

New Rattlesnakes in the *Crotalus viridis* Rafinesque, 1818 and the *Uropsophus triseriatus* Wagler, 1830 species groups (Squamata:Serpentes:Viperidae:Crotalinae).

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ABSTRACT

There have been a series of major reviews of the taxonomy of the *Crotalus (Sayersus) viridis* and the *Uropsophus triseriatus* Wagler, 1830 species groups in the last 16 years.

Most authors now recognize all or most of the subspecies listed by Klauber (1972) as valid species.

However Pook *et al.* (2000) provided evidence to suggest that the taxa *C. nuntius* Klauber, 1935, *C. callignis* Klauber, 1949, and *C. abyssus* Klauber, 1930 should at best be recognized as subspecies of *C. viridis* Rafinesque, 1820, *C. helleri* Meek, 1905 and *C. lutosus* Klauber, 1930 respectively.

Pook *et al.* (2000) also produced evidence to show significant lineages that warranted taxonomic recognition, including central Californian *C. oreganus* Holbrook, 1840 and a population of *C. helleri* from California, distinct from both nominate *C. helleri* and *C. callignis*.

The more recent data of Davis *et al.* (2016), although incomplete, also supported this contention.

As no names are available for each group, both are formally named according to the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

The central Californian form is herein named *C. funki* sp. nov.. The form from Idyllwild (Sky Island), California is herein named *C. helleri idyllwildi* subsp. nov..

It has been recognized for some time that there are morphologically distinct populations of *Uropsophus pusillus* (Klauber, 1952) in Mexico that are divided by geological barriers (Campbell and Lamar 2004). In spite of reviews of the *U. triseriatus* group of species including by Bryson *et al.* (2011, 2014), at least two separate morphologically distinct populations remain unrecognized by taxonomists.

This anomaly is corrected with each being formally named for the first time. The population from Sierra de Coalcomán is formally named *Uropsophus pusillus rentoni* subsp. nov. and the population from Nevado de Colima and Volcan de Colima is herein named *Uropsophus pusillus gedyei* subsp. nov..

Keywords: Taxonomy; snakes; nomenclature; rattlesnake; USA; Mexico; California; Michoacan; Jalisco; Colimna; *Crotalus*; *Uropsophus*; *Sayersus*; *viridis*; *nuntius*; *callignis*; *abyssus*; *helleri*; *lutosus*; *pusillus*; *triseriatus*; new species; *funki*; new subspecies; *idyllwildi*; *rentoni*; *gedyei*.

INTRODUCTION

The iconic Rattlesnakes, treated by many as being of the genus *Crotalus sensu lato* have long been studied in detail by herpetologists.

These snakes are primarily found in North America, including Mexico and among the best known venomous snakes on the planet.

Klauber's works, summarised in his two volume set "*Rattlesnakes*" were published in 1956 and republished in 1972. They represented the culmination of a lifetime's work on Rattlesnakes at all levels and included the results of his own taxonomic reviews in previous decades, which of course followed on from the works of many others before him.

As noted in Klauber (1972), most known forms and variants of Rattlesnakes have been named many times by herpetologists and this is clearly spelt out in the various synonyms lists published in Klauber (1972).

Notwithstanding this, new methods of dealing with taxonomic problems and further fieldwork in what were formerly remote or hard to access locations have yielded forms previously unknown to science.

As of 2016, there are about 50-60 recognized species of Rattlesnake, placed by many authors in the catch-all genus *Crotalus* Linnaeus, 1758.

This genus level taxonomy was given a shake up by Hoser

(2009), who for the first time ever created a genus-level taxonomy that represented the phylogenetic origins of the species.

Hoser (2009) resurrected available names for genera and also erected a number of new genera and subgenera to accommodate species groups and at times single species.

A more recent molecular phylogeny, by Pyron *et al.* (2013) effectively confirmed the validity of the earlier Hoser (2009) taxonomy.

At the species level, no less than four have been formally described since year 2000. These were formally described as *Crotalus campbelli* Bryson *et al.*, 2014, *Crotalus ericsmithi* Campbell and Flores-Villela, 2008, *Crotalus tancitarensis* Alvarado Diaz and Campbell, 2004, and *Crotalus tlaloci* Bryson *et al.*, 2014.

Using the taxonomy of Hoser (2009), these species would be more appropriately placed in the following genera: *Uropsophus* Wagler, 1830 for *campbelli*, *Cummingea* Hoser, 2009 for *ericsmithi*, *Aechmophrys* Coues, 1875 for *tancitarensis* and *Uropsophus* Wagler, 1830 for *tlaloci*.

As of 2016, most authors now recognize all or most of the subspecies listed by Klauber (1972) in some species groups as full species, including the *C. viridis* Rafinesque, 1820 species complex.

This is in part why the recognized number of valid species is higher now than when Klauber (1972) was published.

There have also been a series of major reviews of the taxonomy of the *Crotalus (Sayersus) viridis* and the *Uropsophus triseriatus* Wagler, 1830 species groups in the last 16 years (post-dating year 2000). These are two species diverse groups that have caused frustration for taxonomists due to morphological similarities between forms, disjunct populations, geologically recent separation of populations, a lack of collecting in some relevant regions and other factors.

Pook *et al.* (2000) and Davis *et al.* (2016) provided evidence to suggest that the taxa *C. nuntius* Klauber, 1935, *C. callignis* Klauber, 1949, and *C. abyssus* Klauber, 1936 should at best be recognized as subspecies of *C. viridis* Rafinesque, 1820, *C. helleri* Meek, 1905 and *C. lutosus* Klauber, 1930 respectively.

Pook *et al.* (2000) also produced evidence to show significant lineages that warranted taxonomic recognition, including central Californian *C. oreganus* Holbrook, 1840 and a population of *C. helleri* from California, distinct from both nominate *C. helleri* and *C. callignis*.

However in the sixteen years that have elapsed since that study, neither taxon has been formally named.

As no names are available for each group, both are formally named according to the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

The central Californian form with a distribution centred on the southern coast ranges in the region running south from San Francisco is herein named *C. funki sp. nov.* The form from idyllwild (sky island), California is herein named *C. helleri idyllwildi subsp. nov.*

It has also been recognized for some time that there are morphologically distinct populations of *Uropsophus pusillus* (Klauber, 1952) in Mexico that are divided by geological barriers (Campbell and Lamar 2004). The latter authors detailed these barriers in their text.

In spite of reviews of the *U. triseriatus* group of species including by Bryson *et al.* (2011, 2014), at least two separate morphologically distinct populations remain unrecognized by taxonomists.

Notwithstanding the fact that Bryson *et al.* (2011) found this divergence to be recent (Pleistocene), it is appropriate that each population be given taxonomic recognition. This anomaly is corrected with each being formally named for the first time. The population from Sierra de Coalcomán is formally named

Uropsophus pusillus rentoni subsp. nov. and the population from Nevado de Colima and Volcan de Colima is herein named *Uropsophus pusillus gedyei subsp. nov.*

For some decades I have been working with Rattlesnakes and their taxonomy and as far back as 1993 viewed some of the Californian *C. viridis* complex snakes (*Sayersus*) and several putative taxa from Mexico as warranting further investigation. This was after having spent time in the field collecting some of them and also viewing significant numbers more in private facilities and museum collections.

This includes the two above mentioned lineages identified by Pook *et al.* (2000) as being genetically divergent as well as several potentially unnamed species within the *U. triseriatus* group.

A substantial amount of data was stolen from my facility here in Australia during an illegal armed raid on 17 August 2011, which effectively scuttled much of the work in progress, due mainly to the fact that the most important of this material was never returned (Court of Appeal, Victoria 2014, VCAT 2015).

Some of the species I had intended naming have been named by others.

However four other taxa as mentioned above, have yet to be formally recognized and are under potential threat from human overpopulation and the environmental destruction this is bringing to the relevant areas.

In the face of this and the reality that the bulk of my relevant research files will not be returned (as of 2016), I have made the decision to publish the most important results of this review so as to allow other scientists to identify the relevant taxa and use the names when publishing papers dealing with aspects of biology and the like, where correct identification of entities is important.

Past herpetological studies have been compromised when groups of taxa have erroneously been treated as one and this appears to have been the case in part for the divergent taxa which are mentioned above.

As no names are available for each group, they are formally named according to the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

The central Californian form of *C. oreganus*, treated by many as part of the so-called *Crotalus viridis* group (*Sayersus*), until now treated as a southern population of *C. oreganus* is herein named *C. funki sp. nov.* The form of *C. helleri* from Idyllwild (sky island) California (also treated as part of the *C. viridis* group), is herein named *C. helleri idyllwildi subsp. nov.*

While a number of forms of Mexican Rattlesnake have been formally named in recent years, clearly divergent forms of the putative species *U. pusillus* Klauber, 1952 remain unnamed. These are formally described herein and named for the first time as *U. pusillus rentoni subsp. nov.* and *U. pusillus gedyei subsp. nov.*

Both these forms are known to be isolated by geographical barriers from the nominate form as outlined in detail by Campbell and Lamar (2004), although significantly they only published a colour image of one of the three forms, indicating that they may not have been aware of the obvious colouration differences between the populations. I make this comment noting that for other taxa, they published photos of well known variants in order to exhibit the known range of morphs.

Campbell and Lamar (2004) did however report on earlier noted differences in scalation between the populations of putative *U. pusillus*.

MATERIALS, METHODS AND RESULTS

The reviewed literature relevant to the taxonomy of these Rattlesnake species and the decisions made herein in terms of formal recognition of them includes the following: Ashton and de Queiroz (2001), Ashton *et al.* (1997), Baird and Girard (1852), Beaman and Hayes (2008), Blainville (1835), Brown and Duvall

(1993), Bryson (2007), Bryson *et al.* (2011, 2014), Bush *et al.* (1996), Campbell and Lamar (1989, 2004), Castro-Franco and Bustos-Zagal (1994), Chiszar and Smith (1993), Chiszar *et al.* (2008), Clause (2015), Cliff (1954), Conant and Collins (1991), Cope (1885), Davis and Smith (1953), Davis *et al.* (2016), Diller and Wallace (2002), Domínguez-Guerrero and Fernández-Badillo (2016), Dorcas (1992), Douglas *et al.* (2002), Eaton (1935), Einfalt (1998), Fitch (1936), Franz (1971), Golla and Durso (2015), Gomez *et al.* (2015), Harris and Simmons (1978), Holbrook (1840), Holding *et al.* (2014), Hoser (2009, 2012), Houston (2006), Jones *et al.* (1981), Keehn *et al.* (2013), Keogh and Wallach (1999), Kisser (1980), Klauber (1930, 1935, 1938, 1940, 1943, 1949, 1952, 1972), Kreuzer (2012), Langner (2014), Lee (1996, 2000), Lemos-Espinal and Smith (2015), Lemos-Espinal *et al.* (1994), Linnaeus (1758), Livo and Chiszar (1994), McCraine (1983), McCraine and Wilson (1979), McDiarmid *et al.* (1999), Meek (1905), Meik and Pires-daSilva (2009), Meik *et al.* (2012), Muñoz-Nolasco *et al.* (2015), O'Connor (2012), Olivier (2008), Oyler-McCance and Parker (2010), Parker and Brown (1974), Putman *et al.* (2016), Pyron *et al.* (2013), Rafinesque (1818), Schmidt (2008), Schmidt and Shannon (1947), Schneider (1986), Schuett *et al.* (1993), Sievert (2002a, 2002b), Smith (1946), Smith *et al.* (1993), Smith *et al.* (2005), Sparks *et al.* (2015), Starrett (1993), Stebbins (1985), Tanner (1930), Tanner and Lynn (1934), Werning (2012a, 2012b), Wiseman and Kryzer (2015), Woodbury (1929, 1958), Woodbury and Hansen (1950), Zweifel (1952) and sources cited therein.

More significantly however I should note that this review has also been based on the inspection of many specimens (live and dead) and high quality images of these and other rattlesnakes over the past 3 decades, including about 40 odd nominate *U. pusillus* (from all four main populations in Mexico, with the two populations east of the Rio Tepalcatepec headwaters and Rio Ahujullo Depression being treated herein as one and the same) and over 200 *Crotalus oreganus* and *C. helleri* from California and elsewhere.

Furthermore the relevant taxonomic decisions have been based on an assessment of the geographical and species barriers to the relevant snake populations in view of their historical nature in terms of ascertaining the physical isolation of the relevant groups of snakes and whether or not speciation processes had occurred.

This was for the purpose of determining at what taxonomic level to recognize each relevant group. In only one of the four, did I determine that full species recognition was appropriate, while for the others I took the more conservative view and have designated each as a subspecies.

In terms of species level recognition of the putative *C. oreganus* from central California, I had no hesitation in making this level of recognition. The population appears to be reproductively isolated from all others and the molecular divergences outlined by Pook *et al.* puts these snakes in line with others that already have species-level recognition.

The formal recognition of this species *C. (Sayersus) funki* sp. nov. as a new species is significant as it is the first new species of Rattlesnake formally named from the United States of America in the present century.

THE DISRUPTIVE AND UNSCIENTIFIC INCURSIONS OF WOLFGANG WÜSTER AND HIS GANG OF THIEVES.

It is also appropriate to mention the reaction of a group of group known as the Wüster gang to the publication of Hoser (2009) which was a genus level review of the Rattlesnakes.

That paper adopted a common sense approach to the Rattlesnakes with a new classification at the genus level for these snakes, based on well established and previously established phylogenetic relationships between species and species groups. The paper resurrected old and little used names for obvious genus groups and formally assigned names to unnamed clades.

The response from North American herpetologists at the time, including Joseph Collins, who controlled the internet address "Center for North American Herpetology" or CNAH was favourable, because for the first time in almost a century the fiction that all Rattlesnakes should be in a single genus (*Crotalus*) was properly challenged and dealt with in a sensible manner.

Collins promoted the sensible taxonomy on his website "Centre for North American Herpetology".

Following this, a gang of thieves known as the Wüster gang, led by a pseudo scientist, Wolfgang Wüster from Wales in the UK, commenced an intense campaign to stop other herpetologists adopting the "Hoser taxonomy".

Wüster wrote and published a so-called paper claiming that the journal Hoser (2009) was published in wasn't validly published according to the rules of the *International Code of Zoological Nomenclature* (Wüster and Bérnills, 2011). When this was formally refuted by Hoser (2012a), Wüster and his gang of thieves hatched a plan to organize a mass boycott of the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999) to stop any names proposed by myself or anyone else they took umbrage to from ever being used.

One of the gang of thieves, Hinrich Kaiser, sent a SPAM email that was received by thousands of herpetologists and others worldwide, with a copy inevitably falling into my hands. They called for an all out war against the ICZN and the over 200 year old code of Zoological Nomenclature administered by the ICZN. The plan was thoroughly discredited by Hoser (2012d and 2013), with Hoser (2012d) copying the Kaiser email and plan in full in the journal.

The group attacked journals and editors who used any taxonomy and nomenclature they disapproved of and ran a campaign of hate and lies both online via so-called "social media" (e.g. Facebook, Twitter and chat forums) and in newsletters, journals and other publications they effectively controlled (e.g. Wallach *et al.* 2014).

They even petitioned the *International Commission of Nomenclature* (ICZN) to retrospectively rewrite the rules of the Code to enable their gang to steal "name authority" for over 900 validly named taxa, including species and genera named by such authors as John Edward Gray of the British Museum (e.g. Rhodin *et al.* 2015).

The actions of Wüster and the gang are beneath contempt, totally scientific and also highly illegal. The claims by Rhodin *et al.* (2015) and similar made elsewhere by the gang of thieves were systematically refuted by Hoser (2015a-f) and the many other sources cited therein.

Unable to argue against the merits of the taxonomy proposed by Hoser (2009) and other papers I have published since 1998 dealing with taxonomy and nomenclature, Wüster and their gang of thieves have set on a destructive campaign to attack the rules of the zoological nomenclature (Hoser 2015a-f).

Wüster and associates have aggressively embarked on a campaign to illegally rename each and every taxon formally named by myself and others they have taken a dislike to (so far totalling several hundred potential illegal junior synonyms) and then bludgeon others to use their illegal names in a form of "mob rule" not unlike that seen by so-called Islamic State, or ISIS terrorists in the Middle East.

The illegal actions of Wüster and his gang of thieves should not be tolerated and there is no doubt that history will judge them and their supporters harshly.

I suppose it is worth mentioning that a molecular phylogeny of the world's snakes published by Pyron *et al.* (2013) effectively validated the findings of Hoser (2009) that *Crotalus* as recognized prior was not a monotypic genus.

That Pyron *et al.* (2013) confirmed my earlier findings in earlier papers did not lead to the Wüster gang reversing their attacks on me.

Far from it!

Denzer *et al.* (2016) went further and accused me of stealing the work of their gang. In a long-winded rant of hate and lies, they accused me of plagiarization (theft of the works of others without attributing their work).

By way of example Denzer *et al.* (2016) wrote:

"The taxonomic basis for Hoser's proposals on *Laudakia* can be found in their entirety in Macey *et al.* (1998, 2000b, 2006). Most of Hoser's proposed classification additionally reflects nodes in the phylogeny published by Pyron *et al.* (2013)."

The authors were also repeatedly alleging that I had stolen Pyron's work without citing him.

The problem with their claim is that the relevant *Laudakia* paper was actually published in 2012, a full year before Pyron's phylogeny was even published!

Furthermore, five relevant papers by Macey *et al.* were cited in the *Laudakia* paper (Hoser 2012c), meaning their earlier findings were in fact fully credited when used!

I also note here that the name *Uropsophus* subject of a "ban" by Wüster and his gang is not in fact a creation of mine. It was first "coined" by Wagler, way back in 1830!

Incidentally, at the time he coined *Uropsophus*, Wagler did not produce a shred of scientific evidence to support his proposal.

However there are rules to be applied and used in terms of the *International Code of Zoological Nomenclature*. It is the first available genus-level name to be formally used for the clade of snakes known as the "*triseriatus*" group of species and under the rules of homonymy and priority must be used.

Wüster and his gang must not be allowed to engage in reckless acts of taxonomic vandalism to coin a new name for the group or to force others to use their illegal nomenclature.

They seek to do this for their own personal self-gratification and for no otherwise proper reason.

CROTALUS (SAYERSUS) FUNKI SP. NOV.

Holotype: A preserved specimen at the California Academy of Sciences, USA, specimen number: CAS HERP 210493 collected from Waddell Creek, Santa Cruz County, California, USA, Lat. 37.11, Long. -122.27.

This facility allows access to its holdings.

Paratypes: Two preserved specimens at the California Academy of Sciences, USA, specimen number: CAS HERP 210492 and 210494 collected from Waddell Creek, Santa Cruz County, California, USA Lat. 37.11, Long. -122.27.

Diagnosis: Until now *C. funki sp. nov.* has been treated as a regional variant of *C. oreganus*. It is readily distinguished from that species by the presence of a distinct whiteish-yellow band or stripe running across the head between eyes and distinct black borders of the darker brown dorsal body blotches, versus neither in *C. oreganus*, or at best only indistinct for one or other or both traits.

A detailed diagnosis to separate *C. oreganus* (treated as subspecies), and this species (which until now has been treated as *C. oreganus* and would otherwise key out as it), from all other living Rattlesnakes is in Klauber (1972) or Campbell and Lamar (2004).

Distribution: The general area from San Francisco and Alameda County California in the north, along the coastal strip, including nearby hills to south of San Luis Obispo County, California, USA, in a broad swathe covering most of the southern Coast Ranges, with the possible exception of the far southernmost areas, where *C. helleri* occurs.

The distribution of this taxon is bounded by the allopatric distribution of *C. oreganus* to the north and *C. helleri* to the south and broadly mirrors that of putative nominate *Elgaria multicarinata multicarinata* (Blainville, 1835).

Etymology: Named in honour of Dr. Richard Funk, veterinary surgeon of Mesa Arizona for services to herpetology spanning many decades.

CROTALUS HELLERI IDYLLWILDI SUBSP. NOV.

Holotype: A preserved specimen at the San Diego Natural History Museum, USA, specimen number: 60330 (Herps) collected from Idyllwild, California, USA, Lat. 33.74, Long. -116.72.

This is a facility that allows access to its holdings.

Diagnosis: *C. helleri idyllwildi subsp. nov.* is readily separated from other *C. helleri* by the very dark brownish-grey pattern on the dorsum, broken with very distinctive narrow light yellowish-white markings, forming a somewhat reticulated pattern. By contrast, normal *C. helleri helleri* (or *C. helleri callignis*) from elsewhere are characterised by a much lighter overall colouration consisting of a yellowish brown colouration on the upper body, punctuated with large and irregular dark brown blotches running along the midline. Rarely dark *C. helleri helleri* do occur, but these are characterised by dark colouration all over, as opposed to having the bright markings on the darker body background as seen in *C. helleri idyllwildi subsp. nov.*

A detailed diagnosis to separate *C. helleri* and *C. callignis* (treated as subspecies), and this species (which until now has been treated as *C. helleri* and would otherwise key out as it), from all other living Rattlesnakes is in Klauber (1972) or Campbell and Lamar (2004).

Distribution: Known only from the hills in the region of the type locality, as in areas near Mount San Jacinto, California, USA.

Etymology: Named in reflection of the type locality for the taxon.

UROPSOPHUS PUSILLUS RENTONI SUBSP. NOV.

Holotype: A preserved specimen at the California Academy of Science (CAS), United States of America, specimen number: CAS HERP 165284, collected along Paso Malo Road, 15.0 mi W of the junction of the Dos Aguas-to-Varalosa road. (or 20.6 mi E of Puerto Las Cruces) , Sierra de Coalcoman, Mexico.

The California Academy of Science (CAS), USA is a facility that allows access to its holdings by scientists.

Paratype: A preserved specimen at the Royal Ontario Museum (ROM), Canada, specimen number: ROM Reptiles and Amphibians 47056, collected at Sierra de Coalcoman, Michoacan, Mexico.

Diagnosis: The three subspecies of *Uropsophus pusillus* (Klauber, 1952) can be readily separated from one another by colouration. Nominate *U. pusillus pusillus* is characterised by a mainly light coloured head (upper surface) with a small number of dark spots or small blotches. *C. pusillus rentoni subsp. nov.* is instead characterised by a mainly light coloured head (upper surface) with large areas of darker pigment both anterior to and posterior to the eyes, but still with significant areas of lighter pigment on the upper head. *C. pusillus gedyei subsp. nov.* is characterised by a head that is dominated by darker greyish-brown pigment on most parts of the head, with the exception of the lightening near the temples, which forms a semidistinct temporal streak. In both *U. pusillus pusillus* and *C. pusillus rentoni subsp. nov.* the lightening that forms the temporal streak is very distinct. The snakes depicted in plate 930 of Campbell and Lamar (2004) and Fig 2.49 of Klauber (1972) volume 1, are both consistent with other specimens I have inspected of *C. pusillus rentoni subsp. nov.*

The banding of the tail in *C. pusillus gedyei subsp. nov.* is only semidistinct, versus very distinct in both *U. pusillus pusillus* and *C. pusillus rentoni subsp. nov.*

C. pusillus gedyei subsp. nov. is further separated from the other two subspecies by a greater preponderance of darker markings or dark pigment on the lower flanks (being a significant amount), versus a mainly lighter background with small spots or flecks in the other two subspecies.

The flanks of *U. pusillus pusillus* are generally light in colour with widely spaced smallish spots. By contrast the flanks in *U. pusillus rentoni subsp. nov.* are generally light in colour with

widely spaced smallish spots and additional dark flecks between these spots.

In *U. pusillus gedyei subsp. nov.* the black etching of the dorsal spots is distinct, whereas the same etching is either absent or indistinct in the other two subspecies.

Duellman (1961) noted that specimens from Cerro Tancitaro (*U. pusillus pusillus*) tend to have fewer dorsal blotches (33-46) than specimens from the Sierra de Coalcoman (*U. pusillus rentoni subsp. nov.*).

U. pusillus gedyei subsp. nov. appears to sit between these two extremes.

In *U. pusillus gedyei subsp. nov.* the darker dorsal spots are enlarged and often largely fused along the midline on one side or other giving the snake a distinctly saddled appearance not seen in the other two subspecies.

U. pusillus is readily separated from similar species by the following unique suite of characters: 2 more-or less symmetrical prefrontals, versus 3 or more irregular scales immediately posterior to the internasals in *U. triseriatus* and other species of *Uropsophus*.

Detailed descriptions of *U. pusillus*, (including all three subspecies described herein), including by way of separating all similar species of Rattlesnakes, can be found in Klauber (1972) and Campbell and Lamar (2004), including by way of separation from more recently described long-tailed species and those in the *U. triseriatus* group, as well as all the *C. viridis* species complex.

Distribution: *U. pusillus rentoni subsp. nov.* is found in southwestern Michoacan in the Sierra de Coalcoman, Mexico.

Etymology: Named in honour of Ian Renton of Paradise, South Australia, Australia owner of Snake-away Services, in recognition of his services to herpetology and wildlife conservation over some decades.

UROSOPHUS PUSILLUS GEDYEI SUBSP. NOV.

Holotype: A preserved specimen at the Natural History Museum of Los Angeles County (LACM) specimen number: LACM Herps 25947, collected at 9 miles West of Atenquique, Jalisco, Mexico.

Diagnosis: The three subspecies of *Uropsophus pusillus* (Klauber, 1952) can be readily separated from one another by colouration. Nominate *U. pusillus pusillus* is characterised by a mainly light coloured head (upper surface) with a small number of dark spots or small blotches. *C. pusillus rentoni subsp. nov.* is instead characterised by a mainly light coloured head (upper surface) with large areas of darker pigment both anterior to and posterior to the eyes, but still with significant areas of lighter pigment on the upper head. *C. pusillus gedyei subsp. nov.* is characterised by a head that is dominated by darker greyish-brown pigment on most parts of the head, with the exception of the lightening near the temples, which forms a semidistinct temporal streak. In both *U. pusillus pusillus* and *C. pusillus rentoni subsp. nov.* the lightening that forms the temporal streak is very distinct. The snakes depicted in plate 930 of Campbell and Lamar (2004) and Fig 2.49 of Klauber (1972) volume 1, are both consistent with other specimens I have inspected of *C. pusillus rentoni subsp. nov.*

The banding of the tail in *C. pusillus gedyei subsp. nov.* is only semidistinct, versus very distinct in both *U. pusillus pusillus* and *C. pusillus rentoni subsp. nov.*

C. pusillus gedyei subsp. nov. is further separated from the other two subspecies by a greater preponderance of darker markings or dark pigment on the lower flanks (being a significant amount), versus a mainly lighter background with small spots or flecks in the other two subspecies.

The flanks of *U. pusillus pusillus* are generally light in colour with widely spaced smallish spots. By contrast the flanks in *U. pusillus rentoni subsp. nov.* are generally light in colour with widely spaced smallish spots and additional dark flecks between these spots.

In *U. pusillus gedyei subsp. nov.* the black etching of the dorsal spots is distinct, whereas the same etching is either absent or indistinct in the other two subspecies.

Duellman (1961) noted that specimens from Cerro Tancitaro (*U. pusillus pusillus*) tend to have fewer dorsal blotches (33-46) than specimens from the Sierra de Coalcoman (*U. pusillus rentoni subsp. nov.*).

U. pusillus gedyei subsp. nov. appears to sit between these two extremes.

In *U. pusillus gedyei subsp. nov.* the darker dorsal spots are enlarged and often largely fused along the midline on one side or other giving the snake a distinctly saddled appearance not seen in the other two subspecies.

Distribution: *U. pusillus gedyei subsp. nov.* is found in the extreme western Volcanic Belt in southern Jalisco and adjacent Colima, Mexico.

Etymology: Named in honour of Andrew Gedye of Cairns, North Queensland, Australia, formerly of Cheltenham, Victoria, Australia, in recognition of his services to herpetology and wildlife conservation over some decades including through his captive breeding of rare and endangered species.

NOTES ON THE DESCRIPTIONS FOR ANY POTENTIAL REVISORS

Unless mandated by the rules of the *International Code of Zoological Nomenclature*, none of the spellings of the newly proposed names should be altered in any way. Should one or more newly named taxa be merged by later authors to be treated as a single species, the order of priority of retention of names should be the order (page priority) of the formal descriptions within this text.

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CONFLICT OF INTEREST

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

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