be, the narrative should be challenged.

**SCIENCEEEDSEVIDENCE GEN. NOV.**

LSIDurn:lsid:zoobank.org:act:2D186183-1D28-430C-8BF8-9D2EC02720F5

**Type species:** *Scienceneedsevidence yes sp. nov.* (this paper).

**Diagnosis:** The three species within *Scienceneedsevidence gen. nov.* were all until now treated as populations of "*Acanthodactylus hardyi* (Haas, 1957)".

Putative "*Acanthodactylus hardyi*" with a type locality of Hirmas Station, Saudi Arabia, now placed in the genus *Scienceneedsevidence gen. nov.* is a taxon of far south Jordan and nearby parts of Saudi Arabia.

*Scienceneedsevidence yes sp. nov.* is a taxon from the central and northern parts of Jordan in the region of the border with Saudi Arabia, extending well into the interior of the Arabian Peninsula.

*Scienceneedsevidence topogress sp. nov.* is a taxon from Kuwait City and immediately adjacent parts of the south coast of the Arabian / Persian Gulf.

The three preceding species are separated from all other species within *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* by the following combination of characters:

A relatively small species and a relatively wider head than other species within with *Acanthodactylus* Fitzinger, 1834 *sensu lato*; nasal regions more raised. Larger gulars. Fragmented fourth supraocular. Prefrontals only slightly longer than broad, median suture of nasals is very short, 12 or sometimes 14 almost straight longitudinal rows of ventrals. Dorsals flat, granular, and never keeled. Temporals large, flat and smooth. No enlarged anterior gular shields bordering the chin shields.

Lizards within the genus *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* are separated from all other lizards by the following combination of characters:

Occipital absent. Fingers with three or four series of scales. Flat ventrals. Collar present. Toes with more or less developed pectination. Femoral pores present. Parietal foramen present.

Tamar *et al.* (2016) found that the species within *Scienceneedsevidence gen. nov.* as defined within this paper diverged from the nearest related genus *Questionthenarrative gen. nov.* as defined within this paper 12.6 MYA confirming that it is best treated as a hitherto unnamed genus.

The three species within the genus also diverged from one another 3 or more million years ago.

**Distribution:** The Arabian Peninsula, specifically including Jordan, Saudi Arabia and Kuwait.

**Etymology:** The genus name *Scienceneedsevidence gen. nov.* is a statement of the obvious.

Unfortunately this fact is too often ignored by many so-called scientists and self-professed pseudo-scientists, like for example Adam Britton and Wolfgang Wüster (see details in Hoser 2015a-f, 2019a-b).

**Content:** *Scienceneedsevidence yes sp. nov.* (type species) (this paper); *S. hardyi* (Haas, 1957); *S. topogress sp. nov.* (this paper).

**SCIENCEEEDSEVIDENCE YES SP. NOV.**

LSIDurn:lsid:zoobank.org:act:EC841F6B-EAFE-4CAA-A0EE-CD727951A171

**Holotype:** A preserved specimen at the National Museum (Natural History), Prague, Czech Republic, specimen number NMP6V 71353-2 collected from east of Al Hazim, Jordan.

**Paratype:** A preserved specimen at the National Museum (Natural History), Prague, Czech Republic, specimen number NMP6V 71353-3 collected from east of Al Hazim, Jordan.

**Diagnosis:** The three species within *Scienceneedsevidence gen. nov.* were all until now treated as populations of "*Acanthodactylus hardyi* (Haas, 1957)".

Putative "*Acanthodactylus hardyi*" with a type locality of

Hirmas Station, Saudi Arabia, now placed in the genus *Scienceneedsevidence gen. nov.* is a taxon of far south Jordan and nearby parts of Saudi Arabia.

*Scienceneedsevidence yes sp. nov.* is a taxon from the central and northern parts of Jordan in the region of the border with Saudi Arabia, extending well into the interior of the Arabian Peninsula.

*Scienceneedsevidence topogress sp. nov.* is a taxon from Kuwait City and immediately adjacent parts of the south coast of the Arabian / Persian Gulf.

The three preceding species are separated from all other species within *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* by the following combination of characters:

A relatively small species and a relatively wider head than other species within with *Acanthodactylus* Fitzinger, 1834 *sensu lato*; nasal regions more raised. Larger gulars. Fragmented fourth supraocular. Prefrontals only slightly longer than broad, median suture of nasals is very short, 12 or sometimes 14 almost straight longitudinal rows of ventrals. Dorsals flat, granular, and never keeled. Temporals large, flat and smooth. No enlarged anterior gular shields bordering the chin shields.

The three species *Scienceneedsevidence hardyi*, *S. yes sp. nov.*, and *S. topogress sp. nov.* are separated from one another as follows:

*Scienceneedsevidence hardyi* has a head that is uniform beige on top. Upper surfaces of neck, dorsum and anterior of tail are a dull orange colour with a dense arrangement of light bluish grey-white spots, occupying slightly more than half of the overall upper surface.

Upper surfaces of limbs are of similar arrangement to the body except that the spots are slightly larger and more widely spaced. Tail beyond the anterior is marked white and orange on top and sides, becoming more or less banded distally. Hind feet are light yellow in colour. Tip of snout is beige. Otherwise the labials are ivory white.

*S. yes sp. nov.* is generally coloured a bright orange on top. The head is a near uniform orange on top. Neck and dorsum are generally orange, but with small indistinct whitish-yellow spots, occupying only about a third of the total surface area of the dorsum. There are also some semi-irregular darker orange markings of irregular shape on the dorsum. Tail is orange on top with infusions of white on and from the sides.

Upper surfaces of limbs are generally orange, sometimes becoming darker brown, but with semi-distinct yellowish circular blotches. Labials are generally ivory white, although the snout itself is orange, as are the very upper parts of the first two or three anterior labials.

*S. topogress sp. nov.* is reddish brown on top with semi-distinct light grey spots on the dorsum, from neck to tail.

The head is heavily peppered to be a light grey colour. Upper surfaces of limbs are whitish, especially the forelimbs. Hindlimbs are a dull light brown with dull, semi-distinct light grey spots.

Most of the tail is a dull light orange colour, otherwise whitish, with white bars across anteriorly, these becoming more well defined as bands distally.

Upper labials are mainly red, but with large patches of yellow on those anterior to the eye.

Lizards within the genus *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* are separated from all other lizards by the following combination of characters:

Occipital absent. Fingers with three or four series of scales. Flat ventrals. Collar present. Toes with more or less developed pectination. Femoral pores present. Parietal foramen present.

*S. hardyi* of the type form is depicted in life online at:

<https://www.inaturalist.org/observations/185472764>

*S. yes sp. nov.* is depicted in life online at:

<https://www.inaturalist.org/observations/252136216>

*S. topogress* sp. nov. is depicted in life online at:  
<https://www.inaturalist.org/observations/142442927>  
 and

<https://www.inaturalist.org/observations/257774032>

Tamar *et al.* (2016) found that *S. hardyi* of the type form diverged from *S. yes* sp. nov. and *S. topogress* sp. nov. as defined herein 4.8 MYA. Tamar *et al.* (2016) found that *S. yes* sp. nov. and *S. topogress* sp. nov. as defined herein diverged from one another 3 MYA, confirming that all three taxa are best classified as separate species.

Tamar *et al.* (2016) found that the species within *Scienceneedsevidence* gen. nov. as defined within this paper diverged from the nearest related genus *Questionthenarrative* gen. nov. as defined within this paper 12.6 MYA confirming that it is best treated as a hitherto unnamed genus.

**Distribution:** Central Jordan and east to include the central parts of Saudi Arabia.

**Etymology:** The genus name *Scienceneedsevidence* gen. nov. is a statement of the obvious.

The species name "yes" is an affirmation of this fact.

The species and genus names are in a part of the world where Arabic is the dominant language, so the scientific name will not have an obvious same-language meaning to most users.

#### SCIENCENEEDSEVIDENCE TOPGRESS SP. NOV.

**LSIDurn:**lsid:zoobank.org:act:D89125F9-B744-4792-A8D4-5753337EB189

**Holotype:** A preserved specimen at the Centre d'Ecologie Fonctionnelle et Evolutive, Montpellier, France, specimen number BEV.11053 collected from 35 km southwest of Ratqa, Kuwait.

**Paratypes:** Two preserved specimens at the California Academy of Sciences, San Francisco, California, USA, specimen numbers CAS HERP 190901 and CAS HERP 190902 both collected from Kuwait City, Kuwait.

**Diagnosis:** The three species within *Scienceneedsevidence* gen. nov. were all until now treated as populations of "*Acanthodactylus hardyi* (Haas, 1957)".

Putative "*Acanthodactylus hardyi*" with a type locality of Hirmas Station, Saudi Arabia, now placed in the genus *Scienceneedsevidence* gen. nov. is a taxon of far south Jordan and nearby parts of Saudi Arabia.

*Scienceneedsevidence yes* sp. nov. is a taxon from the central and northern parts of Jordan in the region of the border with Saudi Arabia, extending well into the interior of the Arabian Peninsula.

*Scienceneedsevidence topogress* sp. nov. is a taxon from Kuwait City and immediately adjacent parts of the south coast of the Arabian / Persian Gulf.

The three preceding species are separated from all other species within *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* by the following combination of characters:

A relatively small species and a relatively wider head than other species within with *Acanthodactylus* Fitzinger, 1834 *sensu lato*; nasal regions more raised. Larger gulars. Fragmented fourth supraocular. Prefrontals only slightly longer than broad, median suture of nasals is very short, 12 or sometimes 14 almost straight longitudinal rows of ventrals. Dorsals flat, granular, and never keeled. Temporals large, flat and smooth. No enlarged anterior gular shields bordering the chin shields.

The three species *Scienceneedsevidence hardyi*, *S. yes* sp. nov., and *S. topogress* sp. nov. are separated from one another as follows:

*Scienceneedsevidence hardyi* has a head that is uniform beige on top. Upper surfaces of neck, dorsum and anterior of tail are

a dull orange colour with a dense arrangement of light bluish grey-white spots, occupying slightly more than half of the overall upper surface.

Upper surfaces of limbs are of similar arrangement to the body except that the spots are slightly larger and more widely spaced. Tail beyond the anterior is marked white and orange on top and sides, becoming more or less banded distally. Hind feet are light yellow in colour. Tip of snout is beige. Otherwise the labials are ivory white.

*S. yes* sp. nov. is generally coloured a bright orange on top. The head is a near uniform orange on top. Neck and dorsum are generally orange, but with small indistinct whitish-yellow spots, occupying only about a third of the total surface area of the dorsum. There are also some semi-irregular darker orange markings of irregular shape on the dorsum. Tail is orange on top with infusions of white on and from the sides.

Upper surfaces of limbs are generally orange, sometimes becoming darker brown, but with semi-distinct yellowish circular blotches. Labials are generally ivory white, although the snout itself is orange, as are the very upper parts of the first two or three anterior labials.

*S. topogress* sp. nov. is reddish brown on top with semi-distinct light grey spots on the dorsum, from neck to tail.

The head is heavily peppered to be a light grey colour. Upper surfaces of limbs are whitish, especially the forelimbs. Hindlimbs are a dull light brown with dull, semi-distinct light grey spots.

Most of the tail is a dull light orange colour, otherwise whitish, with white bars across anteriorly, these becoming more well defined as bands distally.

Upper labials are mainly red, but with large patches of yellow on those anterior to the eye.

Lizards within the genus *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* are separated from all other lizards by the following combination of characters:

Occipital absent. Fingers with three or four series of scales. Flat ventrals. Collar present. Toes with more or less developed pectination. Femoral pores present. Parietal foramen present.

*S. hardyi* of the type form is depicted in life online at:

<https://www.inaturalist.org/observations/185472764>

*S. yes* sp. nov. is depicted in life online at:

<https://www.inaturalist.org/observations/252136216>

*S. topogress* sp. nov. is depicted in life online at:

<https://www.inaturalist.org/observations/142442927>

and

<https://www.inaturalist.org/observations/257774032>

Tamar *et al.* (2016) found that *S. hardyi* of the type form diverged from *S. yes* sp. nov. and *S. topogress* sp. nov. as defined herein 4.8 MYA. Tamar *et al.* (2016) found that *S. yes* sp. nov. and *S. topogress* sp. nov. as defined herein diverged from one another 3 MYA, confirming that all three taxa are best classified as separate species.

Tamar *et al.* (2016) found that the species within *Scienceneedsevidence* gen. nov. as defined within this paper diverged from the nearest related genus *Questionthenarrative* gen. nov. as defined within this paper 12.6 MYA confirming that it is best treated as a hitherto unnamed genus.

**Distribution:** Kuwait City and immediate environs. It presumably is found in nearby parts of Iraq and Saudi Arabia.

**Etymology:** The genus name *Scienceneedsevidence* gen. nov. is a statement of the obvious.

The species name "topogress" is an affirmation of the obvious.

The species and genus names are in a part of the world where Arabic is the dominant language, so the scientific name will not have an obvious same-language meaning to most users.

**TAHAQAQMINALSARD GEN. NOV.**

LSIDurn:lsid:zoobank.org:act:AD66755D-DF4D-409E-9FCE-2F235D160D65

**Type species:** *Tahaqaqminalsard absconditus* sp. nov. (this paper).

**Diagnosis:** Species within the genus *Tahaqaqminalsard* gen. nov. are the "*Acanthodactylus grandis* Boulenger, 1909" group of lizards.

These species are separated from all other species within *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* by the following unique combination of characters:

Four supraoculars. One row of granules between the superciliaries and the supraoculars. Four supralabials anterior to the subocular. Temporals granular and not keeled. Unpectinate eyelids. Anterior border of ear opening only lightly pectinate. Small dorsal scales. 14 or 16 oblique longitudinal rows of ventrals. Four series of scales on fingers. Lateral pectination scant or completely absent on toes.

Until now, most authors have treated two other described forms, namely "*Acanthodactylus fraseri* Boulenger, 1918", with a type locality of Az Zubayr (Iraq), and "*Acanthodactylus harranensis* Baran, Kumlutas, Lanza, Sindaco, Avci and Crucitti, 2005" with a type locality of Harran, south-east Turkey as synonyms of "*Acanthodactylus grandis* Boulenger, 1909", with a type locality of "Jerud and Ataibe, east of Damascus, and Khan Agach, between Damascus and Kutaife".

All three are separate species-level taxa.

Molecular evidence of Tamar *et al.* (2016) confirms that not only are all three taxa distinct at the species level (as in 1.4 MYA or more divergent), but their phylogeny also shows a fourth species in the complex in their sample that is 3.4 MYA divergent from nearest known relative, herein formally named as *Tahaqaqminalsard absconditus* sp. nov..

A fifth species in the complex from Iran is also formally named as *Tahaqaqminalsard nonukesyet* sp. nov..

As an obligate mobile dune dweller, the populations of the five species recognised herein have been isolated by virtue of the disconnect of the various dune systems over the past 5 MYA.

Lizards within the genus *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* are separated from all other lizards by the following combination of characters:

Occipital absent. Fingers with three or four series of scales. Flat ventrals. Collar present. Toes with more or less developed pectination. Femoral pores present. Parietal foramen present.

Tamar *et al.* (2016) found that the species within *Tahaqaqminalsard* gen. nov. as defined within this paper diverged from the nearest related genus *Biyaniyachekkarin* gen. nov. as defined within this paper 10.2 MYA confirming that it is best treated as a hitherto unnamed genus.

**Distribution:** Jordan, Syria, Iraq, and southwestern Iran.

**Etymology:** The genus name *Tahaqaqminalsard* gen. nov. is a direct take of the Arabic words, "tahaqaq min alsard" which means "check the narrative", with reference to the need for people to check the narrative being fed to them by so called authorities, whether in the fields of science, geopolitics, or elsewhere in human activities.

**Content:** *Tahaqaqminalsard absconditus* sp. nov. (this paper) (type species); *T. grandis* (Boulenger, 1909); *T. fraseri* (Boulenger, 1918); *T. harranensis* (Baran, Kumlutas, Lanza, Sindaco, Avci and Crucitti, 2005); *T. nonukesyet* sp. nov. (this paper).

**TAHAQAQMINALSARD ABSCONDITUS SP. NOV.**

LSIDurn:lsid:zoobank.org:act:D680B517-2797-43BC-AF70-CDA108683A07

**Holotype:** A preserved specimen at the National Museum (Natural History), Prague, Czech Republic, specimen number

NMP6V70498-2 collected from 5 km south of Palmyra, Syria, Latitude 34.5700 N., Longitude 38.2925 E.

**Paratypes:** Three preserved specimens at the Reptiles and Amphibians collection, Museum national d'Histoire naturelle, Paris, France, specimen numbers MNHN RA 1966.43, MNHN RA 1966.44 and MNHN RA 1966.45 all collected from Palmyra, Syria, Latitude 34.5700 N., Longitude 38.2925 E.

**Diagnosis:** Species within the genus *Tahaqaqminalsard* gen. nov. are the "*Acanthodactylus grandis* Boulenger, 1909" group of lizards.

This includes *Tahaqaqminalsard absconditus* sp. nov. a taxon from south-east Syria and Jordan.

These species are separated from all other species within *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* by the following unique combination of characters:

Four supraoculars. One row of granules between the superciliaries and the supraoculars. Four supralabials anterior to the subocular. Temporals granular and not keeled. Unpectinate eyelids. Anterior border of ear opening only lightly pectinate. Small dorsal scales. 14 or 16 oblique longitudinal rows of ventrals. Four series of scales on fingers. Lateral pectination scant or completely absent on toes.

Until now, most authors have treated two other described forms, namely "*Acanthodactylus fraseri* Boulenger, 1918", with a type locality of Az Zubayr (southern Iraq), and "*Acanthodactylus harranensis* Baran, Kumlutas, Lanza, Sindaco, Avci and Crucitti, 2005" with a type locality of Harran, south-east Turkey and also occurring in nearby parts of Iraq as synonyms of "*Acanthodactylus grandis* Boulenger, 1909", with a type locality of "Jerud and Ataibe, east of Damascus, and Khan Agach, between Damascus and Kutaife".

All three are separate species-level taxa.

Molecular evidence of Tamar *et al.* (2016) confirms that not only are all three taxa distinct at the species level (as in 1.4 MYA or more divergent), but their phylogeny also shows a fourth species in the complex in their sample that is 3.4 MYA divergent from nearest known relative, herein formally named as *Tahaqaqminalsard absconditus* sp. nov..

That taxon is of south-east Syria and north Jordan.

A fifth species in the complex from Iran is also formally named as *Tahaqaqminalsard nonukesyet* sp. nov..

As an obligate mobile dune dweller, the populations of the five species recognised herein have been isolated by virtue of the connections and disconnect of the various dune systems over the past 5 MYA.

The five above-named species in this genus are separated from one another as follows:

*Tahaqaqminalsard grandis* (Boulenger, 1909) and *Tahaqaqminalsard absconditus* sp. nov. are separated from the other three species by their relatively large size, 28 to 35 gulars, 56 to 63 dorsals, and 16 oblique longitudinal rows of ventrals. The colour pattern consists of four dorsal rows of large black spots (bold and well defined in *T. absconditus* sp. nov. and not so in *T. grandis*) and in *T. grandis* another very diffused one on each side, which is absent in *T. absconditus* sp. nov.. On each side of the head there are alternating black and white spots of varying intensity, ranging from well-defined in some specimens to dull in other.

*T. grandis* is further separated from *T. absconditus* sp. nov. by having a dorsal surface of the head that is a combination of dull orange and beige, versus mainly blackish in *T. absconditus* sp. nov..

The anterior parts of the tail of *T. grandis* is mainly orange on top with well defined white bars on either side. This is different to the anterior parts of the tail of *T. absconditus* sp. nov. which is light orange at the very anterior part, then yellow on top with well-defined blackish intrusions from the sides to the top of the tail.

Upper labials of *T. grandis* are mainly light in colour, versus

mainly dark in colour in *T. absconditus* sp. nov. although this difference is not consistent in all *T. absconditus* sp. nov., with southern specimens in particular tending to have lighter rather than darker upper labials.

*T. fraseri* (Boulenger, 1918) is a relatively smaller species. It has 26 to 29 gulars, 46 to 59 dorsals, and 14 (rarely 16) oblique longitudinal rows of ventrals and a strong yellowish hue rather than orangish as seen in the preceding three species.

*T. harranensis* (Baran, Kumlutas, Lanza, Sindaco, Avci and Crucitti, 2005) is separated from the preceding species and defined as follows:

A relatively large and stout-bodied taxon with smooth dorsal scales on trunk and proximal tract of tail, 3-6 more or less enlarged scales forming a fringe on anterior border of ear opening, subocular not reaching the mouth, 4 upper labials anterior to subocular (occasionally 3 or 5 at least on one side), 1st supraocular broken into a large scale and 2-7 (mean 3.2) (in eighteen specimens) minute fragments, 2nd and 3rd supraoculars intact, 4th supraocular very fragmented, ventrals usually in 14 longitudinal rows (arranged in three nearly regular straight longitudinal series medially, staggered and disposed obliquely otherwise), 51-65 (mean 57.3) (in eighteen specimens) midbody scales, 4 longitudinal continuous rows of scales on fingers, toes weakly denticulated, 16-22 (mean 19.7) uncarinate and trimucronate lamellae beneath 4th toe; 18-25 (mean 21.8) femoral pores on right side; tail more than 1.5 times the body length, at least in young and subadult animals; dorsal pattern consisting of more or less irregular, longitudinal dark and light stripes or series of spots in juveniles, of a dark reticulation with light roundish spots in adults and subadults; premaxilla not abruptly narrowed (derived from Baran, Kumlutas, Lanza, Sindaco, Avci and Crucitti, 2005).

*T. nonukesyet* sp. nov. is separated from the four preceding species by also being dull yellowish-brown on top; black spots on the back are larger and with blurred outer edges (arranged in 6 rows on dorsum and upper flank), white dorsolateral lines are formed by semi-joined dull white spots with indistinct edges; tail is mainly yellowish on top and sides, with a row of rectangular brown spots on the dorsolateral edge. The lizards are relatively slender and small with 21 to 30 gulars, 31 to 51 dorsals, and 14 (rarely 16) rows of ventrals. Dorsal scales are lightly keeled and to a greater extent than any of the other four species, which have either no keels or are barely keeled.

Lizards within the genus *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* are separated from all other lizards by the following combination of characters:

Occipital absent. Fingers with three or four series of scales. Flat ventrals. Collar present. Toes with more or less developed pectination. Femoral pores present. Parietal foramen present.

Tamar *et al.* (2016) found that the species within *Tahaqaqminalsard* gen. nov. as defined within this paper diverged from the nearest related genus *Biyaniyachekkarin* gen. nov. as defined within this paper 10.2 MYA confirming that it is best treated as a hitherto unnamed genus.

*Tahaqaqminalsard absconditus* sp. nov. is depicted in life online at:

<https://www.lacerta.de/AS/Bildarchiv.php?Genus=49&Species=244&Kind=1&RegioId=583&Regio=Jordan>

*T. nonukesyet* sp. nov. is depicted in life online at:

<https://www.lacerta.de/AS/Bildarchiv.php?Genus=49&Species=244&Kind=1&RegioId=812&Regio=Iran>

**Distribution:** *Tahaqaqminalsard absconditus* sp. nov. is a taxon from south-east Syria and Jordan.

**Etymology:** The Latin word "*absconditus*" means hidden and this is a reflection of the fact that this species has been hidden from science until now.

#### **TAHAQAQMINALSARD NONUKESYET SP. NOV.**

**LSIDurn:**lsid:zoobank.org:act:472E3AFC-84DB-4EBB-8C16-43B589369C03

**Holotype:** A preserved specimen at the California Academy of Sciences, San Francisco, California, USA, specimen number CAS HERP 141143 collected from 33 km northeasterly of Bushire, near Alchangi, Fars Province, Iran, Latitude 28.883333 N., Longitude 51.033333 E.

This facility allows access to its holdings.

**Paratypes:** Four preserved specimens at the California Academy of Sciences, San Francisco, California, USA, specimen number CAS HERP 102531-102534 all collected from Ahram, Fars Province, Iran, Latitude 28.880278 N., Longitude 51.272778 E.

**Diagnosis:** Species within the genus *Tahaqaqminalsard* gen. nov. are the "*Acanthodactylus grandis* Boulenger, 1909" group of lizards.

This includes *Tahaqaqminalsard absconditus* sp. nov. a taxon from south-east Syria and Jordan.

These species are separated from all other species within *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* by the following unique combination of characters:

Four supraoculars. One row of granules between the superciliaries and the supraoculars. Four supralabials anterior to the subocular. Temporals granular and not keeled. Unpectinate eyelids. Anterior border of ear opening only lightly pectinate. Small dorsal scales. 14 or 16 oblique longitudinal rows of ventrals. Four series of scales on fingers. Lateral pectination scant or completely absent on toes.

Until now, most authors have treated two other described forms, namely "*Acanthodactylus fraseri* Boulenger, 1918", with a type locality of Az Zubayr (southern Iraq), and "*Acanthodactylus harranensis* Baran, Kumlutas, Lanza, Sindaco, Avci and Crucitti, 2005" with a type locality of Harran, south-east Turkey and also occurring in nearby parts of Iraq as synonyms of "*Acanthodactylus grandis* Boulenger, 1909", with a type locality of "Jerud and Ataibe, east of Damascus, and Khan Agach, between Damascus and Kutaife".

All three are separate species-level taxa.

Molecular evidence of Tamar *et al.* (2016) confirms that not only are all three taxa distinct at the species level (as in 1.4 MYA or more divergent), but their phylogeny also shows a fourth species in the complex in their sample that is 3.4 MYA divergent from nearest known relative, herein formally named as *Tahaqaqminalsard absconditus* sp. nov.

That taxon is of south-east Syria and north Jordan.

A fifth species in the complex from Iran is also formally named as *Tahaqaqminalsard nonukesyet* sp. nov.

As an obligate mobile dune dweller, the populations of the five species recognised herein have been isolated by virtue of the connections and disconnect of the various dune systems over the past 5 MYA.

The five above-named species in this genus are separated from one another as follows:

*Tahaqaqminalsard grandis* (Boulenger, 1909) and *Tahaqaqminalsard absconditus* sp. nov. are separated from the other three species by their relatively large size, 28 to 35 gulars, 56 to 63 dorsals, and 16 oblique longitudinal rows of ventrals. The colour pattern consists of four dorsal rows of large black spots (bold and well defined in *T. absconditus* sp. nov. and not so in *T. grandis*) and in *T. grandis* another very diffused one on each side, which is absent in *T. absconditus* sp. nov.. On each side of the head there are alternating black and white spots of varying intensity, ranging from well defined in some specimens to dull in other.

*T. grandis* is further separated from *T. absconditus* sp. nov. by having a dorsal surface of the head that is a combination of dull orange and beige, versus mainly blackish in *T. absconditus* sp. nov..

The anterior parts of the tail of *T. grandis* is mainly orange on top with well defined white bars on either side. This is different to the anterior parts of the tail of *T. absconditus* sp. nov. which is light orange at the very anterior part, then yellow on top with well-defined blackish intrusions from the sides to the top of the tail. Upper labials of *T. grandis* are mainly light in colour, versus mainly dark in colour in *T. absconditus* sp. nov. although this difference is not consistent in all *T. absconditus* sp. nov., with southern specimens in particular tending to have lighter rather than darker upper labials.

*T. fraseri* (Boulenger, 1918) is a relatively smaller species. It has 26 to 29 gulars, 46 to 59 dorsals, and 14 (rarely 16) oblique longitudinal rows of ventrals and a strong yellowish hue rather than orangish as seen in the preceding three species.

*T. harranensis* (Baran, Kumlutas, Lanza, Sindaco, Avci and Crucitti, 2005) is separated from the preceding species and defined as follows:

A relatively large and stout-bodied taxon with smooth dorsal scales on trunk and proximal tract of tail, 3-6 more or less enlarged scales forming a fringe on anterior border of ear opening, subocular not reaching the mouth, 4 upper labials anterior to subocular (occasionally 3 or 5 at least on one side), 1st supraocular broken into a large scale and 2-7 (mean 3.2) (in eighteen specimens) minute fragments, 2nd and 3rd supraoculars intact, 4th supraocular very fragmented, ventrals usually in 14 longitudinal rows (arranged in three nearly regular straight longitudinal series medially, staggered and disposed obliquely otherwise), 51-65 (mean 57.3) (in eighteen specimens) midbody scales, 4 longitudinal continuous rows of scales on fingers, toes weakly denticulated, 16-22 (mean 19.7) uncarinate and trimucronate lamellae beneath 4th toe; 18-25 (mean 21.8) femoral pores on right side; tail more than 1.5 times the body length, at least in young and subadult animals; dorsal pattern consisting of more or less irregular, longitudinal dark and light stripes or series of spots in juveniles, of a dark reticulation with light roundish spots in adults and subadults; premaxilla not abruptly narrowed (derived from Baran, Kumlutas, Lanza, Sindaco, Avci and Crucitti, 2005).

*T. nonukesyet* sp. nov. is separated from the four preceding species by also being dull yellowish-brown on top; black spots on the back are larger and with blurred outer edges (arranged in 6 rows on dorsum and upper flank), white dorsolateral lines are formed by semi-joined dull white spots with indistinct edges; tail is mainly yellowish on top and sides, with a row of rectangular brown spots on the dorsolateral edge. The lizards are relatively slender and small with 21 to 30 gulars, 31 to 51 dorsals, and 14 (rarely 16) rows of ventrals. Dorsal scales are lightly keeled and to a greater extent than any of the other four species, which have either no keels or are barely keeled.

Lizards within the genus *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* are separated from all other lizards by the following combination of characters:

Occipital absent. Fingers with three or four series of scales. Flat ventrals. Collar present. Toes with more or less developed pectination. Femoral pores present. Parietal foramen present.

Tamar *et al.* (2016) found that the species within *Tahaqaqminalsard* gen. nov. as defined within this paper diverged from the nearest related genus *Biyaniyachekkarin* gen. nov. as defined within this paper 10.2 MYA confirming that it is best treated as a hitherto unnamed genus.

*Tahaqaqminalsard absconditus* sp. nov. is depicted in life online at:

<https://www.lacerta.de/AS/Bildarchiv.php?Genus=49&Species=244&Kind=1&RegioId=583&Regio=Jordan>

*T. nonukesyet* sp. nov. is depicted in life online at:

<https://www.lacerta.de/AS/Bildarchiv.php?Genus=49&Species=244&Kind=1&RegioId=812&Regio=Iran>

**Distribution:** *Tahaqaqminalsard nonukesyet* sp. nov. is a taxon from south-west Iran.

**Etymology:** The species name "No Nukes yet" is a statement of the military situation in Iran as of early 2025, at a time when the Jihadist government of Iran is attempting to gain nuclear weapons to annihilate the State of Israel as part of a long-running animosity between Muslims and Jews in the region spanning centuries.

**BIYANIYACHEKKARIN GEN. NOV.**

**LSIDurn:lsid:zoobank.org:act:8C952B21-E8DB-4C3E-A6AD-09B13009459F**

**Type species:** *Acanthodactylus micropholis* Blanford, 1874.

**Diagnosis:** Species within the genus *Biyaniyachekkarin* gen. nov. are separated from all other species within *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* by the following unique combination of characters:

Two entire supraoculars. One or two rows of granules between the supraoculars and the superciliaries. Pectinate eyelids. Four supralabials anterior to the subocular. Minute unkeeled temporals. Large ear opening with no anterior pectination. Flat dorsal scales equal in size or slightly larger than laterals. Ventrals arranged in 10 straight longitudinal rows. Fingers present three rows of scales. Unpectinate toes.

Lizards within the genus *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* are separated from all other lizards by the following combination of characters:

Occipital absent. Fingers with three or four series of scales. Flat ventrals. Collar present. Toes with more or less developed pectination. Femoral pores present. Parietal foramen present.

Tamar *et al.* (2016) found that the species within *Biyaniyachekkarin* gen. nov. as defined within this paper diverged from the nearest related genus *Tahaqaqminalsard* gen. nov. as defined within this paper 10.2 MYA confirming that it is best treated as a hitherto unnamed genus.

**Distribution:** Southern Pakistan and south-east Iran.

**Etymology:** The Urdu language words "biyaniya chek Karin" means "check the narrative", which is wise advice for scientists and others when listening to a narrative from a person with a vested interest about something specific.

**Content:** *Biyaniyachekkarin micropholis* (Blanford, 1874) (type species); *B. khamirensis* (Heidari, Rastegar-Pouyani, Rastegar-Pouyani and Rajabizadeh, 2013).

**PHOTOPHILUS DOMUSARENIALIS SP. NOV.**

**LSIDurn:lsid:zoobank.org:act:CAB49531-4D75-4CF8-8EA0-7E0F1828903A**

**Holotype:** A preserved specimen at the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA, specimen number MCZ Herp R-67964 collected from the Plain of Dra between Tagounite and Zaouia-Sidi-Salah, Boulemane, Morocco.

This facility allows access to its holdings.

**Diagnosis:** *Photophilus domusarenialis* sp. nov. has until now been treated as a population of putative "*Acanthodactylus scutellatus* Audouin, 1809" or alternatively "*Acanthodactylus dumerilii* Milne Edwards, 1829", all herein placed in the genus *Photophilus* Fitzinger, 1843: 20. (Type-species by monotypy, *Acanthodactylus scutellatus*).

*Photophilus domusarenialis* sp. nov. is separated from all other species in the genus *Photophilus* by being generally orange red dorsally, with closely spaced tiny black spots forming a reticulated pattern. Also pale with patches of whitish grey on the dorsum and flanks, this being more prominent on the upper flank. This same patterning of the dorsum continues as much the same on the upper surfaces of the limbs and anterior of the tail.

Most of the top of the tail is a light salmon colour with black

markings on the upper sides of the tail which when viewed laterally is forming a semi-distinct broken stripe on either side. The top of the head is dull orange-brown with numerous irregularly shaped black marks or spots. Between 20 and 30 scale rings down the tail from the anterior end is a reasonably well-formed black stripe down the medial line. Anteriorly this is formed by the merging of rows of black dots on the near anterior tail and posteriorly the line simply stops. Further down the tail, the colour is simply a light salmon on top. Anterior upper labials are mainly orange, with dark patches, while the posterior upper labials are mainly white with some small dark patches. The scales of the front and rear feet are yellowish white, with black centres in many scales.

Venter is white with numerous scattered black spots.

Species within the genus *Photophilus* Fitzinger, 1843 are separated from all other species within *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* by one or other of the following three unique combinations of characters:

1/ Elongated pointed snout. Generally three supraoculars.

One row of granules between the supraoculars and the superciliaries. Five supralabials anterior to the subocular. Small, keeled temporals. Tympanic scale absent. First three pairs of submaxillaries in contact. Dorsals small, flat, granular, and weakly keeled in relatively high number. 14 oblique longitudinal rows of ventrals. Fingers with four series of scales. Intense pectination on fourth toe. Reticulate colour pattern, or:

2/ Small species with short, blunt snout. Five supralabials anterior to the subocular. Subocular not in contact with the upper lip. Ventrals arranged in 12 or 14 longitudinal rows. Fourth supraocular divided. Dorsals flat, large and sharply keeled.

One or two rows of granules between the supraoculars and the superciliaries. Color pattern very faint or completely absent, or:

3/ 14 oblique longitudinal rows of ventrals. Relatively shorter hindlegs. Fourth supraocular generally entire. One row of granules between the superciliaries and the supraoculars. Slightly reticulate colour pattern in males. Females with pale band on each side of the body.

Tamar *et al.* (2016) found that the species *Photophilus domusarenialis* sp. nov. as defined herein diverged from the nearest related species 4.7 MYA, confirming species-level status for this taxon.

**Distribution:** *Photophilus domusarenialis* sp. nov. is known only from the region of the type locality in North Morocco.

**Etymology:** The Latin words "domus arenialis" means "sand dwelling", being a reflection of the habitat choice of the species.

**PHOTOPHILUS RUSSUS SP. NOV.**

**LSIDurn:**lsid:zoobank.org:act:2614B05C-91AE-434C-A92B-F8E94E109A6A

**Holotype:** A preserved specimen at the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA, specimen number MCZ Herp R-27436 collected from Ain Sefra, Naama Province, Algeria, Latitude 32.7591 N., Longitude 0.5783 W.

This facility allows access to its holdings.

**Paratypes:** Two preserved specimens at the Herpetology Department, Staatliches Museum für Naturkunde, Stuttgart, Germany, being specimen number SMNS Herpetologie 780 collected from Ain Sefra, Naama Province, Algeria, Latitude 32.7591 N., Longitude 0.5783 W. and specimen number SMNS Herpetologie 5200 collected from Beni Ounif, Béchar Province, Algeria, Latitude 32.0519 N., Longitude 1.2486 W.

**Diagnosis:** *Photophilus russus* sp. nov. has until now been treated as a population of putative "*Acanthodactylus scutellatus* Audouin, 1809" or alternatively "*Acanthodactylus dumerilii* Milne Edwards, 1829", all herein placed in the genus *Photophilus* Fitzinger, 1843: 20. (Type-species by monotypy, *Acanthodactylus scutellatus*).

*P. russus* sp. nov. is separated from all other species in the

genus *Photophilus* by the following characters:

It is a generally orange coloured lizard on top. The top of the head is generally orange with indistinct brown patches. Neck and body have five rows of spots running down the dorsum. The outermost rows are with white spots and the three inner rows are brown spots. Upper parts of flank are orange with a row of barely visible white spots. Lower flank is white like the belly.

Tail is light brown on top. The upper half of the side of the tail is in the form of reasonably well defined dark brown stripe. Underneath this is solid white, which extends to the underside of the tail.

Upper surfaces of hind limbs are orange with yellow spots.

Species within the genus *Photophilus* Fitzinger, 1843 are separated from all other species within *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* by one or other of the following three unique combinations of characters:

1/ Elongated pointed snout. Generally three supraoculars.

One row of granules between the supraoculars and the superciliaries. Five supralabials anterior to the subocular. Small, keeled temporals. Tympanic scale absent. First three pairs of submaxillaries in contact. Dorsals small, flat, granular, and weakly keeled in relatively high number. 14 oblique longitudinal rows of ventrals. Fingers with four series of scales. Intense pectination on fourth toe. Reticulate colour pattern., or:

2/ Small species with short, blunt snout. Five supralabials anterior to the subocular. Subocular not in contact with the upper lip. Ventrals arranged in 12 or 14 longitudinal rows. Fourth supraocular divided. Dorsals flat, large and sharply keeled.

One or two rows of granules between the supraoculars and the superciliaries. Color pattern very faint or completely absent, or:

3/ 14 oblique longitudinal rows of ventrals. Relatively shorter hindlegs. Fourth supraocular generally entire. One row of granules between the superciliaries and the supraoculars. Slightly reticulate colour pattern in males. Females with pale band on each side of the body.

Tamar *et al.* (2016) found that the species *Photophilus russus* sp. nov. as defined herein diverged from the nearest related species 4.5 MYA, confirming species-level status for this taxon.

**Distribution:** *Photophilus russus* sp. nov. is restricted to the region of northwest Algeria near the type localities.

**Etymology:** The species name *P. russus* sp. nov. comes from the Latin word "russus" meaning russet in colour, as is the case with adults of this species.

**PHOTOPHILUS IPSUMCAERULEUM SP. NOV.**

**LSIDurn:**lsid:zoobank.org:act:D063D6C5-611B-4FAA-8A75-10CA53402E9D

**Holotype:** A preserved specimen at the Museo Civico di Storia Naturale, Carmagnola, Turin, Italy, specimen number MCCI-R1341 collected from 29 km east of Douz, Tunisia, Latitude 33.4614 N., Longitude 9.0295 E.

This facility allows access to its holdings.

**Paratype:** A preserved specimen at the Museo Civico di Storia Naturale, Carmagnola, Turin, Italy, specimen number MCCI-R1334(1) collected from between Hazoua and Matrouha, Tunisia.

**Diagnosis:** *Photophilus ipsumcaeruleum* sp. nov. has until now been treated as a population of putative "*Acanthodactylus scutellatus* Audouin, 1809" or alternatively "*Acanthodactylus dumerilii* Milne Edwards, 1829", all herein placed in the genus *Photophilus* Fitzinger, 1843: 20. (Type-species by monotypy, *Acanthodactylus scutellatus*).

*P. ipsumcaeruleum* sp. nov. is separated from all other species in the genus *Photophilus* by the following characters:

A dorsum that has a reticulated pattern consisting of light orange (dominantly) interspersed with dark brown reticulations that are somewhat broken, enclosing patches of mainly light bluish-grey or even simply light blue, or light yellow on the patches of the lower flank.

The top of the head is deep orange in colour with scattered black spots on the plates between and behind the eye.

Top and bottom of eye is marked with bright orange.

Anterior upper labials are mainly light orange and rear upper labials are mainly white, but with some dark patches. Neck and upper surfaces of the hind limbs are similar in colour and pattern to the body.

Upper surfaces of the forelimbs are brownish with light bluish-grey patches.

Venter is either white or mainly white and with scattered small patches of black. The tail is light greyish or orange on top. The sides are whitish with dark flecks at the anterior parts of the scales. Lower scales of the sides of the tail are whitish as is the underside.

Species within the genus *Photophilus* Fitzinger, 1843 are separated from all other species within *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* by one or other of the following three unique combinations of characters:

1/ Elongated pointed snout. Generally three supraoculars.

One row of granules between the supraoculars and the superciliaries. Five supralabials anterior to the subocular. Small, keeled temporals. Tympanic scale absent. First three pairs of submaxillaries in contact. Dorsals small, flat, granular, and weakly keeled in relatively high number. 14 oblique longitudinal rows of ventrals. Fingers with four series of scales. Intense pectination on fourth toe. Reticulate colour pattern, or:

2/ Small species with short, blunt snout. Five supralabials anterior to the subocular. Subocular not in contact with the upper lip. Ventrals arranged in 12 or 14 longitudinal rows. Fourth supraocular divided. Dorsals flat, large and sharply keeled.

One or two rows of granules between the supraoculars and the superciliaries. Color pattern very faint or completely absent, or:

3/ 14 oblique longitudinal rows of ventrals. Relatively shorter hindlegs. Fourth supraocular generally entire. One row of granules between the superciliaries and the supraoculars. Slightly reticulate colour pattern in males. Females with pale band on each side of the body.

Tamar *et al.* (2016) found that the species *Photophilus ipsumcaeruleum* sp. nov. as defined herein diverged from the nearest related species 2.3 MYA, confirming species-level status for this taxon.

**Distribution:** *Photophilus ipsumcaeruleum* sp. nov. sp. nov. is restricted to the region of west Tunisia in the region of Chott el Djerid.

**Etymology:** The species name *P. ipsumcaeruleum* sp. nov. comes from the Latin word "ipsum caeruleum" meaning "very light blue" in colour, as is the case with the dorsal markings of many adults of this species.

#### PHOTOPHILUS AURANTIUS SP. NOV.

LSIDurn:lsid:zoobank.org:act:DD8023C0-E181-48E6-8F3F-CB79F6C345D6

**Holotype:** A preserved specimen at the Museo Civico di Storia Naturale, Carmagnola, Turin, Italy, specimen number MCCI-R1463 collected from the Adadh area, Akakus, Libya, Africa, Latitude 24.8 N., Longitude 10.3 E.

**Paratype:** A preserved specimen at the Museo Civico di Storia Naturale, Carmagnola, Turin, Italy, specimen number MCCI-R1464 collected from the Adadh area, Akakus, Libya, Africa, Latitude 24.8 N., Longitude 10.3 E.

**Diagnosis:** *Photophilus aurantius* sp. nov. has until now been treated as a population of putative "*Acanthodactylus scutellatus* Audouin, 1809" or alternatively "*Acanthodactylus dumerilii* Milne Edwards, 1829", all herein placed in the genus *Photophilus* Fitzinger, 1843: 20. (Type-species by monotypy, *Acanthodactylus scutellatus*).

*P. aurantius* sp. nov. is separated from all other species in the genus *Photophilus* by the following combination of characters: A dorsum that is a bright or dull orange colour generally.

The dorsum also is marked with a combination of smallish whitish-grey spots, more-or-less arranged in rows down the body along with tiny scattered elongate dark spots over the dorsum as well.

The top of the head is just plain orange and lacking any obvious marks or spots.

Upper flank is the same as the dorsum and the lower flank and belly is white.

Upper labials are a combination of white, light orange and with scattered dark spots.

Upper surfaces of front legs are orange with only a small number of very faded whitish patches.

Upper surfaces of the hindlimbs are orange with numerous reasonably well-defined white spots.

The upper surfaces of the anterior part of the tail is dark orange with black peppering.

The upper surfaces of the mid and distal parts of the tail are lighter orange with yellowish beige on top, forming a medial stripe running along the latter part of the tail. Underneath the tail is white.

Inside the ear is black.

Species within the genus *Photophilus* Fitzinger, 1843 are separated from all other species within *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* by one or other of the following three unique combinations of characters:

1/ Elongated pointed snout. Generally three supraoculars.

One row of granules between the supraoculars and the superciliaries. Five supralabials anterior to the subocular. Small, keeled temporals. Tympanic scale absent. First three pairs of submaxillaries in contact. Dorsals small, flat, granular, and weakly keeled in relatively high number. 14 oblique longitudinal rows of ventrals. Fingers with four series of scales. Intense pectination on fourth toe. Reticulate colour pattern, or:

2/ Small species with short, blunt snout. Five supralabials anterior to the subocular. Subocular not in contact with the upper lip. Ventrals arranged in 12 or 14 longitudinal rows. Fourth supraocular divided. Dorsals flat, large and sharply keeled.

One or two rows of granules between the supraoculars and the superciliaries. Color pattern very faint or completely absent, or:

3/ 14 oblique longitudinal rows of ventrals. Relatively shorter hindlegs. Fourth supraocular generally entire. One row of granules between the superciliaries and the supraoculars. Slightly reticulate colour pattern in males. Females with pale band on each side of the body.

Tamar *et al.* (2016) found that the species *Photophilus aurantius* sp. nov. as defined herein diverged from the nearest related species 2.1 MYA, confirming species-level status for this taxon.

*Photophilus aurantius* sp. nov. is depicted in life online at:

<https://www.inaturalist.org/observations/613861>

and

<https://www.inaturalist.org/observations/613870>

and

<https://www.inaturalist.org/observations/141390317>

**Distribution:** *Photophilus ipsumcaeruleum* sp. nov. is restricted to the region of southwest Libya and nearby southeast Algeria, generally near the elevated ranges.

**Etymology:** The species name *P. aurantius* sp. nov. comes from the Latin word "aurantius" meaning "orange" in reflection of the dull orange dorsal colouration in adults.

#### PHOTOPHILUS NETANYAHUI SP. NOV.

LSIDurn:lsid:zoobank.org:act:D831865F-E8CD-4E74-A4FA-BA23C95BC8AD

**Holotype:** A preserved specimen at the Natural History Museum of Crete (NHMC), part of the University of Crete, Heraklion, Crete, specimen number NHMC\_80.3.110.9 collected from Ras el Sudr, 10 km south of Sinai, Egypt, Latitude 29.52 N., Longitude 32.73 E.

**Diagnosis:** *Photophilus netanyahui* sp. nov. has until now been treated as a population of putative "*Acanthodactylus scutellatus* Audouin, 1809" or alternatively "*Acanthodactylus dumerili* Milne Edwards, 1829", all herein placed in the genus *Photophilus* Fitzinger, 1843: 20. (Type-species by monotypy, *Acanthodactylus scutellatus*).

*P. netanyahui* sp. nov. is separated from all other species in the genus *Photophilus* by the following combination of characters: Brownish interspaces between lighter regions on the dorsum, none of which are arranged in the form of spots or similar, versus an obviously spotted form on the dorsum of type *P. scutellatus*. A large brown patch on each of the upper labials, giving them a strongly barred appearance, versus white upper labials in *P. scutellatus* of north Sinai, south Israel and the Nile delta in Egypt as well as most other species in the *P. scutellatus* complex. Upper surfaces of limbs have a reticulated pattern of dark and light brown. Brown spotting on the upper surfaces of the head. Mainly white venter, yellowish feet. No obvious markings on the tail being generally light all over, but with a preponderance of dark flecks and the like at the anterior and anterior flanks of the tail. Venter is white. Inside of ear is dark in colour.

Species within the genus *Photophilus* Fitzinger, 1843 are separated from all other species within *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* by one or other of the following three unique combinations of characters:

1/ Elongated pointed snout. Generally three supraoculars. One row of granules between the supraoculars and the superciliaries. Five supralabials anterior to the subocular. Small, keeled temporals. Tympanic scale absent. First three pairs of submaxillaries in contact. Dorsals small, flat, granular, and weakly keeled in relatively high number. 14 oblique longitudinal rows of ventrals. Fingers with four series of scales. Intense pectination on fourth toe. Reticulate colour pattern, or:

2/ Small species with short, blunt snout. Five supralabials anterior to the subocular. Subocular not in contact with the upper lip. Ventrals arranged in 12 or 14 longitudinal rows. Fourth supraocular divided. Dorsals flat, large and sharply keeled. One or two rows of granules between the supraoculars and the superciliaries. Color pattern very faint or completely absent, or:

3/ 14 oblique longitudinal rows of ventrals. Relatively shorter hindlegs. Fourth supraocular generally entire. One row of granules between the superciliaries and the supraoculars. Slightly reticulate colour pattern in males. Females with pale band on each side of the body.

Tamar *et al.* (2016) found that the species *Photophilus netanyahui* sp. nov. as defined herein diverged from the nearest related species 3.2 MYA, confirming species-level status for this taxon.

**Distribution:** *Photophilus netanyahui* sp. nov. is restricted to the southern parts of the Sinai Peninsula.

**Etymology:** Named in honour of Benjamin Netanyahu, the Israeli Prime Minister as of early 2025. For details see the etymology for *Lenhosertyphlops* (*Paralenhosertyphlops*) *netanyahui* Hoser, 2025 in Hoser (2025) at page 17.

#### LEVITERGRACILIS GEN. NOV.

LSIDurn:lsid:zoobank.org:act:5E414CB7-8753-4B87-9DDA-C28E40B50E86

**Type species:** *Levitergracilis elonmuski* sp. nov. (this paper).

**Diagnosis:** The species within the genus *Levitergracilis* gen. nov. are separated from all other species within *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* by the following unique combination of characters:

Medium-sized, slender body. Sharply pointed snout. Four supralabials anterior to the subocular. Four entire supraoculars. Subocular wedged among 4th and 5th supralabials. Temporal scales keeled. Low number of dorsals. 14 oblique longitudinal rows of ventrals. Four series of scales on fingers. Row of

granules between the supraoculars and superciliaries usually absent, or at times one. Third pair of submaxillaries separated or only partially in contact. A somewhat reticulate color pattern.

The two species within the subgenus *Paralevitergracilis* subgen. nov. are separated from the two species in the nominate subgenus by an absence of whitish-grey or yellow spots on the back.

Female *Paralevitergracilis* subgen. nov. have brown spots on the dorsum and males with barely defined whitish spots (more in the form of a reticulatum) that have no dark patches or borders.

Lizards within the genus *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* are separated from all other lizards by the following combination of characters:

Occipital absent. Fingers with three or four series of scales. Flat ventrals. Collar present. Toes with more or less developed pectination. Femoral pores present. Parietal foramen present.

Tamar *et al.* (2016) found that the species within *Levitergracilis* gen. nov. as defined within this paper diverged from the nearest related genus *Photophilus* gen. nov. Fitzinger, 1843 (type species: *Lacerta scutellata* Audouin 1829) as used within this paper 14.6 MYA confirming that it is best treated as a hitherto unnamed genus.

**Distribution:** North-west Africa.

**Etymology:** The genus name "*Levitergracilis* gen. nov. comes from the Latin word "*Leviter gracilis*" which means, slightly slender, reflecting the relative build of these lizards as compared to closely related species outside of the genus.

**Content:** *Levitergracilis elonmuski* sp. nov. (type species) (this paper); *L. aureus* (Günther, 1903); *L. brunniusmaculus* sp. nov. (this paper); *L. taghitensis* (Geniez and Foucart, 1995).

#### LEVITERGRACILIS ELONMUSKI SP. NOV.

LSIDurn:lsid:zoobank.org:act:44C3D7C6-5CCE-4B6D-9039-B4580E6FE7BB

**Holotype:** A preserved specimen at the Institute of Evolutionary Biology, Barcelona, Spain, specimen number IBES1371, collected from Aglou-Plage, Morocco, Africa, Latitude 29.7264 N., Longitude 9.7902 W.

**Paratype:** A preserved specimen at the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA, specimen number MCZ Herp R-67960 collected from Sands of Sidi-Moussa des Aglou (15 km north-west of Tiznite), Morocco, Africa, Latitude 29.817 N., Longitude -9.833 W.

**Diagnosis:** *Levitergracilis elonmuski* sp. nov. has until now been treated as a population of putative "*Acanthodactylus aureus* Günther, 1903", herein placed in the genus *Levitergracilis* gen. nov.. (Type-species *Levitergracilis elonmuski* sp. nov.).

*L. elonmuski* sp. nov. is separated from all other species in the genus by the following combination of characters:

A dorsum that is mainly yellowish brown in colour with rows of mainly black etched yellow spots running down the back and also on the upper surfaces of the fore and hind limbs. Lower flank and venter is mainly white, but with significant amounts of black peppering on some scales, especially those on the outer parts of the venter; dark patches or peppering on the upper surfaces of the head and a tail that is mainly light orange-brown on top, blackish on the sides and whitish below.

The closely related species *L. aureus* Günther, 1903 is separated from the preceding species by having whitish grey spots running down the back (instead of yellow), that are not mainly bound by black but rather is in the form of a tiny black patch on the anterior edge of these spots.

*L. aureus* also lacks obvious black on the sides of the tail.

The two species within the subgenus *Paralevitergracilis* subgen. nov. are separated from the preceding two species in the nominate subgenus by an absence of whitish-grey or yellow spots on the back.

Female *Paralevitergracilis* subgen. nov. have brown spots on the

dorsum and males with barely defined whitish spots (more in the form of a reticulatum) that have no dark patches or borders.

The species within the genus *Levitergracilis* gen. nov. are separated from all other species within *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* by the following unique combination of characters:

Medium-sized, slender body. Sharply pointed snout. Four supralabials anterior to the subocular. Four entire supraoculars. Subocular wedged among 4th and 5th supralabials. Temporal scales keeled. Low number of dorsals. 14 oblique longitudinal rows of ventrals. Four series of scales on fingers. Row of granules between the supraoculars and superciliaries usually absent, at times one. Third pair of submaxillaries separated or only partially in contact. A somewhat reticulate color pattern.

The two species within the subgenus *Paralevitergracilis* subgen. nov. are separated from the two species in the nominate subgenus by an absence of whitish-grey or yellow spots on the back.

Lizards within the genus *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* are separated from all other lizards by the following combination of characters:

Occipital absent. Fingers with three or four series of scales. Flat ventrals. Collar present. Toes with more or less developed pectination. Femoral pores present. Parietal foramen present.

Tamar *et al.* (2016) found that the species within *Levitergracilis* gen. nov. as defined within this paper diverged from the nearest related genus *Photophilus* gen. nov. Fitzinger, 1843 (type species: *Lacerta scutellata* Audouin, 1829) as used within this paper 14.6 MYA confirming that it is best treated as a hitherto unnamed genus.

Tamar *et al.* (2016) found that *Levitergracilis elonmuski* sp. nov. diverged from its nearest relative *L. aureus* Günther, 1903, 3.4 MYA confirming that it is a very different species.

*Levitergracilis elonmuski* sp. nov. is depicted in life online at:

<https://www.inaturalist.org/observations/147450119>

and

<https://www.inaturalist.org/observations/147102277>

and

<https://www.inaturalist.org/observations/265143786>

*L. aureus* Günther, 1903 is depicted in life online at:

<https://www.inaturalist.org/observations/67051124>

and

<https://www.inaturalist.org/observations/265184007>

and

<https://www.inaturalist.org/observations/264722335>

**Distribution:** *Levitergracilis elonmuski* sp. nov. is found in south-west coastal Morocco from Agadir south to the border area with Western Sahara. The species *L. aureus* Günther, 1903 is found along the coast south through Western Sahara to northern Mauritania, with a separate population in south-east Morocco.

**Etymology:** *L. elonmuski* sp. nov. is named in honour of South African born billionaire, Elon Musk in recognition of his services against government over-reach and censorship both in the USA and Australia.

On 3 July 2025, it was revealed that more than \$65,000 of Australian taxpayer money went down the drain in legal costs from the Australian "eSafety Commissioner's" failed response to a challenge from Elon Musk's "X" (formerly "twitter") in relation to an attempt to censor the website globally. This was the second legal stoush between the Australian "eSafety Commissioner", Ms. Julie Inman Grant and Elon Musk's "X" (formerly "twitter") in relation to an attempt to censor the website globally.

In May 2024, a Federal Court judge denied the Australian eSafety Commissioner's application to extend an injunction on footage posted on X of a stabbing at Wakeley Church, New South Wales from the month prior.

See for example at:

<https://www.skynews.com.au/australia-news/politics/esafety-commissioner-wasted-66000-of-taxpayer-money-on-court-defeat-to-elon-musks-x-and-billboard-chris/news-story/246585ba5a1acb7870461616d4530e2f>

and

<https://www.abc.net.au/news/2024-05-13/court-chooses-to-end-ban-on-wakeley-stabbing-video-on-x-twitter/103829790>

**SUBGENUS PARALEVITERGRACILIS GEN. NOV.**

**LSIDurn:lsid:zoobank.org:act:00A1BA9E-CAC5-4790-81E7-4D54F86799EA**

**Type species:** *Levitergracilis* (*Paralevitergracilis*)

*brunniusmaculus* sp. nov. (this paper).

**Diagnosis:** The species within the genus *Levitergracilis* gen. nov. are separated from all other species within *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* by the following unique combination of characters:

Medium-sized, slender body. Sharply pointed snout. Four supralabials anterior to the subocular. Four entire supraoculars. Subocular wedged among 4th and 5th supralabials. Temporal scales keeled. Low number of dorsals. 14 oblique longitudinal rows of ventrals. Four series of scales on fingers. Row of granules between the supraoculars and superciliaries usually absent, at times one. Third pair of submaxillaries separated or only partially in contact. A somewhat reticulate color pattern.

The two species within the subgenus *Paralevitergracilis* subgen. nov. are separated from the two species in the nominate subgenus by an absence of whitish-grey or yellow spots on the back.

Female *Paralevitergracilis* subgen. nov. have brown spots on the dorsum and males with barely defined whitish spots (more in the form of a reticulatum) that have no dark patches or borders.

Lizards within the genus *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* are separated from all other lizards by the following combination of characters:

Occipital absent. Fingers with three or four series of scales.

Flat ventrals. Collar present. Toes with more or less developed pectination. Femoral pores present. Parietal foramen present.

Tamar *et al.* (2016) found that the species within *Levitergracilis* gen. nov. as defined within this paper diverged from the nearest related genus *Photophilus* gen. nov. Fitzinger, 1843 (type species: *Lacerta scutellata* Audouin 1829) as used within this paper 14.6 MYA confirming that it is best treated as a hitherto unnamed genus.

Tamar *et al.* (2016) found that the species within *Levitergracilis* gen. nov. as defined within this paper diverged from the nearest related species in the subgenus *Paralevitergracilis* subgen. nov. as defined within this paper 10.2 MYA confirming that it is best treated as a hitherto unnamed genus or subgenus as done herein.

**Distribution:** North-west Africa.

**Etymology:** The genus name "*Levitergracilis* gen. nov. comes from the Latin word "*Leviter gracilis*" which means, slightly slender, reflecting the relative build of these lizards as compared to closely related species outsider the genus.

The subgenus name *Paralevitergracilis* subgen. nov. reflects the fact that these lizards are not quite *Levitergracilis* gen. nov.

**Content:** *Levitergracilis* (*Paralevitergracilis*) *brunniusmaculus* sp. nov. (this paper) (type species); *L. taghitensis* (Geniez and Foucart, 1995).

**LEVITERGRACILIS (PARALEVITERGRACILIS)**

**BRUNNIUSMACULUS SP. NOV.**

**LSIDurn:lsid:zoobank.org:act:51223DF7-DCA1-404C-BED6-8CE18AB0921B**

**Holotype:** A specimen at the Laboratoire de Biogéographie et Écologie des Vertébrés de l'École Pratique des Hautes, Etudes,

Montpellier, France, specimen number BEV14828 collected from 123km NE of Fdérík, Mauritania, Africa, Latitude 23.54 N., Longitude -11.95 W.

**Paratype:** A specimen at the Laboratoire de Biogéographie et Écologie des Vertébrés de l'École Pratique des Hautes, Etudes, Montpellier, France, specimen number BEV14829 collected from 110km SSW of Bir Moghreïn, Africa, Latitude 24.37 N., Longitude -11.87 W.

**Diagnosis:** *Levitergracilis brunniusmaculus* sp. nov. has until now been treated as a population of putative "*Acanthodactylus taghitensis* Geniez and Foucart, 1995", herein placed in the genus *Levitergracilis* gen. nov.. (Type-species *Levitergracilis elonmuski* sp. nov.).

*L. brunniusmaculus* sp. nov. is separated from *L. taghitensis* by the fact that adult female *L. brunniusmaculus* sp. nov. have a dorsum covered with large brown spots, versus only tiny to small in female *L. taghitensis*.

Adult male *L. taghitensis* are essentially orangish on the dorsum, versus more whitish grey on the dorsum in male *L. brunniusmaculus* sp. nov. which also have a more strongly reticulated pattern.

These two species are the entirety of the subgenus *Paralevitergracilis* subgen. nov. being within the genus *Levitergracilis* gen. nov..

The species within the genus *Levitergracilis* gen. nov. are separated from all other species within *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* by the following unique combination of characters:

Medium-sized, slender body. Sharply pointed snout. Four supralabials anterior to the subocular. Four entire supraoculars. Subocular wedged among 4th and 5th supralabials. Temporal scales keeled. Low number of dorsals. 14 oblique longitudinal rows of ventrals. Four series of scales on fingers. Row of granules between the supraoculars and superciliaries usually absent, at times one. Third pair of submaxillaries separated or only partially in contact. A somewhat reticulate color pattern.

The two species within the subgenus *Paralevitergracilis* subgen. nov. are separated from the two species in the nominate subgenus by an absence of whitish-grey or yellow spots on the back.

Female *Paralevitergracilis* subgen. nov. have brown spots on the dorsum and males with barely defined whitish spots (more in the form of a reticulatum) that have no dark patches or borders.

Lizards within the genus *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* are separated from all other lizards by the following combination of characters:

Occipital absent. Fingers with three or four series of scales. Flat ventrals. Collar present. Toes with more or less developed pectination. Femoral pores present. Parietal foramen present.

Tamar *et al.* (2016) found that the species within *Levitergracilis* gen. nov. as defined within this paper diverged from the nearest related genus *Photophilus* gen. nov. Fitzinger, 1843 (type species: *Lacerta scutellata* Audouin 1829) as used within this paper 14.6 MYA confirming that it is best treated as a hitherto unnamed genus.

Tamar *et al.* (2016) found that the species within *Levitergracilis* gen. nov. as defined within this paper diverged from the nearest related species in the subgenus genus *Paralevitergracilis* subgen. nov.

as defined within this paper 10.2 MYA confirming that it is best treated as a hitherto unnamed genus or subgenus as done herein.

Liz *et al.* (2022) found a divergence of over 5 MYA for both *Levitergracilis brunniusmaculus* sp. nov. and *L. taghitensis* as defined herein confirming species level divergences between the populations.

**Distribution:** *Levitergracilis brunniusmaculus* sp. nov. is

confined to northwest Mauritania, Africa. The closely related species *L. taghitensis* occurs to the north in north-west Algeria, near the border with Morocco.

**Etymology:** *L. brunniusmaculus* sp. nov. is named in reflection of the brown spots on the dorsum in adult females. In Latin, "brunnius maculus" means "brown spots".

**DORSOVAREEUS GEN. NOV.**

LSIDurn:lsid:zoobank.org:act:AEC61AB6-FC0B-4C65-B1B4-98CB6B44AEFF

**Type species:** *Dorsovareeus lumenflavomaculis* sp. nov. (this paper).

**Diagnosis:** The species within the genus *Dorsovareeus* gen. nov. are separated from all other species within *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* by the following unique combination of characters:

They are characterized by a small to large, slender to robust body; having small flat dorsals (in some cases weakly keeled), three series of scales on the fingers, 12 or 14 straight longitudinal rows of ventrals, three supraoculars, and only slightly to moderately pectinate toes. Relatively pointed snout. One row of granules between the supraoculars and usually 6 superciliaries. Subocular not in contact with the lip. Three rows of scales on the fingers; tricarinate lamellae on underside of fourth toe. Small granular temporal scales. Small tympanic scale present. Ear opening lightly pectinate anteriorly. Medium-sized, keeled scales on the upper surface of the tail. Males and females with 24-26 presacral vertebrae. Considerably diminished color pattern usually with traces of the two dark dorsal bands and the lines of ocelli, or alternatively four dorsal lines of white ocelli set in a very dense and conspicuous black reticulation.

Lizards within the genus *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* are separated from all other lizards by the following combination of characters:

Occipital absent. Fingers with three or four series of scales. Flat ventrals. Collar present. Toes with more or less developed pectination. Femoral pores present. Parietal foramen present.

Tamar *et al.* (2016) found that the species within *Dorsovareeus* gen. nov. as defined within this paper diverged from the nearest related species in the genus *Chorodromus* Fitzinger, 1843: 20. (Type-species by monotypy, *Acanthodactylus lineomaculatus* Dumeril and Bibron, 1839) some 14.8 MYA confirming that it is best treated as a hitherto unnamed genus as done herein.

**Distribution:** North and northwest Africa.

**Etymology:** The genus name *Dorsovareeus* gen. nov. comes from the Latin words "*Dorso varius*" which means spotted back. The spelling of the genus name should not be changed and is deliberate to ensure no homonym is created.

**Content:** *Dorsovareeus lumenflavomaculis* sp. nov. (this paper) (type species); *D. bedriagai* (Lataste, 1881); *D. beershebensis* (Moravec, El Din, Seligmann, Sivan and Werner, 1999); *D. busacki* (Salvador, 1982); *D. deserti* (Milne-Edwards, 1829); *D. latastei* (Boulenger, 1918); *D. maculata* (Gray, 1838); *D. pardalis* (Lichtenstein, 1823); *D. margaritae* (Tamar, Geniez, Brito and Crochet 2017).

**DORSOVAREEUS LUMENFLAVOMACULIS SP. NOV.**

LSIDurn:lsid:zoobank.org:act:88EF0734-500A-44D3-8CB3-6D0C2087EA07

**Holotype:** A specimen at the Centre d'Ecologie Fonctionnelle et Evolutive, Montpellier, France, specimen number BEV.5510 collected from the North shore of Dayet Srji, near Merzouga, Morocco, Africa, Latitude 31.0802 N., Longitude 4.0134 W.

**Paratype:** A specimen at the Institute of Evolutionary Biology, Barcelona, Spain, specimen number IBES2958 collected from 6 km north of Erfoud, Morocco, Africa, Latitude 31.4366 N., Longitude 4.2344 W.

**Diagnosis:** *Dorsovareeus lumenflavomaculis* sp. nov. has until now been treated as a population of putative

"*Acanthodactylus maculata* (Gray, 1838)", herein placed in the genus *Dorsovareus* gen. nov. (Type-species *Dorsovareus lumenflavomaculis* sp. nov.).

*D. lumenflavomaculis* sp. nov. is separated from other species in the genus *Dorsovareus* gen. nov. by the following unique combination of characters:

Two rows of medium-sized circular bright yellow spots running down either side of the back and another two on the flank. The interspaces are bright orange and with bold black markings, creating an overall pattern that is a reticulatum.

Upper surfaces of forelimbs are orange only, while the upper surfaces of the rear limbs each has a row of yellow spots on the upper medial line. All the yellow spots on the body and limbs are somewhat bordered by black and as mentioned more-or-less round.

This contrasts with the nominate form of *D. maculata* (Gray, 1838) from Tripoli, Libya and regions to the west of there generally near the Mediterranean Coast, which has rows of rectangular-shaped yellow blotches and in the interspaces, no black at all, or if present, very faded.

Upper labials are white and brown, being mainly white anteriorly and mainly brown posteriorly.

By contrast the nominate form of *D. maculata* (Gray, 1838) has large white patches or bars on the otherwise orangish upper labials.

The similar species *D. latastei* (Boulenger, 1918) of Algeria, is separated from the preceding species by having a similar dorsal pattern to *D. lumenflavomaculis* sp. nov. although faded, but with small and rectangular shaped yellow spots on the dorsum. Additionally, the upper labials are a combination of orange and yellow, not white. Additionally, it has a longer snout, a lower average number of dorsal scales, more heavily pectinate toes and a faded color pattern.

*D. bedriagai* (Lataste, 1881) of Tunisia is similar in appearance and pattern to *D. latastei* but darker and with a bold well-defined dorsal pattern, rather than faded. It also has 26 presacral vertebrae as opposed to 24-25 in the previous species and flat scales on the dorsum rather than slightly keeled in the other species.

Like *D. bedriagai*, the morphologically similar *D. pardalis* (Lichtenstein, 1823) and *D. deserti* (Milne-Edwards, 1829) both have flat scales on the dorsum, but instead have ventrals arranged in 12 longitudinal rows, versus 14 in *D. bedriagai*.

The related species *D. beershebensis* (Moravec, El Din, Seligmann, Sivan and Werner, 1999) is separated from the preceding species by the following combination of characters:

Three series of scales around the fingers and toes, which are not pectinate; usually four (otherwise three) complete supraoculars; subocular bordering the mouth or not; dorsal scales small, 50-70 across midbody; ventral plates in 10-14, mode 12, straight longitudinal series; lateral clavula of hemipenis has two branches, lateral branch at least 130% the length of median branch; 24-26 presacral vertebrae in males, 24-27 in females.

*D. busacki* (Salvador, 1982) and the morphologically similar *D. margaritae* (Tamar, Geniez, Brito and Crochet 2017) are separated from the preceding species by having dorsal scales that are flat, ventrals arranged in 12 longitudinal rows and the upper temporal is pointed.

The preceding species, forming the entirety of the genus *Dorsovareus* gen. nov. are separated from all other species within *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* by the following unique combination of characters:

They are characterized by a small to large, slender to robust body; having small flat dorsals (in some cases weakly keeled), three series of scales on the fingers, 12 or 14 straight longitudinal rows of ventrals, three supraoculars, and only slightly to moderately pectinate toes. Relatively pointed snout. One row of granules between the supraoculars and the usually 6

superciliaries. Subocular not in contact with the lip. Three rows of scales on the fingers; tricarinate lamellae on underside of fourth toe. Small granular temporal scales. Small tympanic scale present. Ear opening lightly pectinate anteriorly. Medium-sized, keeled scales on the upper surface of the tail. Males and females with 24-26 presacral vertebrae. Considerably diminished color pattern usually with traces of the two dark dorsal bands and the lines of ocelli, or alternatively four dorsal lines of white ocelli set in a very dense and conspicuous black reticulation.

Lizards within the genus *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* are separated from all other lizards by the following combination of characters:

Occipital absent. Fingers with three or four series of scales. Flat ventrals. Collar present. Toes with more or less developed pectination. Femoral pores present. Parietal foramen present.

Tamar *et al.* (2016) found that the species within *Dorsovareus* gen. nov. as defined within this paper diverged from the nearest related species in the genus *Chorodromus* Fitzinger, 1843: 20. (Type-species by monotypy, *Acanthodactylus lineomaculatus* Dumeril and Bibron, 1839) some 14.8 MYA confirming that it is best treated as a hitherto unnamed genus as done herein.

The species *D. lumenflavomaculis* sp. nov. is depicted online at: <https://www.inaturalist.org/observations/106426383>

and  
<https://www.inaturalist.org/observations/150208049>  
and  
<https://www.inaturalist.org/observations/16848364>  
and  
<https://www.inaturalist.org/observations/71067027>

**Distribution:** The species *D. lumenflavomaculis* sp. nov. is only known from the region of the type localities in east Morocco, near the Algerian border.

**Etymology:** The species name *D. lumenflavomaculis* sp. nov. comes from the Latin words "lumen flavo maculis" which means light yellow spots, which is the most common colour configuration in adults of this species.

#### MARLISSAURUS GEN. NOV.

LSIDurn:lsid:zoobank.org:act:43881E07-D6D3-4C14-AF24-1ACDE3DD3115

**Type species:** *Acanthodactylus (Latastia) boueti* Chabanaud, 1917.

**Diagnosis:** The species within the genus *Mariolissaurus* gen. nov. are separated from all other species within *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* by the following unique combination of characters:

A relatively small species. Three rows of scales on the fingers. Only third supraocular preserved while other three reduced to mere granules. Small, keeled dorsal scales. Very fragmented parietals. Conspicuous lanceolate concavity. Two scales between prefrontals as in savignyi. Unpectinate eyelids. Ear opening lacking anterior denticulation. The upper and lower lips come together evenly. Two rows of granules between the supraoculars and the superciliaries. Distinguishable gular fold. Ventrals arranged in straight longitudinal and transverse rows, the longitudinal ones numbering eight. Small and slightly keeled scales on the upper surface of the tail. Low number of femoral pores. Almost inexistant pectination of the fourth toe. Nasal scale not denticulate. Short toes.

Lizards within the genus *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* are separated from all other lizards by the following combination of characters:

Occipital absent. Fingers with three or four series of scales. Flat ventrals. Collar present. Toes with more or less developed pectination. Femoral pores present. Parietal foramen present. Tamar *et al.* (2016) found that the species within *Mariolissaurus*

*gen. nov.* as defined within this paper diverged from the nearest related species in the genus *Psammoplanis* Fitzinger, 1843: 20. (Type-species by monotypy, *Acanthodactylus savignyi*.) some 17.8 MYA confirming that it is best treated as a hitherto unnamed genus as done herein.

**Distribution:** Immediate vicinity of the Dahomey Gap, sub-Saharan west Africa.

**Etymology:** Named in honour of George Mariolis of Maroochydore, Queensland in recognition of a lifetime's work in the bodybuilding, fitness and personal well-being industry both within Australia and internationally. He has combined all three disciplines to improve the lives of countless people.

**Content:** *Mariolissaurus boueti* (Chabanaud, 1917) (treated herein as a monotypic species with a single described subspecies below).

**MARIOLISSAURUS BOUETI MARIOLISI SUBSP. NOV.**

LSIDurn:lsid:zoobank.org:act:30CCC985-6B75-4BB7-84A4-9E47C75B419B

**Holotype:** A preserved specimen at the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA, specimen number MCZ 49714 collected from Lashambi near Banda Hills, northwest of Wendri, Nigeria, Africa, Latitude 9.33 N., Longitude 6.15 E.

**Diagnosis:** *Mariolissaurus boueti mariolisi subsp. nov.* a taxon from east of the Dahomey Gap in Nigeria is similar in most respects to the nominate form of *Mariolissaurus boueti* (Chabanaud, 1917) generally found west of the Dahomey Gap.

*M. boueti mariolisi subsp. nov.* is separated from *M. boueti* by having six well-defined whitish-yellow lines on the dorsum and flanks (versus relatively poorly defined in *M. boueti*) and yellowish-brown on the mid dorsal area, versus reddish brown in *M. boueti*.

The two subspecies form the entirety of the genus *Mariolissaurus gen. nov.*

The species within the genus *Mariolissaurus gen. nov.* are separated from all other species within *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* by the following unique combination of characters:

A relatively small species. Three rows of scales on the fingers. Only third supraocular preserved while other three reduced to mere granules. Small, keeled dorsal scales. Very fragmented parietals. Conspicuous lanceolate concavity. Two scales between prefrontals as in *savignyi*. Unpectinate eyelids. Ear opening lacking anterior denticulation. The upper and lower lips come together evenly. Two rows of granules between the supraoculars and the superciliaries. Distinguishable gular fold. Ventrals arranged in straight longitudinal and transverse rows, the longitudinal ones numbering eight. Small and slightly keeled scales on the upper surface of the tail. Low number of femoral pores. Almost inexistant pectination of the fourth toe. Nasal scale not denticulate. Short toes.

Lizards within the genus *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* are separated from all other lizards by the following combination of characters:

Occipital absent. Fingers with three or four series of scales. Flat ventrals. Collar present. Toes with more or less developed pectination. Femoral pores present. Parietal foramen present. Tamar *et al.* (2016) found that the species within *Mariolissaurus gen. nov.* as defined within this paper diverged from the nearest related species in the genus *Psammoplanis* Fitzinger, 1843: 20. (Type-species by monotypy, *Acanthodactylus savignyi*.) some 17.8 MYA confirming that it is best treated as a hitherto unnamed genus as done herein.

**Distribution:** Immediate vicinity of the east of the Dahomey Gap, sub-Saharan west Africa in Nigeria.

**Etymology:** As for the genus. Named in honour of George Mariolis of Maroochydore, Queensland in recognition of a

lifetime's work in the bodybuilding, fitness and personal well-being industry both within Australia and internationally.

**GAMBELLAUREA GEN. NOV.**

LSIDurn:lsid:zoobank.org:act:EF75E2AD-DF45-4DB6-A848-46F5047DF4DD

**Type species:** *Zootoca tristrami* Günther, 1864.

**Diagnosis:** The species within the genus *Gambellaurea gen. nov.* are separated from all other species within *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* by the following unique combination of characters:

Large, robust body. Two supraoculars. One row of granules between supraoculars and superciliaries. Eyelids without pectination. Large ear opening without anterior pectination. Temporals granular and without keels. Subocular in contact with the upper lip. Four supralabials anterior to the subocular. Dorsals flat and without keels. 10 straight longitudinal rows of ventrals. Three rows of scales on fingers. Toes not pectinate. Scales on upperside of tail flat, medium-sized, unkeeled and subimbricate. Lizards within the genus *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* are separated from all other lizards by the following combination of characters:

Occipital absent. Fingers with three or four series of scales. Flat ventrals. Collar present. Toes with more or less developed pectination. Femoral pores present. Parietal foramen present. Tamar *et al.* (2016) found that the species within *Gambellaurea gen. nov.* as defined within this paper diverged from the nearest related species in the genus *Mariolissaurus gen. nov.* as defined in this paper some 19.4 MYA confirming that it is best treated as a hitherto unnamed genus as done herein.

**Distribution:** West Asia as in the Levant (the region around the Holy Land of Israel).

**Etymology:** *Gambellaurea gen. nov.* is named in honour of Karla Gambell of Maroochydore, Queensland in recognition of a lifetime's work in the bodybuilding, fitness and personal well-being industry both within Australia and internationally. She is the wife of George Mariolis but earned her reputation in the fitness industry well before marrying George Mariolis, who also had a long history in the industry prior.

**Content:** *Gambellaurea tristrami* (Günther, 1864) (type species); *G. iracensis* (Schmidt, 1939); *G. orientalis* (Angel, 1936); *G. robustus* (Werner, 1929).

**TAENEREMIAS OXYDENTALIS SP. NOV.**

LSIDurn:lsid:zoobank.org:act:84952D17-14CD-4AAC-860A-1D0CD3C69932

**Holotype:** A preserved specimen at the Museum of Natural History, London, UK, specimen number BM 1966.286 collected from Nakpanduri, south of Bawku, Ghana, Africa, Latitude 10.38 N., Longitude 0.11 W.

This facility allows access to its holdings.

**Paratype:** A preserved specimen at the University of Washington Burke Museum, Seattle, Washington, USA, specimen number UWBM:Herp:5965, collected from the Gbele Resource Reserve, Upper West Region, Ghana, Africa, Latitude 10.5000 N., Longitude 2.1667 W. at 217 m ASL, (snout-vent length=49 mm; tail length=110 mm; weight=2.4 g).

**Diagnosis:** *Taeneremias oxydentalis sp. nov.* has until now been treated as a population of putative "*Acanthodactylus guineensis* (Boulenger, 1887). Both are herein placed into the genus *Taeneremias* Boulenger, 1921: 228. (Type-species by monotypy, *Eremias guineensis*).

*Taeneremias oxydentalis sp. nov.* of Ghana is separated from the type form of *T. guineensis* of Nigeria, Niger and immediately east of these countries by having a well-defined pattern on the dorsum and flanks of six thin white lines from head and neck to pelvic region. Between these are well defined areas of brown forming stripes down the body.

By contrast *T. guineensis* and the closely related *T. mandjarum*

(Sternfeld, 1916) that being a related species from Cameroon and the Central African Republic both have the same white or yellow stripes but the wide interspace brown stripes are well punctuated with black spots or reticulations.

The head of *T. oxydentalis* sp. nov. is brownish olive in colour, versus brown in *T. guineensis* and *T. mandjarum*.

The upper surfaces of the hind limbs of *T. oxydentalis* sp. nov. are not with well defined yellow spots as seen in *T. guineensis* and *T. mandjarum*.

*T. oxydentalis* sp. nov. has 62 dorsal scale rows at midbody which are smooth in the nape but from midbody onwards become slightly keeled with increasing intensity towards the tail base (versus 54 dorsal scale rows at midbody or less in *T. guineensis*); 17 femoral pores under each leg (versus 18 or more in *T. guineensis* and 16 in the closely related *T. mandjarum*).

*T. oxydentalis* sp. nov. is further separated from both *T. guineensis* and *T. mandjarum* by having the following suite of characters:

2 complete, large central supraoculars on each side followed by 2 enlarged scales anteriorly (plus 2/1 granules) and 1 scale posteriorly (plus 4 granules) and bordered by 1 row of granules in contact with the supraciliaries (the granule row has 1 extra granule on each side outside of the linear arrangement); 10 enlarged collar scales (collar free only on the sides and almost coadunate) (modified from Kirchhof (2021) and other sources).

*T. oxydentalis* sp. nov. is depicted in life online at: <https://www.lacerta.de/AS/Bildarchiv.php?Genus=49&Species=245&Kind=1&RegioId=1380&Regio=Ghana>

*T. guineensis* sp. nov. is depicted in life online at: <https://www.lacerta.de/AS/Bildarchiv.php?Genus=49&Species=245&Kind=1&RegioId=1200&Regio=Nigeria>

and <https://www.lacerta.de/AS/Bildarchiv.php?Genus=49&Species=245&Kind=1&RegioId=1201&Regio=Niger>

The three preceding species form the entirety of the genus *Taeneremias* Boulenger, 1921.

They are separated from all other species within *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* by the following unique combination of characters:

Three rows of scales on the fingers; two supraoculars; ventrals arranged in ten longitudinal rows; scales absent between the prefrontals; temporal scales medium-sized; keeled scales on upperside of tail; nostril situated among three nasal scales.

Lizards within the genus *Acanthodactylus* Fitzinger in Wiegmann, 1834: 10. (Type-species by monotypy, *Lacerta boskiana*), *sensu lato* are separated from all other lizards by the following combination of characters:

Occipital absent. Fingers with three or four series of scales. Flat ventrals. Collar present. Toes with more or less developed pectination. Femoral pores present. Parietal foramen present.

Tamar *et al.* (2016) found that the three species within *Taeneremias* as defined within this paper diverged from the nearest related species in the genus *Gambellisaurea* gen. nov. as defined in this paper some 33.3 MYA confirming that it is best treated as a genus separate to both *Gambellisaurea* gen. nov. and *Acanthodactylus sensu stricto* (also 33.3 MYA divergent).

*Eremias* (*Taeneremias*) *benuensis* Monard, 1949 at page 737 is a junior synonym of *Eremias mandjarum* Sternfeld, 1916, herein placed in the genus *Taeneremias* Boulenger, 1921 as defined herein.

**Distribution:** *Taeneremias oxydentalis* sp. nov. is a native of Ghana.

*T. guineensis* is a taxon from Nigeria, Niger and east of these countries. There may be more than one species within this putative taxon due to significant local variations in specimen morphology.

*T. mandjarum* (Sternfeld, 1916) is a taxon from Cameroon and

the Central African Republic.

**Etymology:** The word “*occidentalis*” is Latin for western, which is the relative distribution of this species as compared to the other taxa in the genus including the better known *T. guineensis*. The spelling of the scientific name for this taxon has been deliberately spelt as “*oxydentalis*” to prevent the risk of creation of a homonym had the spelling remained as “*occidentalis*”.

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#### CONFLICT OF INTEREST

None.

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## **Two new species of lizards in the genus *Omanosaura* Lutz, Bischoff and Mayer, 1986 (Sauria: Lacertidae) from Oman.**

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### **ABSTRACT**

Until now, the genus *Omanosaura* Lutz, Bischoff and Mayer, 1986 comprised just two species.

These were *Omanosaura jayakari* (Boulenger, 1887) and *O. cyanura* (Arnold, 1972).

However, the molecular evidence of Mendez *et al.* (2018) showed that putative *O. cyanura* was in fact three species, each being estimated as being at least 3.47 MYA divergent from one another.

This paper formally names the two previously unnamed taxa as new species.

These are *Omanosaura yes* *sp. nov.* and *O. another* *sp. nov.*

Both are formally named in accordance with the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999) as part of the permanent scientific record.

Correct identification and naming of species is the first and most important step towards their long-term conservation.

**Keywords:** Lizard; Oman; United Arab Emirates; *Omanosaura*; *jayakari*; *cyanura*; new species; *yes*; *another*.

### **INTRODUCTION**

Until now, the genus *Omanosaura* Lutz, Bischoff and Mayer, 1986 comprised just two species.

These were *Omanosaura jayakari* (Boulenger, 1887) and *O. cyanura* (Arnold, 1972).

However, the molecular evidence of Mendez *et al.* (2018) showed that putative *O. cyanura* was in fact three species, each being estimated as being at least 3.47 MYA divergent from one another.

Inspection of specimens of these putative species showed consistent morphological differences between the three taxa.

On the basis of their divergences and ease of separation, the two unnamed forms are formally named herein for the first time.

These are *Omanosaura yes* *sp. nov.* and *O. another* *sp. nov.*

Both are formally named in accordance with the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999) as part of the permanent scientific record.

Correct identification and naming of species is the first and most important step towards their long-term conservation.

### **MATERIALS, METHODS AND RESULTS**

Previously published and available papers on all species in the genus *Omanosaura* Lutz, Bischoff and Mayer, 1986 were reviewed.

The most important of these were Anderson (1896), Anderson (1963), Arnold (1972, 1973, 1989), Bischoff (1987, 2001, 2005,

2007), Bischoff and Schmittler (1981), Böhme *et al.* (2023), Bosch and Kroniger (2008), Boulenger (1887a, 1887b, 1920, 1921), Brown (1985), Burriel-Carranza *et al.* (2019, 2022), Carranza and Burriel-Carranza (2021), Esser (2010), Gardner (2009, 2013), Gebhart (2013), Grossmann *et al.* (2012a, 2012b, 2013), Henkel (2003), Jongbloed (2000), Langerwerf (1984), Leptien (1994, 1997, 2005), Leptien and Böhme (1994), Lutz *et al.* (1986), Mayer and Bischoff (1996), Mendes (2018), Reed and Marx (1959), Sindaco and Jeremcenko (2008), Sindaco *et al.* (2011, 2014), van der Kooij (2001), Wermuth (1965), Werner (1895) and sources cited therein.

Specimens of both putative species in the genus, namely *Omanosaura jayakari* (Boulenger, 1887) and *O. cyanura* (Arnold, 1972) were inspected from across their known ranges.

In the case of putative *Omanosaura jayakari* there was never evidence of there being more than one species.

In the case of putative *O. cyanura*, Mendez *et al.* (2018) flagged three species and these were morphologically diagnosable.

Therefore, I had absolutely no hesitation in deciding to name the two unnamed forms as new species in accordance with the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999) as part of the permanent scientific record.

It should be noted that no synonym names were available and if there had been any, they would have been used.

Unless otherwise stated the descriptions as published below are based on adult male specimens.

Spellings of scientific names are deliberate and should not be altered.

In terms of the conservation of the species, the comments in Hoser (2015a-f and 2019a-b) apply.

No species in this genus appears to be under immediate conservation risk.

**OMANOSAURA YES SP. NOV.**

**LSIDurn:lsid:zoobank.org:act:3B6B9E29-8F5D-4EBB-A996-FA1A8A13AD3C**

**Holotype:** A preserved specimen at the Natural History Museum, London, United Kingdom, specimen number NHMUK ZOO 1977.73-74 collected from Jabal al Habinah, 9 km northwest of Saiq, Jabal khdhar, 6100 ft, Oman.

This facility allows access to its holdings.

**Paratype:** A preserved specimen at the Natural History Museum, London, United Kingdom, specimen number NHMUK ZOO 1996.395 collected from near Dibab, Oman.

**Diagnosis:** Putative *Omanosaura cyanura* (Arnold, 1972) has been treated as a single taxon occupying a zone from the north-east of the United Arab Emirates, through the Al Hajar Mountains in the north of Oman.

However, the molecular evidence of Mendez *et al.* (2018) showed that putative *O. cyanura* was in fact three species, each being estimated as being at least 3.47 MYA divergent from one another.

As the trio of forms are morphologically diagnosable, the two unnamed ones are formally named in this paper for the first time.

The type form of *O. cyanura* with a type locality of "Trucial States, Wadi Shawkah, Latitude 25.06 N., Longitude 50.03 E." is found in the western Al Hajar Mountains generally north of the border with Oman in the United Arab Emirates.

Immediately south of the border with the United Arab Emirates and inside Oman, one finds *Omanosaura another sp. nov.*

From central north Oman and including the eastern Al Hajar Mountains *Omanosaura yes sp. nov.* occurs.

The three species are separated from one another as follows:

Adult *O. cyanura* has a yellowish-brown coloured head (upper surfaces) and a strongly dark reddish dorsum. The upper surfaces of the limbs are orangish grey.

Adult *O. another sp. nov.* has a dark reddish-brown head and dorsum. The upper surfaces of the limbs are purplish red.

Adult *O. yes sp. nov.* has a faded reddish grey dorsum with significant light peppering all over, this light peppering is not evident in the other two species. The top of the head also has numerous dark spots all over, these also being found on the upper surfaces of the forelimbs, again being quite different to the other two species.

Juveniles of the three preceding species have whitish-yellowish and dark longitudinal stripes and bluish tails.

The three preceding species are also sympatric with the other species in the genus, namely *Omanosaura jayakari* (Boulenger, 1887), which occupies a slightly larger range that overlays that of the three preceding species, also generally associated with the Al Hajar Mountains.

"*Lacerta jayakari* Boulenger, 1887" is the type species of the genus *Omanosaura* Lutz, Bischoff and Mayer, 1986.

*O. cyanura*, *O. another sp. nov.* and *O. yes sp. nov.* are separated from all other Lacertid lizard species by the following combination of characters: Small species differentiated from all other species by possessing a double series of carinate and bluntly spinose lamellae on the undersides of the digits. Other characters, which in combination define *O. cyanura*, *O. another sp. nov.* and *O. yes sp. nov.* are very slender limbs and tail, very depressed habitus, a series of strongly expanded plates under lower forelimb, large scales on the tibia, very strongly keeled caudal scales, hemipenis with well-developed armature, retracted lobes flattened and complexly folded, and micro-ornamentation of crown-shaped tubercles, and a bright blue tail. The sympatric *O. jayakari* is much larger, has higher meristic

counts, tubercular subdigital lamellae, a hemipenial micro-ornamentation of recurved spines and a dorsum that invariably has well defined white spots on it.

The closely related taxon *Apathya cappadocica* (Werner, 1902) of Turkey, North Iraq and northwest Iran has carinate toes but there is only one series of subdigital lamellae and the lower eyelid has a 'window' of transparent, black-edged scales (modified from Arnold 1972).

The genus *Omanosaura* is further separated from all other Lacertid lizards as follows:

*Omanosaura* has two postnasals on each side and five to seven supralabials in front of the subocular. A massetericum is never present, and the tympanum is very small. The collar is very narrow, and the caudal scales are strongly keeled. Unlike lizards of the genus *Podarcis*, *Omanosaura* has strongly developed skin folds on both sides of the neck. *Omanosaura* differs from *Podarcis* (*sensu* Arnold 1973), *Archaeolacerta*, *Timon* and *Apathya* in that the frontal is doubly indented on its leading edge and in the granular temporal scaling. It also differs from all these species, except *Apathya*, in that the supratemporals lie on the parietal plate. In contrast to all other Palaearctic Lacertidae, the large first supratemporal is followed by several smaller ones, which always meet with beveled edges. There is an additional row of enlarged scutes on the inner side of the forearm, and a very strongly developed hemipenis armature (*sensu* Arnold 1973) is present. The number of presacral scutes is very constant and low (25 in males and 26 in females) (modified from Lutz 1986).

*Omanosaura yes sp. nov.* is depicted in life online at:

<https://www.lacerta.de/AS/Bildarchiv.php?Genus=48&Species=226&Kind=1&RegioId=563&Regio=Oman> (bottom six images)

*O. another sp. nov.* is depicted in life online at:

<https://www.lacerta.de/AS/Bildarchiv.php?Genus=48&Species=226&Kind=1&RegioId=563&Regio=Oman> (top image only)

and

<https://www.inaturalist.org/observations/58464040>

*O. cyanura* is depicted in life online at:

<https://www.inaturalist.org/observations/1122449>

and

<https://www.inaturalist.org/observations/255996673>

and

<https://www.inaturalist.org/observations/189733623>

**Distribution:** *Omanosaura yes sp. nov.* occurs from central north Oman and including the eastern Al Hajar Mountains.

**Etymology:** "Yes" is the word exclaimed when a herpetologist catches this species for the first time.

**OMANOSAURA ANOTHER SP. NOV.**

**LSIDurn:lsid:zoobank.org:act:6A7ECE41-13FE-4397-A049-1E9586D35D5E**

**Holotype:** The lizard depicted in the image posted at:

<https://www.inaturalist.org/observations/58464040>

being from Al Buraymi Governorate, Oman, photographed by D. H. Fischer on 26 January 2015.

The same image of the same holotype specimen is at: <https://www.lacerta.de/AS/Bildarchiv.php?Genus=48&Species=226&Kind=1&RegioId=563&Regio=Oman> (top image only)

**Diagnosis:** Putative *Omanosaura cyanura* (Arnold, 1972) has been treated as a single taxon occupying a zone from the north-east of the United Arab Emirates, through the Al Hajar Mountains in the north of Oman.

However, the molecular evidence of Mendez *et al.* (2018) showed that putative *O. cyanura* was in fact three species, each being estimated as being at least 3.47 MYA divergent from one another.

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"*Lacerta jayakari* Boulenger, 1887" is the type species of the genus *Omanosaura* Lutz, Bischoff and Mayer, 1986.

*O. cyanura*, *O. another sp. nov.* and *O. yes sp. nov.* are separated from all other Lacertid lizard species by the following combination of characters: A small species differentiated from all other species by possessing a double series of carinate and bluntly spinose lamellae on the undersides of the digits. Other characters, which in combination define *O. cyanura*, *O. another sp. nov.* and *O. yes sp. nov.* are very slender limbs and tail, very depressed habitus, a series of strongly expanded plates under lower forelimb, large scales on the tibia, very strongly keeled caudal scales, hemipenis with well-developed armature, retracted lobes flattened and complexly folded, and micro-ornamentation of crown-shaped tubercles, and a bright blue tail. The sympatric *O. jayakari* is much larger, has higher meristic counts, tubercular subdigital lamellae, a hemipenial micro-ornamentation of recurved spines and a dorsum that invariably has well defined white spots on it.

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The genus *Omanosaura* is further separated from all other Lacertid lizards as follows:

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<https://www.lacerta.de/AS/Bildarchiv.php?Genus=48&Species=226&Kind=1&Regid=563&Regio=Oman> (top image only)

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and

<https://www.inaturalist.org/observations/255996673>

and

<https://www.inaturalist.org/observations/189733623>

**Distribution:** *Omanosaura another sp. nov.* is found immediately south of the border, with the United Arab Emirates and inside Oman.

**Etymology:** "Another" is a commonly exclaimed word by a herpetologist when they catch and photograph this species for the first time.

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#### CONFLICT OF INTEREST

None.

**A new species of Garter Snake from Guerrero, Mexico, closely associated with *Brucerogersus chrysocephalus* (Cope, 1885) (Natricinae: Colubridae).**

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**ABSTRACT**

In spite of intensive interest from herpetologists, not all species within the North American Garter Snake group, *Thamnophis* Fitzinger, 1843 *sensu lato* have yet been formally named.

Hoser (2012) used available and new names to subdivide the genus *Thamnophis* as then recognised into a number of genera based on divergences estimated at 10 or more million years.

That arrangement has been corroborated by more recent molecular studies.

This paper formally names a morphologically and genetically divergent northwestern population of putative *Brucerogersus chrysocephalus* (Cope, 1885) from Mexico as a new species *B. aa* sp. nov.

in accordance with the rules of the *International Code of Zoological Nomenclature* (Ride et al. 1999) as part of the permanent scientific record.

Correct identification and naming of species is the first and most important step towards their long-term conservation.

This is especially the case in an area of significant biodiversity such as Mexico, and when faced with significant human population increases and the environmental destruction this causes.

**Keywords:** Snake; Garter Snake; Mexico; Oaxaca; Veracruz; Guerrero; Puebla; *Thamnophis*; *Brucerogersus*; *chrysocephalus* new species; *aa*.

**INTRODUCTION**

In spite of intensive interest from herpetologists, not all species within the North American Garter Snake group, *Thamnophis* Fitzinger, 1843 *sensu lato* have yet been formally named.

Hoser (2012) used available and new names to subdivide the genus *Thamnophis* as then recognised into a number of genera based on divergences estimated at 10 or more million years.

That arrangement has been corroborated by more recent molecular studies.

Grünwald et al. (2024) most recently named "*Thamnophis ahumadai* Grünwald, Mendoza-Portilla, Grünwald, Montano-Ruvalcaba, Franz-Chavez, Garcia-Vazquez and Reyes-Velasco, 2024" from Jalsico, Mexico.

That taxon is herein placed in the genus *Adelophis* Duges, 1879 (in Cope 1879).

*Adelophis copei* Duges in Cope (1879) is the type species of the genus *Adelophis*.

Grünwald et al. (2024) also flagged other potentially unrecognised species or subspecies. More than a year has passed since the publication of that paper in June 2024 and neither the authors of that paper or anyone else has indicated any intention of formally naming any of the other potentially flagged taxa.

Rather than allowing a species to potentially expire through indifference, a previously unnamed form from Guerrero is

formally named in this paper in accordance with the rules of the *International Code of Zoological Nomenclature* (Ride et al. 1999) as part of the permanent scientific record.

This paper formally names a morphologically and genetically divergent northwestern population of putative *Brucerogersus chrysocephalus* (Cope, 1885) from Guerrero, Mexico as a new species. It is named *B. aa* sp. nov..

Correct identification and naming of species is the first and most important step towards their long-term conservation.

This is especially the case in an area of significant biodiversity such as Mexico, and when faced with significant human population increases and the environmental destruction this causes.

**MATERIALS AND METHODS**

Following the flagging of a potentially unnamed form associated with *Brucerogersus chrysocephalus* (Cope, 1885) identified by Grünwald et al. (2024) as "*Thamnophis aff. chrysocephalus*" (see fig. 1. on page 161), *Brucerogersus chrysocephalus* (Cope, 1885) *sensu lato* was audited.

This involved a sweep of the relevant literature and inspection of specimens of the putative taxon from across the known range of the species, including the Mexican states of Oaxaca, Veracruz and Guerrero.

Potential available synonym names were also assessed.

Included was viewing of available images with good quality

location data and museum holdings.

Literature relevant to the taxonomic and nomenclatural decision to formally name the new species included Bocourt (1873), Boulenger (1893), Burbrink and Fitterman (2019), Cope (1879, 1885, 1900), Eisermann *et al.* (2016), Grünwald *et al.* (2014), Fitzinger (1843), Grübner (2006), Hall (1951), Hallas (2021), Hallmen and Chlebowy (2001), Hallmen and Grübner (2006), Heimes (2016), Hoser (2012), Köhler (2008), Liner (2007), Mata-Silva *et al.* (2015), McCranie (2011, 2015), Queiroz *et al.* (2002), Ride *et al.* (1999), Rossman (1965), Rossman *et al.* (1996), Smith (1942, 1943), Smith *et al.* (1950), Taylor (1940, 1942), Webb (1982), Wilson and Meyer (1985), Wilson and McCranie (2003), Woolrich-Piña *et al.* (2017) and sources cited therein.

## RESULTS

Due to clear genetic divergence as shown by Grünwald *et al.* (2024), consistent morphological differences, allopatric distribution and all available evidence suggesting that the Guerrero, Mexico population of putative "*Thamnophis aff. chrysocephalus*" is evolving separately from nominate "*Thamnophis chrysocephalus* (Cope, 1885)" it is formally recognised herein as a separate and new species.

The type locality for "*Eutaenia chrysocephala* Cope, 1885" is Orizaba, Veracruz, Mexico.

An alleged synonym is "*Thamnophis eburatus* Taylor, 1940".

That taxon has a type locality of Cerro San Felipe, Oaxaca, Mexico.

It is evidently of the same form as the type form and not of the form identified by Grünwald *et al.* (2024) as the "*Thamnophis aff. chrysocephalus*" Guerrero population.

As there is no available name for the "*Thamnophis aff. chrysocephalus*" Guerrero population it is formally named herein as *Brucerothersus aa sp. nov.*

It should be noted that no synonym names were available and if they had been they would have been used.

Unless otherwise stated the description as published below is based on adult male specimens.

Spellings of the scientific name is deliberate and should not be altered.

In terms of the conservation of this species, the comments in Hoser (2015a-f and 2019a-b) apply.

## BRUCEROTHERSUS AA SP. NOV.

**LSID**Durn:lsid:zoobank.org:act:356B2FF0-44CB-43EC-AA6E-A6B9ACE88B6A

**Holotype:** A preserved specimen at the University of Kansas Biodiversity Institute Herpetology Collection, Kansas, USA, specimen number KU KUH 182696 collected from 0.8-1.6 km NNW (airline) of Puerto del Gallo, Guerrero, Mexico, Latitude 17.48 N., Longitude -100.19 W.

This facility allows access to its holdings.

**Paratypes:** Two preserved specimens at the University of Kansas Biodiversity Institute Herpetology Collection, Kansas, USA, being specimen number KU KUH 182697 collected from 14.1-14.4 km SW El Jiquero, Guerrero, Mexico, Latitude 17.43 N., Longitude 100.08 W. and specimen number KU KUH 182698 collected from 5.3 km SW El Jiquero, Guerrero, Mexico, Latitude 17.47 N., Longitude -100.04 W.

**Diagnosis:** Until now *Brucerothersus aa sp. nov.* of Guerrero, Mexico has been treated as a northwest population of the Mexican Garter Snake species "*Eutaenia chrysocephala* Cope, 1885" better known as *Thamnophis chrysocephala*.

The genus name "*Eutaenia*" as proposed by Cope in 1885 is a junior homonym for *Eutaenia* Thomson, 1857, being a genus of longhorn beetles, which is why the name *Brucerothersus* Hoser, 2012, was formally proposed for the relevant group of snakes also using "*Eutaenia chrysocephala* Cope, 1885" as the type species. *Brucerothersus chrysocephala* Cope, 1885 is of the form with a type locality of Orizaba, Veracruz, Mexico. This taxon occurs in Veracruz, Oaxaca and the eastern part of Puebla.

An alleged synonym is "*Thamnophis eburatus* Taylor, 1940".

That taxon has a type locality of Cerro San Felipe, Oaxaca, Mexico.

It is evidently of the same species taxon as the type form of "*Eutaenia chrysocephala* Cope, 1885".

*Brucerothersus aa sp. nov.* of Guerrero, Mexico is the form identified by Grünwald *et al.* (2024) as "*Thamnophis aff. chrysocephalus*", being a species from Guerrero, Mexico.

*Brucerothersus aa sp. nov.* is readily separated from *B. chrysocephalus* on the basis of adult colouration.

Adult *Brucerothersus aa sp. nov.* have a thick and well defined light vertebral line running from the back of the head, onto the body, whereupon it fades. The blackish markings on either side of vertebral line on the neck and forebody do not enter the vertebral line space.

By contrast in adult *B. chrysocephalus* there is no thick and well defined light vertebral line running from the back of the head, onto the body, whereupon it fades or alternatively it is thin and ill defined. In adult *B. chrysocephalus* the blackish markings on either side of vertebral line on the neck and forebody do enter the vertebral line space.

Overall the dorsum of *B. aa sp. nov.* is brownish in colour, versus generally a dark greyish in *B. chrysocephalus*. A blackish race of the latter is sometimes known as "*Thamnophis eburatus* Taylor, 1940", but is in fact merely a variant of *B. chrysocephalus*.

*B. aa sp. nov.* has a dull brownish-yellow head, versus a golden-brown head in *B. chrysocephalus*.

The closely related species *B. fulvus* (Bocourt, 1893) including subspecies that are sometimes treated as full species, being the only other member of the genus *Brucerothersus* Hoser, 2012 is separated from *B. chrysocephalus* and *B. aa sp. nov.* by having an unmarked upper surface of the head that is olive in colour and relatively indistinct black markings on the dorsum and upper flank. The iris is yellow as opposed to dull orange to red in *B. chrysocephalus* and *B. aa sp. nov.*

The genus *Brucerothersus* Hoser, 2012 is separated from the genera *Thamnophis* Fitzinger, 1843, *Chilopomoea* Cope 1875 and *Gregswedoshus* Hoser, 2012 by the following suite of characters: A slender body, and a wide, flat head, with a large eye.

*Brucerothersus* Hoser, 2012 has a head more triangular in shape than seen in other Garter Snakes in the genera *Thamnophis*, *Chilopomoea* and *Gregswedoshus*.

The side of the eye contracts the frontal plate, so that it is not wider than the superciliaries posteriorly. Superior labials eight, none higher than long, fourth and fifth below orbit. The inferior surfaces are dark which causes a good definition of the lateral line. There are representations of two rows of lateral black spots, but they are merely black scale-borders, those of the inferior row the more distinct, although these may vary and sometimes appear bar or zig-zag like, sometimes interspersed with white. A similar row of black edges is on the first row of scales. All of these spots become distinct on the sides of the neck. Nuchal spot large, black, conspicuous and with a shallow notch behind; no occipital or other spots on the head. The gastrosteges often have black bases. Keeled dorsal scales and a single anal plate.

*Brucerothersus aa sp. nov.* is depicted online at:

<https://www.inaturalist.org/observations/154285301>

*B. chrysocephalus* is depicted in life online at:

<https://www.inaturalist.org/observations/4904583>

and

<https://www.inaturalist.org/observations/176329757>

**Distribution:** *Brucerothersus aa sp. nov.* is confined to Guerrero, Mexico.

**Etymology:** When I mentioned to my wife and kids this new species, they merely uttered the word "aa" and hence the name for the taxon.

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CONFLICT OF INTEREST - NONE.

## **Six new species in the African Water Snake genera *Grayia* Günther, 1858 and *Xenurophis* Günther, 1863.**

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### **ABSTRACT**

Recent molecular studies including that of Chaney *et al.* (2024) have flagged several potentially unnamed species of African Water Snake in the genera *Grayia* Günther, 1858 and *Xenurophis* Günther, 1863. All are native to wetter parts of sub-Saharan Africa, which is a region of immense growth in human populations.

There is a desperate need to catalogue biodiversity before it becomes extinct due to human indifference.

This paper takes the critically important step of identifying and naming six morphologically distinct and highly divergent species of African Water Snake, all of which inhabit river systems under intense human pressure.

**Keywords:** Africa; *Grayia*; *Xenurophis*; *tholloni*; *ornata*; Congo; new species; *adelynhoserae*; *jackyhoserae*; *paludicola*; *michaelsmythi*; *monicasmitae*; *aviyemenii*.

### **INTRODUCTION**

Recent molecular studies including that of Chaney *et al.* (2024) have flagged several potentially unnamed species of African Water Snake in the genera *Grayia* Günther, 1858 and *Xenurophis* Günther, 1863.

All are native to wetter parts of sub-Saharan Africa, which is a region of immense growth in human populations.

The centre of evolution for both genera is the Congo River basin, most of which lies within the Democratic Republic of Congo (DRC).

To get an idea as to how much of a threat human overpopulation is in this region, one only needs to look at the population growth in the DRC.

According to the website at:  
[https://www.worldometers.info/world-population/democratic-republic-of-the-congo-population/#google\\_vignette](https://www.worldometers.info/world-population/democratic-republic-of-the-congo-population/#google_vignette)

The population of DRC stood at 112,952,757 as of 7.27 PM, Australian Eastern time on 13 July 2025.

In 1960 it was just 15,264,846.

That is an increase of more than 7 times in just 45 years.

It is a conservative estimate that there may well be over 1 billion people in DRC in less than 100 years!

The situation in the rest of Africa is equally dire!

Thus there is a desperate need to catalogue biodiversity before it becomes extinct due to human indifference.

This paper takes the critically important step of identifying and naming six morphologically distinct and highly divergent species of African Water Snake, all of which inhabit river systems under intense human pressure in this epicentre of

human population growth, habitat destruction and ecosystem collapse.

### **MATERIALS AND METHODS**

Following on from the paper of Chaney *et al.* (2024), the genus *Grayia* Günther, 1858 was audited to see if there were any remaining unnamed forms.

Chaney *et al.* (2024) and the earlier work of Chaney in her PhD thesis was reviewed.

Likewise, all other earlier relevant publications on the genus were reviewed to see if any unnamed species were flagged.

Lineages identified by Chaney *et al.* (2024) that were Pliocene or older in terms of divergence that remained unnamed were inspected to see if they represented unnamed species not recognised by Chaney *et al.* (2024) or other authors.

Some of these lineages did in fact have available names (e.g. *G. furcata* Mocquard, 1887 was available for the divergent population found around Kinshasa, Democratic Republic of Congo and Brazzaville, Congo, including locations to the north, which Chaney *et al.* (2024) had merely referred to as *Grayia ornata* (Bocage, 1866), with a type locality of north Angola.

However, six lineages did not have any available names.

These were audited by way of inspection of specimens, including though images either sent to me or available online, and a review of the available literature.

Publications relevant to the taxonomic and nomenclatural decisions herein included Adams *et al.* (2024), Barnett (2001), Barnett and Emms (2005), Bocage (1866a, 1866b), Boettger (1889), Böhme *et al.* (2011, 2023), Boulenger (1897, 1901), Branch and Rödel (2003), Broadley (1983, 1991), Broadley and Cotterill (2004), Broadley and Howell (1991), Broadley *et al.* (2003), Burger *et al.* (2004), Carlino and Pauwels (2015),

Chaney *et al.* (2024), Chifundera (1990), Chippaux and Jackson (2019), Chirio and Lebreton (2007), Chirio and Ineich (2006), Dollo (1887), Ernst *et al.* (2020), Gruschwitz *et al.* (1991), Günther (1858, 1863, 1888, 1895), Haagner *et al.* (2000), Hallowell (1844, 1854), Hughes (1983, 2013), ICZN (2012), Jackson (2008), Jackson and Blackburn (2007), Jackson *et al.* (2007), Jacobsen (2009), Largen and Rasmussen (1993), Largen and Spawls (2010), Laurent (1954, 1956), Lawson (1993), Leach (1818), Loveridge (1929, 1936, 1956, 1957), Marques *et al.* (2018), Meirte (1992), Menzies (1966), Monard (1940), Monasterio (2016), Mocquard (1897), Pauwels (1996), Pauwels and Colyn (2023), Pauwels and David (2008), Pauwels and Meirte (1996), Pauwels and Vande Weghe (2008), Pauwels *et al.* (1998, 2000a, 2000b, 2002a, 2002b, 2022), Perret (1961), Pietersen *et al.* (2021), Pitman (1974), Ride *et al.* (1999), Rochebrune (1884), Rödel and Mahsberg (2000), Rödel *et al.* (1999), Sanchez-Vialas (2022), Schmidt (1923), Segniabeto *et al.* (2011, 2022), Senter and Chippaux (2022), Spawls *et al.* (2002, 2023), Sternfeld (1917), Trape (2023), Trape and Balde (2014), Trape and Mané (2004, 2006, 2015, 2017), Trape and Roux-Estève (1995), Wallach *et al.* (2014), Werner (1899), Witte (1933) and sources cited therein.

## RESULTS

All six above-mentioned unnamed lineages within *Grayia* Günther, 1858 *sensu lato* were identifiable as separate species based on consistent morphological differences.

All are formally named herein in accordance with the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999) as amended (ICZN 2012) as part of the permanent scientific record.

*Xenurophis* Günther, 1863, type species *Xenurophis caesar* Günther, 1863 is also resurrected from the synonymy of *Grayia* Günther, 1858, type species *Grayia silurophaga* Günther, 1858, which is a synonym of *Macrophis ornatus* Bocage, 1866.

Chaney *et al.* (2024) found the two relevant lineages diverged from each other in the Oligocene, supporting my decision to split *Grayia* Günther, 1858 *sensu lato* using available names.

Four of the six newly named lineages are within *Grayia* Günther, 1858.

Two of the six newly named lineages are within *Xenurophis* Günther, 1863.

*Grayia ornata* (Bocage, 1866) as recognised by Chaney *et al.* (2024) is split five ways with three species formally named for the first time.

*G. smythii* is split three ways with one species formally named for the first time.

*Xenurophis tholloni* (Mocquard, 1897) is split three ways with two species formally named for the first time.

## INFORMATION RELEVANT TO THE FORMAL DESCRIPTIONS THAT FOLLOW

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

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

In terms of the following formal descriptions, spelling of names should not be altered in any way for any purpose unless expressly and exclusively called for by the rules governing Zoological Nomenclature as administered by the International Commission of Zoological Nomenclature (see Ride *et al.* 1999 and ICZN 2012).

Material downloaded from the internet and cited anywhere in this paper was downloaded and checked most recently as of 13 July 2025, unless otherwise stated and were accurate in terms of the context cited herein as of that date.

Unless otherwise stated explicitly, colour descriptions apply to living adult male specimens of generally good health and not under any form of stress by means such as excessive cool,

heat, dehydration, excessive aging or abnormal skin reaction to chemical or other input.

This includes the descriptions of the snakes not including pre-sloughing snakes, which are often significantly different to the usual colouration for the specimen or species, being usually more whitish or dull.

Note that there is ordinarily some sexual dimorphism between adults of species within the relevant taxa and in these species there are quite significant colour changes from young to adult.

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

The "version of record" is the printed version and not pdf version. Both are identical in all materially relevant ways except for the fact that the images in the printed version may be in black and white, as opposed to colour as seen in the pdf version.

The people who assisted with provision of photos and other materials used within this paper or for research by me are also thanked for their assistances, for which they sought nothing in return.

The use of provocative and interesting etymologies in this and/or other papers is deliberate and designed to further public interest in the relevant species, which will aid conservation outcomes and/or to highlight other matters of public importance that may otherwise be overlooked.

The conservation status of the newly named taxa is uncertain and the long-term prognosis is worrying on the basis of human population pressures and endemic poverty in the regions that the species occur.

Immediate recognition of and monitoring of the new taxa will be the best way to secure them into the future. Each are significant units for conservation management.

The relevant comments of Hoser (2015a-f, 2019a-b) and sources cited therein apply.

## GRAYIA ADELYNHOSERAE SP. NOV.

LSIDurn:lsid:zoobank.org:act:32EC9D6B-745D-45EF-B1A6-AE601EEF89A0

**Holotype:** A specimen at the University of Texas at El Paso, El Paso, Texas, United States of America specimen number UTEP 22635 collected from the Busira River, Balolombo Village, Democratic Republic of Congo (DRC), Africa, Latitude -00.259 S., Longitude 19.636 E. at 305 metres ASL.

**Paratypes:** Two specimens at the University of Texas at El Paso, El Paso, Texas, United States of America being specimen number UTEP 22637 collected from Momboyo River, Bolondo-Bulumbe Village, Democratic Republic of Congo (DRC), Africa, Latitude -00.407 S., Longitude 19.144 E. at 312 metres ASL. and specimen number UTEP 22638 collected from 2 km E of Bolondo-Bulumbe at the Isankele Village River, Democratic Republic of Congo (DRC), Africa, Latitude -00.41 S., Longitude 19.18 E.

**Diagnosis:** Until now, putative *Grayia ornata* (Bocage, 1866) has been treated a widespread central African species with a distribution extending from Angola in the south to include the Congo River basin and others to the immediate north as far north as Cameroon and presumably including the Central African Republic.

Chaney *et al.* (2024) published a detailed phylogeny of this putative taxon and split off the most divergent mainly eastern population as a new species, being *G. obscura* Chaney, Greenbaum and Pauwels, 2024 (listed in the paper erroneously as 2023).

However, the same paper identified five other species-level divergent populations, which they treated all as being putative *G. ornata*.

Besides *G. ornata* being an available name for the (west) coastal population, the name *G. furcata* Mocquard, 1887 is available for

the population found around Kinshasa, Democratic Republic of Congo and Brazzaville, Congo, including locations to the north. Three other divergent lineages remained unnamed and these are formally named herein.

These are *G. adelynhoserae* sp. nov. for the population from the Middle Congo Basin, generally upstream from the rapids near Kinshasa, Democratic Republic of Congo (DRC) and Brazzaville, Congo to central Congo (DRC); *G. jackyhoserae* sp. nov. for the upstream population found west of the Great Rift Valley around the locations of Bazinga and Aweza-Libulku in the DRC and *G. paludicola* sp. nov. for the population found around Umangi, Kuku and Kona in the DRC.

The five preceding species are separated from one another by the following character combinations:

*G. adelynhoserae* sp. nov. is tending towards melanistic in coloration on top.

Dorsal pattern of dark black bands that are narrow on top and widen on the flanks as a V-shape.

Overall the V-shapes on the flanks are thick-set.

The rest of the dorsum is a lighter brown, tending towards whitish underneath and including the bottom of each dorsal band where it meets the ventral areas. Head is brown on top and sides and with significant greyish-black peppering.

Black under the eye. The upper labials are yellow, but with black etching on the posterior upper edge of each scale only. Tail markings basically indistinct, being almost a uniform grey colour.

*G. adelynhoserae* sp. nov. is depicted in life online at:

<https://www.inaturalist.org/observations/145953842>

It is also depicted in Chaney *et al.* (2024) at Fig. 20 A.

*G. furcata* is readily separated from the preceding and other relevant species by the combination of the following:

A light brown snake on top, without any tending towards melanism. The dark dorsal cross bands on the body are relatively thin, and this includes the v-shaped parts on the flank. These split on the vertebral line instead of on the lower flank as is seen in *G. adelynhoserae* sp. nov.. Upper labials are white. While the tail is noticeably darker than the body, it is not blackish as seen in *G. adelynhoserae* sp. nov..

*G. furcata* is depicted Chaney *et al.* (2024) at Fig. 20 B and so can be readily compared with *G. adelynhoserae* sp. nov. in the adjoining photo to the left.

*G. jackyhoserae* sp. nov. is an olive-coloured snake on top, rather than yellow-orange-brownish on top in both *G. furcata* and *G. adelynhoserae* sp. nov..

The configuration of the dorsal crossbands is somewhat intermediate to that seen in *G. furcata* and *G. adelynhoserae* sp. nov..

While still relatively narrow, the dorsal bands on *G. jackyhoserae* sp. nov. are slightly thicker than those seen on *G. furcata*. They also tend to split to the v-shape only on the flank, rather than near the vertebral line. The head is yellowish-brown on top versus reddish-brown on top in *G. furcata* and *G. adelynhoserae* sp. nov..

The venter of *G. jackyhoserae* sp. nov. is whitish anteriorly becoming heavily peppered greyish black posteriorly.

*G. jackyhoserae* sp. nov. is depicted in Chaney *et al.* (2024) at Fig. 20 C.

*G. ornata* is similar in pattern to *G. furcata* but is generally olive-yellow on top, rather than with the reddish hue seen in *G. furcata*. The dorsal cross bands are slightly wider than those seen in *G. furcata* and split sharply into V-shapes about half-way down the side of the flank.

The majority of the colour on the back and flanks is yellowish olive but appears quite dark because each scale is etched dark grey.

*G. ornata* is depicted in life online at:

<https://www.inaturalist.org/observations/92923644>

and

<https://www.inaturalist.org/observations/37659104>

*G. paludicola* sp. nov. is similar in lost respects to *G. furcata* as described above, but separated from that species by having broken and irregular crossbands both anteriorly and posteriorly. The head is chocolate brown and the body itself yellow, except for the black bands. The bands on the body are bordered by white and there is a white patch under the eye.

As a group of species, *G. ornata*, *G. furcata*, *G. adelynhoserae* sp. nov., *G. jackyhoserae* sp. nov. and *G. paludicola* sp. nov. are separated from all other species of *Grayia* Günther 1858 and *Xenurophis* Günther 1863 by the following character combination:

Maximum SVL 1190 mm, 17-19 dorsal midbody scale rows; 1-2 upper labial scales in contact with

the eye; 65-90 subcaudals; 8-9 or rarely 7 supralabials; brown, gray, or tan body color with a large number of dark brown or black body bands that split to form a v-shape (bifurcate) on the flanks; 1-3 extralabial scales present in most specimens; venter is cream colored with little to no black or dark brown speckling, except perhaps posteriorly; chin and upper labial scales are usually pale cream.

Snakes in the genera *Xenurophis* Günther 1863 and *Grayia* Günther 1858 form the entirety of the Subfamily Grayiinae Dowling 1967.

The type genus is *Grayia* Günther 1858.

Grayiinae is a subfamily of Afrotropical aquatic snakes diagnosed by smooth scales lacking apical pits, the absence of subocular scales, the possession of a loreal scale, round pupils, moderate to long tails, 15-19 straight dorsal scale rows at midbody, vertebral row not widened, 65-162 divided subcaudals, 7-10 supralabials, two pairs of chin shields, maxillary teeth homogeneous and unspecialized, the absence of posterior hypapophyses, and a banded or striped dorsal pattern, this is sometimes very faded or hard to see unless the snake is closely inspected.

Chaney *et al.* (2024) found that each of *G. ornata*, *G. furcata*, *G. adelynhoserae* sp. nov., *G. jackyhoserae* sp. nov. and *G. paludicola* sp. nov. diverged in the early Pliocene or Miocene, confirming that species level recognition for each of the five putative taxa is warranted.

**Distribution:** *G. adelynhoserae* sp. nov. occurs in the Middle Congo Basin, generally upstream from the rapids near Kinshasa, Democratic Republic of Congo (DRC) and Brazzaville, Congo to central Congo (DRC).

**Etymology:** *G. adelynhoserae* sp. nov. is named in honour of Adelyn Hoser, my eldest daughter of Park Orchards, Victoria, Australia in recognition of more than 25 years services to wildlife conservation.

**GRAYIA JACKYHOSERAЕ SP. NOV.**

**LSIDurn:lsid:zoobank.org:act:960D980A-4AAE-46DB-A4BC-8B1F6A5A60CB**

**Holotype:** A specimen at the University of Texas at El Paso, El Paso, Texas, United States

specimen number UTEP 22639 collected from Aweza-Libulu, Democratic Republic of Congo (DRC), Africa, Latitude 1.963 N. Longitude 30.039 E. at 1175 metres ASL.

**Paratypes:** Two specimens at the University of Texas at El Paso, El Paso, Texas, United States

being specimen numbers UTEP 22640 and UTEP 22641 both collected from Aweza-Libulu, Democratic Republic of Congo (DRC), Africa, Latitude 1.963 N. Longitude 30.039 E. at 1175 metres ASL.

**Diagnosis:** Until now, putative *Grayia ornata* (Bocage, 1866) has been treated a widespread central African species with a distribution extending from Angola in the south to include the Congo River basin and others to the immediate north as far north as Cameroon and presumably including the Central African Republic.

Chaney *et al.* (2024) published a detailed phylogeny of this

putative taxon and split off the most divergent mainly eastern population as a new species, being *G. obscura* Chaney, Greenbaum and Pauwels, 2024 (listed in the paper erroneously as 2023).

However, the same paper identified five other species-level divergent populations, which they treated all as being putative *G. ornata*.

Besides *G. ornata* being an available name for the (west) coastal population, the name *G. furcata* Mocquard, 1887 is available for the population found around Kinshasa, Democratic Republic of Congo and Brazzaville, Congo, including locations to the north. Three other divergent lineages remained unnamed and these are formally named herein.

These are *G. adelynhoserae* sp. nov. for the population from the Middle Congo Basin, generally upstream from the rapids near Kinshasa, Democratic Republic of Congo (DRC) and Brazzaville, Congo to central Congo (DRC); *G. jackyhoserae* sp. nov. for the upstream population found west of the Great Rift Valley around the locations of Bazinga and Aweza-Libulku in the DRC and *G. paludicola* sp. nov. for the population found around Umangi, Kuku and Kona in the DRC.

The five preceding species are separated from one another by the following character combinations:

*G. adelynhoserae* sp. nov. is tending towards melanistic in coloration on top.

Dorsal pattern of dark black bands that are narrow on top and widen on the flanks as a V-shape.

Overall the V-shapes on the flanks are thick-set.

The rest of the dorsum is a lighter brown, tending towards whitish underneath and including the bottom of each dorsal band where it meets the ventral areas. Head is brown on top and sides and with significant greyish-black peppering.

Black under the eye. The upper labials are yellow, but with black etching on the posterior upper edge of each scale only. Tail markings basically indistinct, being almost a uniform grey colour.

*G. adelynhoserae* sp. nov. is depicted in life online at:

<https://www.inaturalist.org/observations/145953842>

It is also depicted in Chaney *et al.* (2024) at Fig. 20 A.

*G. furcata* is readily separated from the preceding and other relevant species by the combination of the following:

A light brown snake on top, without any tending towards melanism. The dark dorsal cross bands on the body are relatively thin, and this includes the v-shaped parts on the flank. These split on the vertebral line instead of on the lower flank as is seen in *G. adelynhoserae* sp. nov.. Upper labials are white. While the tail is noticeably darker than the body, it is not blackish as seen in *G. adelynhoserae* sp. nov..

*G. furcata* is depicted Chaney *et al.* (2024) at Fig. 20 B and so can be readily compared with *G. adelynhoserae* sp. nov. in the adjoining photo to the left.

*G. jackyhoserae* sp. nov. is an olive-coloured snake on top, rather than yellow-orange-brownish on top in both *G. furcata* and *G. adelynhoserae* sp. nov..

The configuration of the dorsal crossbands is somewhat intermediate to that seen in *G. furcata* and *G. adelynhoserae* sp. nov..

While still relatively narrow, the dorsal bands on *G. jackyhoserae* sp. nov. are slightly thicker than those seen on *G. furcata*. They also tend to split to the v-shape only on the flank, rather than near the vertebral line. The head is yellowish-brown on top versus reddish-brown on top in *G. furcata* and *G. adelynhoserae* sp. nov..

The venter of *G. jackyhoserae* sp. nov. is whitish anteriorly becoming heavily peppered greyish-black posteriorly.

*G. jackyhoserae* sp. nov. is depicted in Chaney *et al.* (2024) at Fig. 20 C.

*G. ornata* is similar in pattern to *G. furcata* but is generally olive-yellow on top, rather than with the reddish hue seen in *G. furcata*.

The dorsal cross bands are slightly wider than those seen in *G. furcata* and split sharply into V-shapes about half-way down the side of the flank.

The majority of the colour on the back and flanks is yellowish olive but appears quite dark because each scale is etched dark grey.

*G. ornata* is depicted in life online at:

<https://www.inaturalist.org/observations/92923644> and

<https://www.inaturalist.org/observations/37659104>

*G. paludicola* sp. nov. is similar in lost respects to *G. furcata* as described above but separated from that species by having broken and irregular crossbands both anteriorly and posteriorly. The head is chocolate brown and the body itself yellow, except for the black bands. The bands on the body are bordered by white and there is a white patch under the eye.

As a group of species, *G. ornata*, *G. furcata*, *G. adelynhoserae* sp. nov., *G. jackyhoserae* sp. nov. and *G. paludicola* sp. nov. are separated from all other species of *Grayia* Günther 1858 and *Xenurophis* Günther 1863 by the following character combination:

Maximum SVL 1190 mm, 17-19 dorsal midbody scale rows; 1-2 upper labial scales in contact with

the eye; 65-90 subcaudals; 8-9 or rarely 7 supralabials; brown, gray, or tan body color with a large number of dark brown or black body bands that split to form a v-shape (bifurcate) on the flanks; 1-3 extralabial scales present in most specimens; venter is cream-colored with little to no black or dark brown speckling, except perhaps posteriorly; chin and upper labial scales are usually pale cream.

Snakes in the genera *Xenurophis* Günther 1863 and *Grayia* Günther 1858 form the entirety of the Subfamily Grayiinae Dowling 1967.

The type genus is *Grayia* Günther 1858.

Grayiinae is a subfamily of Afrotropical aquatic snakes diagnosed by smooth scales lacking apical pits, the absence of subocular scales, the possession of a loreal scale, round pupils, moderate to long tails, 15-19 straight dorsal scale rows at midbody, vertebral row not widened, 65-162 divided subcaudals, 7-10 supralabials, two pairs of chin shields, maxillary teeth homogeneous and unspecialized, the absence of posterior hypapophyses, and a banded or striped dorsal pattern, this is sometimes very faded or hard to see unless the snake is closely inspected.

Chaney *et al.* (2024) found that each of *G. ornata*, *G. furcata*, *G. adelynhoserae* sp. nov., *G. jackyhoserae* sp. nov. and *G. paludicola* sp. nov. diverged in the early Pliocene or Miocene, confirming that species level recognition for each of the five putative taxa is warranted.

**Distribution:** *G. jackyhoserae* sp. nov. occurs west of the Great Rift Valley around the locations of Bazinga and Aweza-Libulku in the Democratic Republic of Congo (DRC).

**Etymology:** *G. jackyhoserae* sp. nov. is named in honour of Jacky Hoser, my youngest daughter of Park Orchards, Victoria, Australia in recognition of over 20 years of services to wildlife conservation.

**GRAYIA PALUDICOLA SP. NOV.**

**LSIDurn:lsid:zoobank.org:act:5ED1D372-0B68-4C6E-9C39-DC57AA05947C**

**Holotype:** A specimen at the Royal Belgian institute of Natural Sciences, Bruxelles, Belgium, specimen number RBINS18986 collected from Kona, Mongala Province, Democratic Republic of Congo (DRC), Africa.

**Paratype:** A specimen at the National Museum in Prague, Czech Republic, specimen number

NMP-P6V75320 collected from Kuku, Mongala Province, Democratic Republic of Congo (DRC), Africa.

**Diagnosis:** Until now, putative *Grayia ornata* (Bocage, 1866)

has been treated a widespread central African species with a distribution extending from Angola in the south to include the Congo River basin and others to the immediate north as far north as Cameroon and presumably including the Central African Republic.

Chaney *et al.* (2024) published a detailed phylogeny of this putative taxon and split off the most divergent mainly eastern population as a new species, being *G. obscura* Chaney, Greenbaum and Pauwels, 2024 (listed in the paper erroneously as 2023).

However, the same paper identified five other species-level divergent populations, which they treated all as being putative *G. ornata*.

Besides *G. ornata* being an available name for the (west) coastal population, the name *G. furcata* Mocquard, 1887 is available for the population found around Kinshasa, Democratic Republic of Congo and Brazzaville, Congo, including locations to the north.

Three other divergent lineages remained unnamed and these are formally named herein.

These are *G. adelynhoserae* *sp. nov.* for the population from the Middle Congo Basin, generally upstream from the rapids near Kinshasa, Democratic Republic of Congo (DRC) and Brazzaville, Congo to central Congo (DRC); *G. jackyhoserae* *sp. nov.* for the upstream population found west of the Great Rift Valley around the locations of Bazinga and Aweza-Libulku in the DRC and *G. paludicola* *sp. nov.* for the population found around Umangi, Kuku and Kona in the DRC.

The five preceding species are separated from one another by the following character combinations:

*G. adelynhoserae* *sp. nov.* is tending towards melanistic in coloration on top.

Dorsal pattern of dark black bands that are narrow on top and widen on the flanks as a V-shape.

Overall the V-shapes on the flanks are thick set.

The rest of the dorsum is a lighter brown, tending towards whitish underneath and including the bottom of each dorsal band where it meets the ventral areas. Head is brown on top and sides and with significant greyish-black peppering.

Black under the eye. The upper labials are yellow, but with black etching on the posterior upper edge of each scale only. Tail markings basically indistinct, being almost a uniform grey colour.

*G. adelynhoserae* *sp. nov.* is depicted in life online at:

<https://www.inaturalist.org/observations/145953842>

It is also depicted in Chaney *et al.* (2024) at Fig. 20 A.

*G. furcata* is readily separated from the preceding and other relevant species by the combination of the following:

A light brown snake on top, without any tending towards melanism. The dark dorsal cross bands on the body are relatively thin, and this includes the v-shaped parts on the flank. These split on the vertebral line instead of on the lower flank as is seen in *G. adelynhoserae* *sp. nov.*. Upper labials are white. While the tail is noticeably darker than the body, it is not blackish as seen in *G. adelynhoserae* *sp. nov.*.

*G. furcata* is depicted Chaney *et al.* (2024) at Fig. 20 B and so can be readily compared with *G. adelynhoserae* *sp. nov.* in the adjoining photo to the left.

*G. jackyhoserae* *sp. nov.* is an olive-coloured snake on top, rather than yellow-orange-brownish on top in both *G. furcata* and *G. adelynhoserae* *sp. nov.*.

The configuration of the dorsal crossbands is somewhat intermediate to that seen in *G. furcata* and *G. adelynhoserae* *sp. nov.*.

While still relatively narrow, the dorsal bands on *G. jackyhoserae* *sp. nov.* are slightly thicker than those seen on *G. furcata*. They also tend to split to the v-shape only on the flank, rather than near the vertebral line. The head is yellowish-brown on top versus reddish-brown on top in *G. furcata* and *G. adelynhoserae* *sp. nov.*.

The venter of *G. jackyhoserae* *sp. nov.* is whitish anteriorly becoming heavily peppered greyish black posteriorly.

*G. jackyhoserae* *sp. nov.* is depicted in Chaney *et al.* (2024) at Fig. 20 C.

*G. ornata* is similar in pattern to *G. furcata* but is generally olive-yellow on top, rather than with the reddish hue seen in *G. furcata*. The dorsal cross bands are slightly wider than those seen in *G. furcata* and split sharply into V-shapes about half-way down the side of the flank.

The majority of the colour on the back and flanks is yellowish olive but appears quite dark because each scale is etched dark grey.

*G. ornata* is depicted in life online at:

<https://www.inaturalist.org/observations/92923644>

and

<https://www.inaturalist.org/observations/37659104>

*G. paludicola* *sp. nov.* is similar in lost respects to *G. furcata* as described above but separated from that species by having broken and irregular crossbands both anteriorly and posteriorly. The head is chocolate brown and the body itself yellow, except for the black bands. The bands on the body are bordered by white and there is a white patch under the eye.

As a group of species, *G. ornata*, *G. furcata*, *G. adelynhoserae* *sp. nov.*, *G. jackyhoserae* *sp. nov.* and *G. paludicola* *sp. nov.* are separated from all other species of *Grayia* Günther 1858 and *Xenurophis* Günther 1863 by the following character combination:

Maximum SVL 1190 mm, 17-19 dorsal midbody scale rows; 1-2 upper labial scales in contact with the eye; 65-90 subcaudals; 8-9 or rarely 7 supralabials; brown, gray, or tan body color with a large number of dark brown or black body bands that split to form a v-shape (bifurcate) on the flanks; 1-3 extralabial scales present in most specimens; venter is cream-colored with little to no black or dark brown speckling, except perhaps posteriorly; chin and upper labial scales are usually pale cream.

Snakes in the genera *Xenurophis* Günther 1863 and *Grayia* Günther 1858 form the entirety of the Subfamily Grayiinae Dowling 1967.

The type genus is *Grayia* Günther 1858.

Grayiinae is a subfamily of Afrotropical aquatic snakes diagnosed by smooth scales lacking apical pits, the absence of subocular scales, the possession of a loreal scale, round pupils, moderate to long tails, 15-19 straight dorsal scale rows at midbody, vertebral row not widened, 65-162 divided subcaudals, 7-10 supralabials, two pairs of chin shields, maxillary teeth homogeneous and unspecialized, the absence of posterior hypapophyses, and a banded or striped dorsal pattern, this is sometimes very faded or hard to see unless the snake is closely inspected.

Chaney *et al.* (2024) found that each of *G. ornata*, *G. furcata*, *G. adelynhoserae* *sp. nov.*, *G. jackyhoserae* *sp. nov.* and *G. paludicola* *sp. nov.* diverged in the early Pliocene or Miocene, confirming that species level recognition for each of the five putative taxa is warranted.

**Distribution:** *G. paludicola* *sp. nov.* occurs around Umangi, Kuku and Kona in the Democratic Republic of Congo (DRC), Africa.

**Etymology:** The word “*paludicola*” in Latin means “swamp dwelling”, which accurately states the preferred habitat for the species.

**GRAYIA MICHAELSMYTHI SP. NOV.**

**LSIDurn:lsid:zoobank.org:act:DC8BF736-45B8-4229-8A8C-D57B4624F8DE**

**Holotype:** A specimen at the Museum of Natural History, Division of Herpetology, University of Kansas, Lawrence, Kansas 66045, USA, specimen number KU341872 collected from Chimpanzee Camp, Korup National Park, Mundembatown, Ndian Division, Cameroon, Africa, Latitude 4.95 N., Longitude 8.86667 E. at about 51 metres ASL.

**Diagnosis:** Until now, putative *Grayia smythii* (Leach, 1818) with a type locality of Boma in the Democratic Republic of Congo (DRC) has been treated as a wide-ranging taxon inhabiting wetter parts of sub-Saharan Africa in the tropical belt extending from west Africa to Uganda.

However, the molecular and morphological results of Chaney *et al.* (2024) implied at least three separate species, all diverging in the Pliocene, resulting in three species recognised herein.

These are *G. smythii* of the Congo River basin, *G. triangularis* Hallowell 1854 from west Africa and a third species for which there is no available name.

This is *Grayia michaelsmythi* sp. nov. named herein. It is a taxon from Cameroon, Equatorial Guinea and Gabon in central Africa.

The three species are readily separated from one another as follows:

*G. michaelsmythi* sp. nov. is the only species in the group with irregular whitish longitudinal lines on the side of the body, a uniform brownish-grey body colour, and blackish lower parts.

The other two species have white or whitish ventrals.

*G. triangularis* is the only species with rows of distinct black or grey spots that form lines extending dorsoventrally along the edges of their anterior ventral scales. It is also unusual in having a uniform greyish dorsum without any semblance of banding or similar.

*G. smythii* from the far east of their range sometimes have ventral striping, but not in the form of obvious spots forming lines, but rather as tiny spots or continuous lines. Otherwise, there is no ventral or lateral striping or arranged spots to give rise to this view in specimens from all other parts of the range of this taxon.

*G. smythii* and *G. michaelsmythi* sp. nov. both have squarish-shaped parietal scales, versus triangular in *G. triangularis*.

*G. smythii* is the only species of the trio which has a well-defined dorsal pattern including obvious cross bands.

*G. smythii*, *G. triangularis* and *G. michaelsmythi* sp. nov. as a trio of closely related species are separated from all other species of *Grayia* Günther 1858 and *Xenurophis* Günther 1863 by the following character combination:

Extralabial scale absent; 16-17 dorsal midbody scale rows; 1-2 upper labial scales in contact with the eye; 7-8 supralabials; 75-110 subcaudals; 24 maxillary teeth; dark brown dorsum with darker brown or black chevrons and pale cream, scalloped or triangle pattern on the lower flanks (*G. smythii*) or alternatively a greyish unicolour on the dorsum and flanks (*G. michaelsmythi* sp. nov. or *G. triangularis*).

Snakes in the genera *Xenurophis* Günther 1863 and *Grayia* Günther 1858 form the entirety of the Subfamily Grayiinae Dowling 1967.

The type genus is *Grayia* Günther 1858.

Grayiinae is a subfamily of Afrotropical aquatic snakes diagnosed by smooth scales lacking apical pits, the absence of subocular scales, the possession of a loreal scale, round pupils, moderate to long tails, 15-19 straight dorsal scale rows at midbody, vertebral row not widened, 65-162 divided subcaudals, 7-10 supralabials, two pairs of chin shields, maxillary teeth homogeneous and unspecialized, the absence of posterior hypapophyses, and a banded or striped dorsal pattern, this is sometimes very faded or hard to see unless the snake is closely inspected.

*G. smythii* and *G. triangularis* (as *G. smythii*) are both depicted in Chaney *et al.* (2014) on page 35.

*G. smythii* is depicted in life online at:

<https://www.inaturalist.org/observations/169397503>

and

<https://www.inaturalist.org/observations/259778054>

**Distribution:** *Grayia michaelsmythi* sp. nov. is a taxon from Cameroon, Equatorial Guinea and Gabon in central Africa.

**Etymology:** *G. michaelsmythi* sp. nov. is named in honour of Michael Smyth of Ringwood, Victoria, Australia, in recognition for

his services to wildlife conservation globally, including working with Snakebusters: Australia's best reptile shows.

**XENUROPHIS MONICASMITAE SP. NOV.**

**LSIDurn:lsid:zoobank.org:act:BBE55616-588E-4354-81FE-EF8ACFC2F6F8**

**Holotype:** A specimen at the Royal Belgian institute of Natural Sciences, Bruxelles, Belgium, specimen number RBINS 20168 collected from Saniamoridou, Nze 're 'kore' Region, Guinea, Africa, Latitude 8.985 N., Longitude 8.925 E..

**Paratypes:** Three preserved specimens at the Royal Belgian institute of Natural Sciences, Bruxelles, Belgium, specimen numbers RBINS 20165, RBINS 20166 and RBINS 20167 all collected from Bankoro-Fassirou, Guinea, Africa.

**Diagnosis:** Until now, *Xenurophis monicasmitae* sp. nov. has been treated as a west African population of *X. tholloni* Mocquard 1897 with a type locality of French Congo.

Likewise for the species *X. aviyemenii* sp. nov. from the upper Ruki River system in the Democratic Republic of Congo (DRC) and the previously synonymised form *X. fasciata* (Boulenger, 1901) with a type locality of Lemaire Mission, South-west of Lake Tanganyika, Democratic Republic of Congo (DRC).

While the four species are morphologically similar, *X.*

*monicasmitae* sp. nov. adults are readily separated from adult *X. tholloni* by having upper labials thinly etched black and without a thick black line under the eye, versus thickly etched black upper labials and a joined thick black line under the eye.

Black spots on the back of *X. monicasmitae* sp. nov. are barely bordered lighter anteriorly, versus strongly bordered with light, yellowish cream in *X. tholloni*.

The light on the dorsum of *X. monicasmitae* sp. nov. is so faded as to be unnoticeable at a distance, versus well defined as bands in *X. tholloni*.

*X. fasciata* (Boulenger, 1901) is similar in most respects to *X. tholloni*, but is separated from that species by having whitish upper labials (except for the etching), versus upper labials that are obviously whitish on the lower half and orangeish on the upper half in *X. tholloni*.

*X. fasciata* and *X. monicasmitae* sp. nov. also has black etching of the infralabials, versus brownish-grey in *X. tholloni*.

A fourth species in the group, being *X. aviyemenii* sp. nov. from the upper Ruki River system in the Democratic Republic of Congo (DRC), is similar in most respects to *X. monicasmitae* sp. nov. as described above) but separated from that species by having bold yellow patches anterior to the black scales on the dorsum, forming semi-distinct dorsal bands and being yellowish in colour, rather than reddish brown on the sides of the head and snout.

*X. monicasmitae* sp. nov., *X. aviyemenii* sp. nov., *X.*

*monicasmitae* sp. nov. and *X. tholloni* are separated from all other species of *Xenurophis* Günther 1863 and *Grayia* Günther 1858 by the following character combination: Extralabial scale absent; 15 midbody dorsal scale rows; 1 or rarely 2 supralabials in contact with the eye; roughly 140 subcaudals; anal plate divided; body banding of any sort does not extend on to the tail.

Snakes in the genera *Xenurophis* Günther 1863 and *Grayia* Günther 1858 form the entirety of the Subfamily Grayiinae Dowling 1967.

The type genus is *Grayia* Günther 1858.

Grayiinae is a subfamily of Afrotropical aquatic snakes diagnosed by smooth scales lacking apical pits, the absence of subocular scales, the possession of a loreal scale, round pupils, moderate to long tails, 15-19 straight dorsal scale rows at midbody, vertebral row not widened, 65-162 divided subcaudals, 7-10 supralabials, two pairs of chin shields, maxillary teeth homogeneous and unspecialized, the absence of posterior hypapophyses, and a banded or striped dorsal pattern, this is sometimes very faded or hard to see unless the snake is closely inspected.

*X. monicasmitae* sp. nov. is depicted in life online at:

<https://www.inaturalist.org/observations/254441914>

It is also depicted in Pauwels *et al.* (2022) on page 119 in Fig. 1. The closely related *X. fasciata* (Boulenger, 1901) is depicted in Chaney *et al.* (2024) on page 39 as "*G. (Xenurophis) tholloni*". Chaney *et al.* (2024) found that each of *X. monicasmitae* sp. nov., *X. aviyemenii* sp. nov., *X. monicasmitae* sp. nov. and *X. tholloni* diverged in the Pliocene, confirming that species level recognition for each of the four putative taxa is warranted.

**Distribution:** *X. monicasmitae* sp. nov. is known from Guinea and immediately adjacent countries in West Africa. The eastern limit of the range of the taxon is not known, but most likely is the Dahomey Gap (Togo/Benin).

**Etymology:** *X. monicasmitae* sp. nov. is named in honour of Monica Smit of Victoria, Australia.

She was unlawfully arrested and bashed by the fascist Victorian (Australian) Police during a Covid-19 lockdown in year 2020. She successfully sued the police for wrongful arrest, but in spite of this, Victorian County Court Judge My Anh Tran imposed a \$200K costs order against her to pay for the police's unsuccessful attempt to defend the case, thereby financially ruining her.

This sort of rubbish only happens in Australia and so it is fitting that a snake from a supposedly backward African Nation is formally named after a victim from a corrupt fascist country that is in many ways even more warped and backward.

More details are at:

<https://www.news.com.au/lifestyle/real-life/news-life/melbourne-activist-monica-smit-unlawfully-arrested-during-2020-antilockdown-protest-court-finds/news-story/b53c9e5e617b546340e7690f77b99f83>

#### **XENUROPHIS AVIYEMENII SP. NOV.**

**LSIDurn:lsid:zoobank.org:act:659ADE88-601C-4B87-822D-6B3178768B26**

**Holotype:** A specimen at the University of Texas at El Paso, El Paso, Texas, United States

University of Texas at El Paso, El Paso, Texas, United States specimen number UTEP22661 collected from Katoko-Kombe (AKA Katoko-Kombe), Sankuru Province, Democratic Republic of Congo, Africa, Latitude -3.243 S., Longitude 24.249 E. at 506 metres ASL.

**Diagnosis:** Until now, *Xenurophis monicasmitae* sp. nov. has been treated as a west African population of *X. tholloni* Mocquard 1897 with a type locality of French Congo.

Likewise for the species *X. aviyemenii* sp. nov. from the upper Ruki River system in the Democratic Republic of Congo (DRC) and the previously synonymised form *X. fasciata* (Boulenger, 1901) with a type locality of Lemaire Mission, South-west of Lake Tanganyika, Democratic Republic of Congo (DRC).

While the four species are morphologically similar, *X. monicasmitae* sp. nov. adults are readily separated from adult *X. tholloni* by having upper labials thinly etched black and without a thick black line under the eye, versus thickly etched black upper labials and a joined thick black line under the eye.

Black spots on the back of *X. monicasmitae* sp. nov. are barely bordered lighter anteriorly, versus strongly bordered with light, yellowish cream in *X. tholloni*.

The light on the dorsum of *X. monicasmitae* sp. nov. is so faded as to be unnoticeable at a distance, versus well defined as bands in *X. tholloni*.

*X. fasciata* (Boulenger, 1901) is similar in most respects to *X. tholloni* but is separated from that species by having whitish upper labials (except for the etching), versus upper labials that are obviously whitish on the lower half and orangeish on the upper half in *X. tholloni*.

*X. fasciata* and *X. monicasmitae* sp. nov. also has black etching of the infralabials, versus brownish grey in *X. tholloni*.

A fourth species in the group, being *X. aviyemenii* sp. nov. from the upper Ruki River system in the Democratic Republic of

Congo (DRC), is similar in most respects to *X. monicasmitae* sp. nov. as described above) but separated from that species by having bold yellow patches anterior to the black scales on the dorsum, forming semi-distinct dorsal bands and being yellowish in colour, rather than reddish brown on the sides of the head and snout.

*X. monicasmitae* sp. nov., *X. aviyemenii* sp. nov., *X. monicasmitae* sp. nov. and *X. tholloni* are separated from all other species of *Xenurophis* Günther 1863 and *Grayia* Günther 1858 by the following character combination: Extralabial scale absent; 15 midbody dorsal scale rows; 1 or rarely 2 supralabials in contact with the eye; roughly 140 subcaudals; anal plate divided; body banding of any sort does not extend on to the tail. Snakes in the genera *Xenurophis* Günther 1863 and *Grayia* Günther 1858 form the entirety of the Subfamily Grayiinae Dowling 1967.

The type genus is *Grayia* Günther 1858.

Grayiinae is a subfamily of Afrotropical aquatic snakes diagnosed by smooth scales lacking apical pits, the absence of subocular scales, the possession of a loreal scale, round pupils, moderate to long tails, 15-19 straight dorsal scale rows at midbody, vertebral row not widened, 65-162 divided subcaudals, 7-10 supralabials, two pairs of chin shields, maxillary teeth homogeneous and unspecialized, the absence of posterior hypapophyses, and a banded or striped dorsal pattern, this is sometimes very faded or hard to see unless the snake is closely inspected.

*X. monicasmitae* sp. nov. is depicted in life online at:

<https://www.inaturalist.org/observations/254441914>

It is also depicted in Pauwels *et al.* (2022) on page 119 in Fig. 1. The closely related *X. fasciata* (Boulenger, 1901) is depicted in Chaney *et al.* (2024) on page 39 as "*G. (Xenurophis) tholloni*". Chaney *et al.* (2024) found that each of *X. monicasmitae* sp. nov., *X. aviyemenii* sp. nov., *X. monicasmitae* sp. nov. and *X. tholloni* diverged in the Pliocene, confirming that species level recognition for each of the four putative taxa is warranted.

**Distribution:** *X. aviyemenii* sp. nov. is a taxon known from the upper Ruki River system in the Democratic Republic of Congo (DRC).

**Etymology:** The species *X. aviyemenii* sp. nov. is named in honour of Avraham Shalom Yemini (né Waks; Hebrew: אברהם יונימי וואקס).

He is an Australian-Israeli media commentator. Since 2020 he has worked as the Australian correspondent for "Rebel News", a Canadian based news website with a global reach.

Perhaps the best endorsement of Avi Yemini as he is known, comes from the Murdoch controlled hate media and other arms of the Australian State-controlled media. This is through their non-stop disparagement of him and the repeated defamatory stories they publish.

See for example at:

<https://www.news.com.au/national/nsw-act/courts-law/controversial-activist-avi-yemini-pulls-out-of-legal-fight-with-rmit-over-factchecking-article/news-story/7a21a215356848c37a9d358f50c615f2>

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**CONFLICT OF INTEREST**

None.



Hatchling female hybrid between a male Queensland Black-headed Python and a female Coastal Queensland Carpet Python. Photo: Raymond Hoser.

**World first. A natural cross-breeding of a male Black Headed Python (*Aspidites melanocephalus*) with a female coastal Queensland Carpet Python (*Morelia macdowelli*), that produced 12 healthy young.**

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### ABSTRACT

This paper reports on a world first breeding between a male Queensland Black Headed Python *Aspidites melanocephalus* (Krefft, 1864) with a female coastal Queensland Carpet Python *Morelia macdowelli* Wells and Wellington, 1984, (Brisbane form) that produced 12 healthy young.

The young were intermediate in morphology and colour between the two parents. Significantly, Carpet Pythons and Black-headed Pythons do co-exist in the wild in the same locations and so an investigation into pre and post mating isolating mechanisms in wild populations should be funded and undertaken.

It is noted that in captivity, male Black-headed Pythons produce most semen in May, while Carpet Pythons peak in September (in most years in normal seasonal cycles).

Hybridisation involving other species of Australian python, notably *Morelia cheynei* Wells and Wellington, 1984 male mating *Simalia fuscus* (Peters, 1873) and *M. cheynei* male mating *Australiasis kinghorni* (Stull, 1933) have been previously detailed with photos of adult offspring published by Hoser (1989).

**Keywords:** *Morelia*; *Aspidites*; *Simalia*; *Australiasis*; hybridisation; pythons; Carpet Python; Black Headed Python; *Morelia macdowelli*; *Aspidites ramsayi*; captive breeding; taxonomy; nomenclature; Australia.

### INTRODUCTION

Cross species matings and successful breedings of pythons and other snakes are well known in the literature (e.g. Hoser 1989).

Following on from the development of artificial insemination techniques as developed and published by Hoser (2008), hybridisation between species of snakes, in particular pythons has become extremely common, especially among hobbyists in the USA.

Examples abound in the literature and online.

There are even "Facebook" groups devoted exclusively to the posting of photos of hybrid snakes.

See for example

<https://www.facebook.com/groups/1910028035887831>

Created in 2016 and still online as of 1 Jan 2023, controlled by James Bradfield and with over 9K listed members.

However, what has not been detailed prior in any formal way has been the world's first ever cross breeding of a male Black Headed Python (*Aspidites melanocephalus*) with a female coastal Queensland Carpet Python (*Morelia macdowelli*).

In this case, apparently 13 good eggs were laid and 12 hatched to produce outwardly healthy young.

The details of this breeding, referred to in passing in Hoser (2022) form the basis of this paper.

### MATERIALS AND METHODS

The male Black-headed Python was obtained from well-known Victorian reptile breeder Neil Sonnemann of Murrumbidgee Victoria on 23 March 2009. It was recently hatched from parents with a Queensland lineage. This was also confirmed by the pair of large parietal scales on the head, being diagnostic of this subspecies, the type form of *Aspidites melanocephalus* as detailed by Hoser (2000).

As a hatchling it was difficult to raise in that its feeding was erratic and it was prone to regurgitate food. Notwithstanding this and some tender loving care, the snake was raised to adulthood and from that point on was essentially normal in all relevant ways and a robust, trouble free captive.

The female carpet Python was obtained from Louisa Tzoulas of Sunbury, Victoria, on 5 September 2015.

It was a long-term captive of adult size, heavily obese at the time, but otherwise of good health and temperament.

Both snakes were housed separately, as in one per cage and both were among the many snakes used in Snakebusters, Hands on Reptile shows.

These are the only reptile displays in Australia that are hands on and let people hold the animals.

Typically snakes are shipped to venues in plastic boxes. As a rule, pythons are grouped by size in boxes (not by species) and often shipped more than one to a box.

This is usually the best way to manage large numbers of snakes and allows them to be handed out to large numbers of people in a short time in order to maximise the hands-on experience of clients wanting to hold the animals.

The Carpet Python was unsexed at the time of receipt, but as there was no intention to breed the snake, sex was not relevant anyway.

It was presumed to be a male by the previous owner and the claim was never tested.

The carpet Python was a good captive in that it was trouble free. It was fed little in the first year of ownership at our facility due to its morbid obesity at time of receipt. After that it was fed as required to maintain condition.

The housing of all relevant snakes was in plastic tubs, usually of the under bed storage boxes types of containers. These are placed one end on a heat mat and the other end room temperature in a building that is air conditioned to remove temperature extremes.

The heat mats may be turned on from anywhere from 24/7 to 0 hours a day, but usually about 12 hours on and 12 hours off per day, or 6 hours on and 18 hours off, depending on time of year and other factors.

Because the Snakebusters: Hands on reptiles shows business does wildlife shows all year, including the cooler winter months, priority is given to maintaining the snakes in health and condition to do reptile displays and be handled, rather than to breed, which often relies on cooler temperatures and less handling to prevent snakes developing stress and/or infections that may arise as a result of stress.

As a result, breedings of snakes is not common at our facility for the display snakes and more often by accident rather than design.

While there is a deliberate cooling over winter for the snakes, this is mainly in the vein of giving seasonality to the snakes care and long-term cycles rather than a well-defined and co-ordinated summer/winter cycle and planned matings for breedings.

This seasonality is mainly in the form of shortened duration times for when the heat mats under the cages are turned on, (say from 12 hours a day to 4 or 6).

Sometimes between reptile displays on different days, snakes are not unloaded from boxes if that can be avoided.

This is common if and when the relevant snakes are in good health and have not recently fed and therefore need no heat to digest food.

This is also a desirable situation in that it gives a stronger emphasis to the cooling part of the cycle in that the snakes are denied access to heat. It also saves up to 2 hours in that the load or unload of snakes can take up to 2 hours (one hour each way), which is avoided by not having to do both when displays are done two days in a row.

In terms of the context of what follows, it must be noted that no attempt was made to breed the relevant snakes or for that matter that the relevant Carpet Python was in fact a female.

In fact it was a presumed "male".

## RESULTS

Mating was not observed between the parent snakes, but must have occurred when snakes were being stored in a box between reptile displays. It is assumed that the mating occurred early in the spring (Australian) of 2017 (i.e. around September/October 2017), with eggs being laid about 6-12 weeks post-dating the mating.

Alternatively mating was earlier (anytime from about May to the Spring), with sperm storage by the female Carpet Python.

As already mentioned, in order to facilitate "cooling" over winter, it was routine practice to leave snakes in boxes overnight when there were late in day reptile displays and early next day ones.

Recall also that snakes were boxed together based on size and known non-aggression to one another and not on the basis of species.

As there was only one male Black-headed Python ever shipped with carpet pythons between displays, the relevant male that mated the female was readily obvious. A second larger male at the facility was never shipped with other snakes for some years since it attacked and tried to eat an Olive Python it had been shipped with. That snake actually came off second best in the altercation, but neither suffered any permanent harm from the incident.

It did mean however that the relevant Black-headed Python was never shipped with any other snake after that time.

It was also of the Northern Territory subspecies *Aspidites melanocephalus adelynensis* Hoser, 2000 with a different parietal arrangement to the Queensland subspecies.

That the female Carpet Python was gravid was not known until the snake was found in the cage, coiled around a mass of eggs.

On 21 November 2017, the snake's cage was opened to get the snake out for a Snakebusters: Hands on reptiles display, when it was found to be coiled around a mass of eggs.

Due to the fact that we were intolerably busy and time poor, the mass of eggs was simply placed into an incubator and effectively ignored until the time of hatching.

The eggs were assumed to be a mating from another Carpet Python at our facility and no further thought was given to who the father was.

Laid were 13 eggs that appeared OK and 5 obvious slugs (much smaller as in about one quarter the size or smaller and in the form of yellowish masses).

After about 6 weeks one of the eggs (at bottom centre of mass appeared to go off and hardened up, but that did not affect others.

The egg mass incubated "as is" in incubator at between 30 and 30.5 Deg C.

The incubator was constructed of a modified fridge.

It had a heat mat at the bottom, 3 computer fans within it.

These circulated air in the chamber and this was in turn temperature controlled by a probe thermostat.

The eggs themselves were in a plastic "Sistema" tub about 33 cm long, 20 cm wide and 13 cm high.

Vermiculite to a depth of about 2 cm was at the bottom of the tub. Two tiny air holes were at the top of the container (in the lid) and the vermiculite was moist to feel moist when squeezed but not to emit water.

The humidity in the container was such that there was condensation on parts of the surfaces of the sides or top, but not all. The eggs were never moist to touch but remained fully hydrated and "full" throughout incubation until a few weeks preceding hatching when they became indented on the upper surfaces.

Eggs were laid on 21 November 2017 and hatched and emerged on 30 Jan 2018, with one remaining in egg and emerging on next day.

12 hatched.

13 good eggs all measured about 5.5. cm long and 3.5 cm wide on average.

They were normal in terms of proportions for Carpet Snake eggs. They were, as already mentioned, incubated in a fridge as an incubator and at very stable temperature. The container had tiny air holes and vermiculite, but in reality moisture loss from the container was near zero.

The originally laid eggs were retrieved as near full eggs in that they were retrieved from a dry cage, so may have shrivelled slightly when found, but soon rehydrated to full in the incubator. They began to indent about 5-6 weeks into incubation and became more so until hatching, when prior to hatching all were severely indented and folded and yet otherwise appeared to be OK.

The male Black-headed Python was thin in build and a bit flighty, but otherwise robust and in good health.

At one stage it was placed with a cooled female Black-headed Python to breed, but no mating with this snake was observed. An attempt to extract semen from the Queensland male Black-headed python in May or June in 2017 was attempted, with a view to artificially inseminating the female, but no semen could be extracted.

I did not record the date, but that would have been in the May/June period as I knew this was the mating season for captive Black-headed Pythons.

In years since 2017, I was able to extract semen from the same snake in those months of May and June, based on the normal seasonal cycle.

That I was unable to get semen at the time in hindsight flagged the likelihood this was because it had (without my knowledge) mated the female Carpet Python and was therefore effectively "dry". In the usual situation I allow a week for a male python to recharge with semen after I have extracted some.

In passing I also note that a very old male NT Black-headed Python did mate with the female (also cooled in 2017), but no eggs were produced.

(All three Black-headed pythons died in 2022 of different causes on different widely separated dates and were old at the relevant time, so their deaths were not unexpected).

At the time the Queensland Black-headed Python mated the Carpet Python it was mature and not growing and measured 235 cm total length, 23 cm tail and 5.4 cm head length.

The female Carpet Python measured 210 cm total length, 28 cm tail and 6.3 cm head length.

It remained a relatively thick-set snake for its length (after excess weight had been removed). While it was clearly a South-east Queensland "coastal carpet python", the exact provenance of the snake was not known and it is assumed to be of captive bred origin based on temperament, condition and the fact that the owner claimed to have bought it from a pet shop and raised it from young.

The newly hatched babies had labial pits in the lower labials (as seen in the Carpet Python), large shields on the head between the eyes (typical of a Black headed Python) and coloration intermediate between the two. The build was half way between *Aspidites* and *Morelia* and the heads not black, indicating that the black head in *A. melanocepalus* is a recessive trait.

The snakes also had the single large parietal on either side, as per the Queensland male Black-headed Python subspecies, which confirmed that snake as the father on the basis of no other potential candidates.

Babies (numbers 1-12) had the following measurements on date of hatching (down to the nearest one tenth of a cm). Head lengths run to the back of the skull.

- 1 - Total length 140 cm, tail 6.5 cm, head length 2 cm,
- 2 - Total length 141.5 cm, tail 7 cm, head length 2 cm,
- 3 - Total length 141.8 cm, tail 7.1 cm, head length 2 cm,
- 4 - Total length 142.3 cm, tail 7.5 cm, head length 2.1 cm,
- 5 - Total length 143 cm, tail 7.4 cm, head length 1.9 cm,
- 6 - Total length 145 cm, tail 7.1 cm, head length 1.9 cm,
- 7 - Total length 143 cm, tail 7.4 cm, head length 2.1 cm,
- 8 - Total length 142 cm, tail 6.9 cm, head length 2.2 cm,
- 9 - Total length 143 cm, tail 7.1 cm, head length 1.9 cm,
- 10 - Total length 144 cm, tail 7.5 cm, head length 2.1 cm,
- 11 - Total length 144 cm, tail 7.4 cm, head length 2.2 cm,
- 12 - Total length 145 cm, tail 7 cm, head length 2 cm,

Babies all had 3-5 reduced in size labial pits (lower labials), versus 7 in the breeding female and none in the Black-headed Python.

As a group all were weighed at 252 grams = 21 grams each on average.

The sizes of the snakes were similar, but some were larger than others.

In the first instance no snakes were sexed as it was presumed both sexes would be present and because they were juveniles, this did not matter.

All were housed (while young) in 33 cm long (approx.) Sistema tubs in a standard snake cage set up (heat one end and cool at other the container being placed over a "heat mat").

This included, newspaper substrate, non-spill deep water bowl at cool end and under box heat mat at other end, on 24/7.

#### FEEDING AND SHEDDING IN THE EARLY STAGES

4 Feb 2018 - each was fed two adult mouse arms or legs (one ate voluntarily).

7 Feb 2018 - each was fed two adult mouse arms or legs (three ate voluntarily).

9-10 Feb 2018 - all shed their skins, most were shed in one piece. However, when it was noticed that one of the snakes was shedding (as evidenced by peeling skin on the body) on 8 Feb 2018 all cages were fully saturated with water to facilitate shedding in all snakes. Most shed in one piece.

15 Feb (before feeding) all were photographed individually. The snakes have been photographed many times in the following years.

15 Feb 2018 - each was fed two adult mouse arms or legs (all were force fed, as in none ate voluntarily).

18 Feb 2018 - all fed 2 Mouse arms or legs (3 ate voluntarily)

21 Feb 2018 - all fed 3 pinkie mice - (3 ate voluntarily)

24 Feb 2018 - all fed 3 pinkie mice - (6 ate voluntarily)

28 Feb 2018 - 1 snake shed skin (second) - all fed 4 X Pinkie mice (9 ate voluntarily) (other three refused to strike at food - even when provoked)

5 March 2018 - 2 more shed skins - all fed 4 X Pinkie mice - except for three which were offered and ate 2 X adult mouse heads instead (7 ate voluntarily ... 3 heads and 4 pinkies) (other 5 refused to strike at food - even when provoked)

9 March 2018 - 5 were fed - ate voluntarily - 2 adult mouse heads each - others were not fed. Two had shed their skins for second time and most others obviously will do so in next few days.

10 March 2018 - Unfed snakes were fed as for others.

14 March - All snakes fed 2 X small hairy mice (9 took voluntarily and others assist fed as in shoved 2/3 way down into throat with last part outside of mouth).

19 March 2018 - All fed 2 X Mouse heads each (9 took voluntarily and 3 did not, these NOT being the three that were force/assist fed last time, meaning all snakes had voluntarily eaten at least once)

24 March 2018 - All fed 2 X Mouse heads each (9 took voluntarily and 3 did not, these NOT being the three that were force/assist fed last time, meaning all snakes had voluntarily eaten at least once)

30 March 2018 - All fed 4 X Mouse heads each (9 took voluntarily and 3 did not, these NOT being the three that were force/assist fed last time, meaning all snakes had voluntarily eaten at least once)

4 April 2018 - 6 were fed smallish adult mice and 6 ate 4 X Mouse heads each of which three had to be force / assist fed.

7 April 2018 - 6 were fed smallish adult mice and 6 ate 4 X Mouse heads each of which three had to be force / assist fed.

10 April 2018 - 8 were fed smallish adult mice and 4 ate 4 X Mouse heads each of which four had to be force / assist fed. All snakes had now shed skins twice. The non-eaters tended to be the same each time - eaters tended to strike at anything coming close when inspected and non-eaters do not.

All continued to grow and feed beyond dates indicated.

31 Aug 2018 - first death. The smallest of all snakes, but not significantly smaller and a good feeder to this date, died. Its body went spungy about a fortnight prior and generally got worse until a day prior, to death, when it went limp from the mid section down and next morning (on 31 Aug) was found dead in cage.

# snakeman.com.au

Adult male hybrid Black-headed Python cross Carpet Python.

Hoser 2025 - Australasian Journal of Herpetology 80:58-64.

29 Oct 2018 – second death – this being the nicest patterned of all the offspring. A few days prior it had been fed a large adult mouse (old female) and the snake regurgitated it 48 hours later. The following day (29 Oct 2018) it was found dead in the cage, presumably as a consequence of the prior incident and potentially septicaemia.

As of 29 Oct 2018, all others (now 10) snakes were doing well, except for one other which has had a respiratory infection/condition for about 8 weeks. Three others also developed similar conditions in the month of August, but all were treated with salt water in mouth as a rinse and they did clear up. The remaining “sick” snake was as of 29 Oct, being force-fed and still growing in line with the other snakes. It recovered fully over the following month.

From December 2018 to end 2022 the remaining 10 snakes were trouble free as captives and reached an adult size averaging 180 cm in total length by end 2021, with no observed growth in length in any snakes beyond that date, save for the incidents detailed below involving two snakes.

A third snake was stolen at a reptile display on 9 December 2018. It was recovered by the Victoria police in a planned armed raid on the thief, Matthew Christopher Gatt of 12 Domain Drive, Hillside, Victoria, complete with parasitic snake mites 3 weeks later on 31 December 2018. The snake died of mite-borne viral disease shortly thereafter. Matthew Gatt was charged and convicted and fined 8 thousand dollars on 21 March of 2019 (for details see Hoser 2019).

Gatt had been caught committing the premeditated theft on CCTV cameras.

This is a rare occasion that the Victoria Police actually charged a criminal for a crime. They usually protect them.

The same applies in terms of the magistrate (Denise Livingstone) who found Gatt guilty, convicted him and fined him.

The judiciary in Victoria is notoriously corrupt and as a rule they tend to protect criminals (Hoser 1994, 1999a, 1999b).

Part of the reason for this is that cocaine use is rife in the Victorian legal system and the judges, magistrates, court staff and lawyers get their drugs from police-protected criminals (Fraser 2010).

#### HUSBANDRY AND MANAGEMENT FROM 2019-2023

When the snakes grew in size, they were shifted from the original cages to plastic underbed storage boxes of the form the parents were kept in.

As rule they were kept one per cage.

Up to 23 March 2022, nine of that litter remained alive and well. Some of those snakes at various ages are depicted online (as of 1 January 2023) at: <https://www.flickr.com/photos/thereptileman/48781145103/> and <https://www.flickr.com/photos/thereptileman/48781160003/> and <https://www.flickr.com/photos/thereptileman/48736752052/> and <https://www.flickr.com/photos/thereptileman/48781549921/> and <https://www.flickr.com/photos/thereptileman/48781479611/>

On 23 March 2022 a large female died from a large inoperable tumour, meaning that as of end 2022 just eight of the original twelve hatchlings born four years earlier remained alive.

All were males bar one runt female that was physically similar to the two others that died suddenly in the first year.

In terms of the sexes, the female that died was the second largest and second longest of the litter as an adult and the remaining runt female the smallest of the surviving snakes, meaning that there was no obvious trend differences in the sizes of the sexes. Both parents were of similar length, although the female was more thick set and heavier.

Interestingly, those that looked more like the male parent behaved more like him and those more like the female parent

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behaved more like her.

The situation of the only likely breeder female dying in 2022, effectively prevented any future breedings of this lineage of snakes, especially as the male Black-headed Python that mated the female South-east Queensland Carpet Python also died in 2022.

As of the time of completing this paper in early 2023, all eight remaining snakes hatched on 30 Jan 2018 appeared to be in perfect health. By July 2025 two more had died, leaving six healthy adults left.

This broad survivorship outcome seems little different to pure-lineage pythons of any given species in routine captive conditions and is obviously better to a comparable wild snake survivorship rate, in which less than 4 of 12 would make adulthood.

Besides the usual rigors of captivity, all were among the most frequently used snakes in the Snakebusters hands on reptile shows on the basis of age, ability to be handled by non-snake handlers for long periods without signs of stress, the fact that they did not constrict around necks of people that the snakes were placed on, they did not head for the ground when around a person's neck, they did not tighten around the neck of the person they were on when taken from that person to be placed on another, or bite, all of which made for the perfect reptile show snake.

This often meant that the snakes would be doing hands on reptile shows for days on end (often being handled for periods extending to be hours for days on end) and in spite of this, did well in captivity in the usual way. As a rule the snakes showed no signs of stress or reason to lessen the amount of handling.

In the reptile shows situation, excessive cold, an imminent sloughing of the skin or recent feedings could be seen to make the snakes tire quickly, in which case they would tend to tie themselves in knots. This would result in snakes being retired on the day.

The aforementioned factors did not always result in snakes being tired on a given day, but as red flags, snakes within these situations were generally passed over to leave our facility to do a reptile show, or alternatively if we were heavily booked, they were taken with to a display, but were the last to be used for handling and the first to be retired on the day.

The same management protocols applied to all other snakes used in our hands on reptile displays and also in terms of the elapid snakes (ours being surgically de-venomized or "venomoid" as detailed in Hoser 2004a, 2004b, 2005, 2006a, 2006b).

## DISCUSSION

While the hybridisation of species is not something to be encouraged, including with regards to snakes, provided there is no long-term continuation of lineages or release of hybrids into the wild, no long-term harm to any species or conservation is done.

As of 2025, none of the remaining six snakes are female and so this lineage is dead-ended.

Rather than ignoring such hybridisation acts and pretending they do not exist or happen, it is important that such cases be made known and become part of the formal scientific record.

This knowledge may provide an explanation for an aberrant animal that may appear at some later date, if it is known that hybridisation between relevant species can or may occur.

In terms of the hands-on reptile shows that we have done for decades, the Black-headed Python crossed Carpet Pythons have been among the best snakes we have used in terms of handing them to children to be handled.

In our situation this is done by putting them around the neck of the child (or adult), and letting the snake either hang, or, as they do, to crawl around the person's neck.

As a rule we do not allow people to just hold the snake in their hands.

This is because they can easily throw or drop the snake before a

handler can intervene and save the snake from potential injury.

By contrast, when a person tries remove the snake from around their neck, the action of doing so is sufficiently slow, as to enable a handler to intervene and grab the snake before it is thrown or injured.

While the preceding scenarios are not common, it is due to the massive number of hands-on reptile shows we do on an annual basis (typically over 1,000 in a non-Covid-19 year) the preceding situations occur commonly enough for us to be wise to them and to be ready to stop any actions likely to injure the snakes.

Of course other than the risk of a bite from a mistreated snake, which has no venom or serious risk to the handler, the risk to members of the public is effectively zero and so our management protocols are effectively only geared towards eliminating or minimizing risk to the snakes, which in the scheme of things is many orders of magnitude greater.

While allowing members of the public to hold the snake means that there will always be a risk to the snakes involved, we regard the relatively minor risks to the snakes as compared to the educational benefits of allowing members of the public to handle and interact with the snakes, as not outweighing these.

For this reason we continue to do hands on reptile shows with the Black Headed Python cross Carpet Pythons as well as our other pythons of various species, as well as lizards, frogs, turtles and crocodiles.

We find all are quite amenable to handling. There are rarely any adverse issues.

As a rule our reptiles and frogs die of age-related diseases at old age, indicating that contrary to popular perception, regular handling of captive reptiles is not detrimental to their welfare.

In my view handling of reptiles and frogs on a regular basis is a form of "enrichment" that the animals would not otherwise get if confined mainly to a cage.

The exercising of the snakes (in particular) by handling does cause them to burn energy and lose condition more rapidly than counterparts left in cages.

But counter to that the snakes are simply fed more over the long term and commensurate with the preceding, they end up being more muscular and in generally better condition than the snakes that are not regularly handled at live reptile displays that we do.

In effect our snakes are treated like athletes and relatively speaking look the same, versus the so-called couch potatoes that simply languish in a cage and that we see at other reptile keeping facilities and public zoos.

Pythons handled at our hands-on reptile shows don't bite handlers as a rule. In fact they generally don't bite anyone, no matter what is done to them, although we do watch out for their welfare and stop overt mishandling as soon as it is seen.

It is evident from what we see on a daily basis, that they generally like being handled and as a rule remain on the human holding them because they like to take the heat from their bodies.

It should be noted that we are in Melbourne, Australia which is usually cold, or if displaying indoors, the room temperature of about 20-22 Deg C. is still below the preferred activity temperature for the snakes.

It is quite amazing how much heat the snakes draw from the people as they are being handled.

On the rare occasions it is hot and there is a risk of snakes over-heating, we simply bathe them in buckets of cold tap water regularly to strip excess heat from them. This is very effective and enables us to continue to display reptiles in hot conditions otherwise far too hot for the reptiles in that they would otherwise die from overheating.

On average we do at least one outdoors reptile display in a marquee in the sun at an air temperature of over 40 degrees Celsius and we are able to have snakes handled over several hours in the heat without any coming close to overheating or being at risk of death from heat due to the cooling methods we use.

Significantly in terms of the hybrid Black-headed Python cross Carpet Pythons, the management and husbandry of these snakes was effectively not significantly different to that of any other pythons I have kept, including Carpets (*Morelia* Gray, 1842 spp.) of various forms, Olive Pythons *Liasis olivaceus* Gray, 1842, Water Pythons *Simalia fuscus* (Peters, 1863), Scrub Pythons (*Australiasis* Wells and Wellington, 1984 spp.), Rough-scaled Pythons, *Jackypython carinata* (Smith, 1981), Womas *Aspidates ramsayi* (Macleay, 1882) and *Antaresia* Wells and Wellington, 1984 spp. Pythons.

(Note: *Simalia* Gray, 1849) has the Water Python as the type species, NOT the Scrub Python as commonly reported on the internet. See Cogger *et al.* (1983) for an explanation with the relevant details, which by default means the taxonomy of Wells and Wellington 1984 and 1985 is in fact correct. The name *Simalia* has been unlawfully promoted by the notorious Wolfgang Wüster and his gang of thieves in recent years as a means of usurping the correct ICZN name for the Scrub Pythons, *Australiasis* Wells and Wellington, 1984 (see Ride *et al.* 1999). The actions of Wüster *et al.* have been in breach of the Australian Copyright Act 1968, Moral Rights Provisions, the relevant parts being within Sections 36, 115, 189-190, 193-195, in particular Sections 195A1 (2) and 195AJ (a-b) and 195AQ(2)) and equivalent international copyright laws enshrined by the Berne Convention 1886.

#### LEGAL SITUATION OF HYBRID PYTHONS

This varies depending on location, jurisdiction and laws at the time.

At the relevant time in Victoria, Australia, it was illegal to attempt to deliberately hybridise native animals that do not breed with one another in the wild (although this law is regularly breached by the government's own dysfunctional "Zoos Victoria" business with respect of some native mammals, most notably species within the genera *Burramys* Broom, 1896 and *Gymnoblepius* McCoy, 1867).

As the breeding was not deliberate, no law was broken.

While nuclear DNA is 50 percent per parent, the mitochondrial DNA is all female and it was the female that laid the eggs.

Therefore, the juveniles were recorded as Carpet Pythons rather than Black-headed Pythons and have been treated legally as such at all times (as Carpet Pythons).

After the snakes were first produced, the wildlife department were made aware of the breeding and the stated policy of our business not trading or breeding any of the offspring snakes until their time of death.

Also not known is if Carpet Pythons and Black-headed Pythons have ever cross-bred in the wild and/or the fate of any offspring.

Based on different seasons for sperm production and habitat preferences of Black Headed Pythons versus Carpet Pythons, at a guess I would say that cross species mating may seem unlikely.

However, sperm storage in *Morelia* pythons is well-known and it is also well-known that Diamond Pythons in particular mate in autumn and spring and yet only lay eggs in late spring, implying sperm storage is routine for these snakes at least.

Even if wild hybrids are produced, it is likely that they would not survive due to the fact they would presumably not fit into a niche in the same way that a pure-bred Carpet Python or pure-bred Black-headed Python would.

The apparent "ease" in which the hybrid pythons were produced (literally by accident), implies that this act was repeatable and may have happened at some time or place before and may well happen again.

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**CONFLICTS OF INTEREST - NONE.**

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