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Tidying up Death Adder taxonomy (Serpentes: Elapidae: *Acanthophis*): including descriptions of new subspecies and the first ever key to identify all recognized species and subspecies within the genus.

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ABSTRACT

The taxonomy and nomenclature of Australasian Death Adders (Genus *Acanthophis* Daudin, 1803) was largely resolved by the papers of Hoser (1998) and Hoser (2002).

Since then a Welsh snake fancier and career criminal named Mr. Wolfgang Wüster and his associates in crime have engaged in a reckless and destructive global campaign to stop people using correct taxonomy and nomenclature for the relevant species (e.g. Wüster 2001, Wüster *et al.* 2001, 2005).

For more detailed listings of the destabilizing publications by Wüster and associates see Hoser (2013).

This campaign by Wüster culminated in the reckless publication of Kaiser (2012a, 2012b) Kaiser *et al.* (2013) and Kaiser (2013), all of which were properly condemned by Cogger (2013, 2014), Shea (2013a, 2013b, 2013c, 2013d) and many others.

Further studies have identified five divergent forms of *Acanthophis* previously not recognized by most herpetologists but upon examination are distinct and worthy of taxonomic recognition.

These are formally described herein according to the Zoological Code (Ride *et al.* 1999).

These are *Acanthophis wellsei hoserae subsp. nov.* from the Pilbara region north of the Fortescue River in the region east of the Yule River, Western Australia, *Acanthophis pyrrhus maryani subsp. nov.* from drier parts of Western Australia south of the Pilbara region and away from the southern margins of the state, *Acanthophis pyrrhus moorei subsp. nov.* from an elevated site in the Channel Country of south-west Queensland, *Acanthophis antarcticus granti subsp. nov.* from Magnetic Island, Queensland and the immediately adjacent coastal ranges and *Acanthophis groenveldi mumpini subsp. nov.* from Obi Island (Indonesia) and at least one immediately adjacent outlier in eastern Indonesia in the waters south of Halmahera and north of Ceram.

The two species of *Acanthophis* from Tanimbar Island and the Kei Islands are formally described herein with descriptions that properly separate them from all other species in order to resolve potential or alleged confusion arising from earlier publications.

For the first time ever, a key is provided to identify all species of *Acanthophis* from all parts of their range, including all parts of Australia, Papua New Guinea and Indonesia.

Furthermore the key is usable without the need to know the provenance of the relevant specimen.

Keywords: Taxonomy; Australasia; *Acanthophis*; Hoser; Pilbara; Yule River; Western Australia; Obi; Indonesia; Magnetic; Island; Queensland; *wellsei*; *pyrrhus*; *antarcticus*; *crotalusei*; *barnetti*; *woolfi*; *cummingi*; *bottomi*; *hawkei*; *lancasteri*; *rugosus*; *laevis*; *praelongus*; *schistos*; *cliffrosswellingtoni*; *donnellani*; *groenveldi*; *macgregori*; *yuwoni*; new subspecies; *hoserae*; *maryani; moorei*; *granti*; *mumpini.*

INTRODUCTION

The taxonomy of Australasian Death Adders was largely resolved by the papers of Hoser (1998) and Hoser (2002). Significant is that these papers for the first time formally restricted the taxon *Acanthophis praelongus* Ramsay, 1877 to the Cape York region of Queensland and went further in describing unnamed forms from northern Australia and the adjacent region.

Since then a Welsh snake fancier named Wolfgang Wüster and his associates have engaged in a destructive campaign to stop people using correct taxonomy for the relevant species (e.g. Wüster 2001, Wüster *et al.* 2001, 2005), or for more detailed

listings of the destabilizing publications by Wüster see Hoser (2013).

This campaign by Wüster culminated in the reckless publication of Kaiser (2012a, 2012b), Kaiser *et al.* (2013) and Kaiser (2013), all of which were properly condemned by Cogger (2014a), Shea (2013a, 2013b, 2013c, 2013d) and many others.

Notwithstanding Shea's 2013 comments and Cogger's (2014a) condemnation of the destabilizing tactics of Wüster and his gang, which includes the likes of Mark O'Shea, convicted wildlife smuggler David John Williams and taxonomic vandal Wulf Scheip (see for example Schleip 2008), Cogger (2014) did little to stop the widespread confusion in terms of the genus *Acanthophis* due in part to the hate campaign against Cogger's book orchestrated by the Wüster gang on various Facebook pages (various authors 2014).

In terms of the Death Adders and as a direct result of the reckless actions and confusion caused by Wüster's actions (notably through the publication of Wüster *et al.* 2005), Cogger's (2014a) diagnostic keys are in error and if used, would not even necessarily correctly identify the limited number of species he recognizes in his ultra conservative treatment of the Australian reptiles.

These errors were subsequently conceded by Cogger (2014b), who also stated that his book represented the majority view of Australian herpetologists at the relevant time and not necessarily what was correct.

As a result of the ongoing confusion with regards to *Acanthophis* classification, I herein provide an accurate diagnostic key that can be used to accurately identify all described and recognized species and subspecies as described and recognized by Hoser (1998), Hoser (2002) and this paper.

For the purposes of this paper, I rely exclusively on the diagnostic information as published by Hoser (1998 and 2002) on the basis that no evidence from anywhere has emerged to contradict the information within that paper and any taxonomic conclusions that have arisen since then.

Of note in particular is that the morphology-based descriptions of Death Adder species from New Guinea and nearby islands by Hoser (1998) and Hoser (2002), have been largely confirmed by more recent geological and molecular evidence for species groups across the same geographical range, with species groups being split along similar lines (geographical) to those of the Death Adders in Hoser (1998 and 2002) and obviously affected by the same ecological barriers in the form of deep sea water zones or high and cold mountains.

Examples of such studies and papers include Harvey *et al.* (2000), Rawlings and Donnellan (2003), Rawlings *et al.* (2004, 2008) and Reynolds *et al.* (2013a, 2013b, 2014), all of whom showed north/south splits in similar python species in island New Guinea (separated by the central ranges cordillera) and where applicable, different taxa in the islands to the west of New Guinea (separated by deep seas).

As part of my ongoing brief to study Death Adders, now spanning a period in excess of 40 years, further studies have identified five divergent forms of *Acanthophis* previously not recognized as distinct but worthy of taxonomic recognition.

These are formally described herein according to the Zoological Code (Ride *et al.* 1999) at the conservative level of subspecies.

These are *Acanthophis wellsei hoserae subsp. nov*. from the Pilbara region in the region generally north of the Fortescue River, but notably east of the Yule River, in north-west Western Australia, *Acanthophis pyrrhus maryani subsp. nov.* from drier parts of Western Australia south of the Pilbara region and away from the southern margins of the state, *Acanthophis pyrrhus moorei subsp. nov.* from south-west Queensland and currently known only from a sample of four females from the same isolated location, *Acanthophis antarcticus granti subsp. nov*. from Magnetic Island, Queensland and the immediately adjacent coastal ranges and *Acanthophis groonveldi mumpini subsp. nov*. from Obi Island and outliers in Indonesia.

The species of *Acanthophis* from Tanimbar Island and the Kei Islands are formally described herein with descriptions that properly separate them from all other species in order to resolve potential confusion allegedly or potentially arising from earlier publications.

I do note however that in terms of *Acanthophis wellsei hoserae subsp. nov*. from the Pilbara region of Western Australia, there is a strong argument for the taxon described to be recognized as a full species. I do however not do this, instead treating it herein as a subspecies only, pending molecular evidence one way or other. This is also to keep the treatment of this form consistent with that of *Acanthophis wellsei donnellani* Hoser, 2002, the taxon from the Cape Range of Western Australia.

However I note herein that already a number of correspondents including Brian Bush (Bush *et al*. 2013) have written that they believe *Acanthophis wellsei donnellani* Hoser, 2002 is in fact a species level taxon.

Those authors rely only on my own previously published morphological differences to sustain this point of view.

Due to the fact that Hoser (1998) and Hoser (2002) as well as the definitive paper on the genus as a whole published by Hoser (1995), are all widely available, including on the internet via the site http://www.herp.net, it is not necessary for me to provide extensive documentation of the genus or rehash this material.

However key publications relevant to the genus *Acanthophis* and taxonomy of the genus as discussed herein, do include the following: Aplin (1998), Aplin and Donnellan (1999), Ball (1993), Barnett and Gow (1992), Bird (1992), Bohme (1991), Boulenger, (1898), Bush (1998), Carpenter and Ferguson (1977), Carpenter *et al.* (1978), Cogger (1983, 2014), Coventry and Robertson (1991), Davis *et al.* (1980), Doughty *et al.* (2011), Ehmann (1992), Fairley (1929), Fearn (2001), Fry (1998), Fry *et al.* (2001), Fyfe and Munday (1988), Gilbertson-Middlebrook (1981), Glasby *et al.* (1983), Gow (1977, 1981), Greer (1989), Hay (1972), Hoser (1981, 1982, 1983, 1984a, 1984b, 1985a, 1985b, 1985c, 1987, 1989, 1991, 1992, 1993, 1995, 1996, 1997a, 1997b, 1998, 1999, 2001, 2002, 2012a, 2012b, 2013), Hoser and Williams (1991), Hudson (1979), ICZN (1991, 2000), Johnston (1987), Kim and Tamiya (1981), Lindgren (1975), Longmore (1986), Loveridge (1948), Macleay (1877), Maryan *et al.* (2014), McDowall (1984), Menkhorst (1994), Mirtschin (1976, 1982, 1985), Mirtschin and Davis (1991, 1992), O'Shea (1996, 1998), Pyron *et al.* (2011), Ramsay, (1877), Reynolds *et al.* (2013a, 2013b), Shaw and Nodder, (1802), Shea (1998, 2002, 2013a, 2013b, 2013c, 2013d), Sheumack *et al.* (1979), Shine (1980, 1991), Smith (1997), Stettler (1985), Storr (1981), Storr *et al.* (1986), Swan (1990), van Woerkom (1985), Valentic (1998), Wells (2002), Wells and Wellington (1983, 1985, 1999), Wilson and Knowles (1988), Wilson and Swan (2003), Worrell (1972) and sources cited therein.

There are countless other publications on snakes of the genus *Acanthophis* that effectively either rehash the information provided in the above sources, or alternatively invariably provide the same information in original form.

In the event a later author seeks to merge one or more taxon described within this paper, the order of priority should be by page priority in terms of this paper; that is the first name listed is the first to be used. Gender, spellings and the like of names should not be altered in any way unless mandated by the Zoological Code, even if apparently wrong in the original descriptions herein.

This also applies to my earlier named taxon, *Acanthophis cummingi* Hoser, 1998 named after Fia Cumming of Lyons, Canberra, ACT, Australia and formerly of Chatswood, Sydney, NSW, Australia.

While no herpetologist has yet raised the issue of gender of that name, I do so herein both as original author and first revisor and make it known that the assignment was deliberate.

Cumming is in fact a female, but the gender is a deliberate play on her actions to expose corruption in NSW Wildlife authorities, the NPWS, in that it took what Australians call "balls" (an extreme form of courage usually referred to as being only found in very brave men).

As Cumming displayed "balls" when putting her life at risk by blowing the whistle on immense systemic corruption, I think it is appropriate in the circumstances to give her a male gender scientific name recognizing her efforts.

The taxon *Cummingea* Hoser, 2009 also named in her honour, recognizes her feminine gender.

Also of note is that in 2002, Richard Wells divided the genus *Acanthophis* Daudin, 1803 into two, placing *A. pyrrhus* Boulenger, 1898 into his proposed new genus *Aggressiserpens* Wells, 2002.
While the name has been effectively ignored by most other authors.

However it is now also subject to a planned over-writing by Wolfgang Wüster *et al.*, as specifically identified in Kaiser (2012b) and Kaiser *et al.* (2013).

As Cogger (2014b) said, there is no legal justification or basis for the action of Kaiser *et al.* and so the Wells name remains valid and available under the Zoological Code (Ride *et al.* 1999) if one accepts his taxonomy.

Notwithstanding this, I have chosen not to recognize the genus as such at this stage, preferring to place all within *Acanthophis*, and with the only likely prospect of change where I stand pending a better molecular sampling of relevant taxa within *Acanthophis* as presently understood that indicates species level divergence between clades in excess of 8-10 MYA by well calibrated means.

However phylogenies produced to date have indicated a distinct clade including the species *A. wellsei* Hoser, 1998 and *A. pyrrhus*, being significantly divergent from all other *Acanthophis* taxa (but not well calibrated), which also matches the morphology of the relevant species.
Therefore I find it entirely appropriate to (at the present time) recognize these western taxa taxonomically at the subspecies level. For this, the name *Aggressiserpens* Wells, 2002 is the correct name of use under the rules of the Zoological Code (Ride *et al.* 1999), including the rules of homonymy, priority and stability. I add that no one should use or adopt any invalid junior synonyms coined by Wüster *et al.*.

THEFT OF RESEARCH FILES AND DATA

I note also the following. In 2006 an online petition sponsored by a group of animal-hating pseudoscientists including career criminals Wolfgang Wüster, Mark O'Shea, David John Williams, Bryan Fry and others posted at: http://www.aussiereptileclassifieds.com/phpPETITION (Hunter *et al.* 2006) called for my successful wildlife education business and all my other herpetological activity to be shut down by the government of Victoria, here in Australia.
These men were successful in that after a ruthless five-year campaign which included a non-stop barrage of lies and deceptive conduct they got their wish granted.

On 17 August 2011, 11 heavily armed police and wildlife officers conducted a highly illegal and violent raid on our family home and research facility. The raid was led by government employed wildlife officers Glenn Sharp and Emily Gibson, who claimed they were raiding me at the behest of Terri Irwin, owner of Australia Zoo, Queensland. Irwin was the wife of animal attacker, the late Steve Irwin, a police-protected criminal, himself killed when mistreating a stingray on 4 September 2006. One of Wüster's friends, another serial law-breaker named Tony Harrison had actively solicited Irwin's support in having the wildlife officers conduct the armed raid and had bragged about the (then) impending raid on a Facebook hate site he had created some months earlier (details published by Hoser 2013).

In this raid, myself, my wife and two young daughters were arrested at gunpoint and held hostage in the kitchen of the house for nine hours while the facility was ransacked and effectively destroyed. Besides the unspeakable acts of killing tame captive snakes in cages and criminal damage to the cages themselves, irreparable damage to household goods, parked motor vehicles and the like, the raiding officers illegally shut down our business.

They then effectively placed myself under house arrest at gunpoint for some months after the raid.
An application by myself to the Supreme Court of Victoria led to the re-opening of our unlawfully shut down wildlife education business, but that didn't stop Sharp, Gibson and others at the DSE engaging in illegal conduct to try to stop the business trading, including breaches of the trademarks laws and fair trading laws. Simultaneously, Sharp and Gibson also green-lighted criminal activities by others they were corruptly protecting.
As a direct result of culpable misconduct by various DSE officers, two people died on 14 February 2013. No one at the DSE was charged.

Of greater relevance here in terms of this scientific paper is that at the time of the raid on 17 August 2011, research files spanning more than 40 years were taken and never returned, including materials and records relevant to this paper.

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

Faced with the dilemma of deciding whether to spend another fourty years gathering data, by which time I may be dead from old age, being aged 52 as of 2014, or publishing the relevant paper/s with less data, I have opted to publish.
Underlying this motivation has been an increasing concern that a delay to formally identify and name undescribed biodiversity may lead to its extinction before another scientist gets around to the matter.

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

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

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

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

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

THE NEED FOR A WORKABLE DICHOTOMOUS KEY TO THE GENUS

In order to reduce confusion among herpetologists in terms of the genus *Acanthophis*, and to combat the misinformation about these snakes being bandied around on the internet and elsewhere, I have for the first time ever, provided a dichotomous key to identify all species and subspecies of *Acanthophis* from all parts of their range, including all parts of Australia, Papua New Guinea and Indonesia, and without the need to know the provenance of the relevant specimen.

Noting the now extensive private trade in *Acanthophis* species both within Australia and elsewhere, it is more important than ever that people be able to accurately identify the species of their animals.

Even if a keeper or herpetologist chooses not to recognize given taxa identified herein based on reckless misinformation by Wüster or others, the key will enable users to accurately ascertain the provenance of their animal with certainty to enable proper conservation measures to be undertaken.

To give an idea as to the potential use of the key provided herein, I refer to the illegal armed raid on my research facility led by corrupt Victorian Wildlife Officers, Glenn Sharp and Emily Gibson on 17 August 2011.

The raid was nothing more than a fishing exercise seeking evidence of non-existent criminal offences, as part of a wide-ranging and illegal attack on my lawful wildlife education business and my wife and two young and vulnerable children.

Taken from the freezer was a bog-standard deceased Floodplains Death Adder, *Acanthophis cummingi* Hoser, 1998, which in line with other well-preserved corpses I would have lodged with the local National Museum of Victoria and was merely awaiting delivery there by myself at a mutually convenient date and time. This was a legally held captive-bred animal that had died and being held legally and should never have been taken from the facility by the wildlife officers.

Removing identifying notes attached to the specimen, the DSE officers handed the snake to resident Museum Herpetologist, Jane Melville (a lizard expert with effectively zero expertise on elapid snakes) to identify, with the DSE officers hoping that the snake may be identified by her as an illegal "unscheduled taxon" such as *Acanthophis wellsei* Hoser, 1998.

(Most, if not all specimens of that taxon found by wildlife officers in Victoria have to date, under the directions of Ron Waters, Glenn Sharp and Emily Gibson been seized and destroyed as part of their warped campaign to rid the world of all "Hoser-named" taxa, the most recent case being several specimens taken from the facility of Rob Valentic which were then killed under direction).

Using her copy of Cogger (2000), Melville later wrote in a statement (Melville, 2011) that she was unable to accurately identify the snake to species.

There was nothing wrong with her statement in as much as she never claimed to be an expert on Death Adders. However had the officers bothered to take the snake from the reptile facility to me in the kitchen (where I was being held hostage), I could have either directed the officers to the written notes accompanying the snake or reidentified it for them!

During the same raid and using a copy of Wilson and Swan (2003) as their reference source, the wildlife officers issued a so-called "seizure/retention notice" on a geriatric Djarra Death Adder, *Acanthophis woolfi* Hoser, 1998. Without apology, the notice was withdrawn a month later.

In fairness to the authors Wilson and Swan, the error by the wildlife officers was as a result of their inability and failure to read the book and not the fault of the authors.
The error came about due to the wildlife officers reckless guessing as to what species the snake was.

In legal proceedings in early 2011, when a photo of the same snake being used at a wildlife display at Endeavour Hills Shopping Mall in January 2009 was shown to wildlife officer Doug Winkle, he gave his "expert" evidence that the same snake was a "Tiger Snake", this evidence being accepted as correct by the corrupt and biased magistrate at the time (later overturned on appeal). Winkle also later admitted that he was in error and that the snake was a Death Adder as put to him by my lawyer, however, Winkle went on to say he had no idea what species the snake was.

In other words a dichotomous key for the genus *Acanthophis*, no matter how good it is, will only be worthwhile if actually used!

ACANTHOPHIS WELLSEI HOSERAE SUBSP. NOV.

Holotype: A specimen at the Western Australian Museum, Perth, Western Australia, specimen number: R139366 from Meentheena, Western Australia. The Western Australian Museum is a government controlled facility that allows access to its specimens for research purposes.

Paratypes: Two specimens at the Western Australian Museum, Perth, Western Australia, specimen numbers: R139137 and R139239 from Meentheena, Western Australia. The Western Australian Museum is a government controlled facility that allows access to its specimens for research purposes.

Diagnosis: *Acanthophis wellsei hoserae subsp. nov.* has until now been regarded as a variant of *Acanthophis wellsei* Hoser, 1998. It is known definitively from the hilly region east of the Yule River and north of the Fortescue River in Western Australia.

In common with *A. wellsei wellsei*, *A. wellsei hoserae subsp. nov.* is believed to occur in both orange/red and black/red morphs, although black/red morphs are relatively uncommon. However the two taxa are most readily separated as follows: For *A. wellsei hoserae subsp. nov.* the darker cross-bands at mid-body are either wider than the light bands, of the same width or barely noticeably narrower than the lighter bands. By contrast in *A. wellsei wellsei* (the only taxon this new species may be easily confused with), the darker cross-bands are noticeably narrower and obviously so at mid-body.

A. wellsei hoserae subsp. nov. are also separated from *A. wellsei wellsei* by the fact that behind the parietals are several well-formed scale ridges running longitudinally to the back of the head. In *A. wellsei wellsei* the same ridges are so small as to be indistinct.

The other subspecies of *A. wellsei* is *A. wellsei donnellani* Hoser, 2002 from the Cape Range of Western Australia.

In that taxon, females have on average, statistically significantly lower ventral scale counts than *A. wellsei* from elsewhere, as well as a relatively longer tail.

The supraocular scales in *A. wellsei donnellani* are distinctly flared when compared with other *A. wellsei.*

Keeling in *A. wellsei donnellani* is highly pronounced on scale rows 1-4.

Specimens of *A. wellsei donnellani* are a paler ground colour, with less contrasting bands than those of all *A. wellsei wellsei* and *A. wellsei hoserae subsp. nov.* from the western parts of their range. At the northern margins of the range of *A. wellsei hoserae subsp. nov.* light coloured individuals are most common, but these may be separated from *A. wellsei donnellani* by the traits just outlined and the fact that *A. wellsei donnellani* is of more yellowish-greyish colouration (on a light-reddish-brown background) most of the time and the dorsal crossbands are relatively indistinct as compared to the other two subspecies of *A. wellsei*.

In the lighter individuals of *A. wellsei hoserae subsp. nov.* there are noticeable but small white markings on the supralabials. In *A. wellsei donnellani* such markings are either absent or peppered to such an extent as to be indistinct.

For *A. wellsei donnellani* the dorsal ground colour is often lightish with yellowish greyish crossbands superimposed on a light-reddish-brown background, with black tips on the posterior margins of the yellowish grey crossband scales (black tips are on the last row only on each band).

A. wellsei donnellani is restricted to the Cape Range area of Western Australia as opposed to the main *A. wellsei wellsei* population that is found in the region centered around the Hamersley Ranges of Western Australia.

A. wellsei hoserae subsp. nov. is known to occur in the hilly region bounded by the Yule River, Western Australia (Woodstock, being the known south-west extremity for the range of the subspecies) and the deserts east and north of here, the

easternmost site known for the taxon being Carawine Gorge, Western Australia and the northernmost site being 29 km North-north-east of Marble Bar, Western Australia. It is also believed to be distributed in the region west of that just outlined to be found around the Chichester Ranges of WA and immediately adjacent hilly areas of suitable habitat to the north and to the edge of the Great Sandy Desert and sandy coastal areas of otherwise unsuitable habitat, this also being taken to include areas with large numbers of Desert Death Adders (*Acanthophis pyrrhus*). Its distribution is bounded by the Fortescue River valley in the south and flat dry areas on the other sides, although it is possible that *A. wellsei wellsei* occur in the Chichester Ranges where it is closest to the Fortescue River Valley, this being the region nearest the West Coast of Australia as opposed to the upper reaches of the basin.

The distribution of the three different subspecies of *Acanthophis wellsei* by geographical region mirrors that of other reptiles who's habits are essentially rock-dwelling or prefer such habitats and are in effect stapled to such habitat. The barriers that have affected one group of saxacoline reptiles, seems to have affected many, although for the *Acanthophis wellsei* complex it seems that a competing species (successful in a different habitat) forms the distributional barrier/s as opposed to any extreme unsuitability of the intervening habitat itself..

By way of example, the distribution of *A. wellsei hoserae subsp. nov.* effectively mirrors that of *Varanus pilbaraensis* Storr, 1980 (as defined by Maryan *et al.* 2014) and *Egernia epsisolus* Doughty *et al*., 2011.

Colouration differences in populations appears to reflect substrate (rock type) and corresponding soil colours, as well as perhaps that of dead vegetation on the ground where the snakes may rest.

Etymology: Named in honour of my long-suffering wife, Shireen Hoser in recognition for her long-term contributions to herpetology, including through her management of the wildlife education business, Snakebusters: Australia's best reptiles. Also recognized is her reptile education work in Africa.

ACANTHOPHIS PYRRHUS MARYANI SUBSP. NOV.

Holotype: A specimen at the Western Australian Museum, Perth, Western Australia, specimen number: R154930 from Carosue Dam, 110 km North East of Kalgoorlie, Western Australia. The Western Australian Museum is a government controlled facility that allows access to its specimens for research purposes.

Paratype: A specimen at the Western Australian Museum, Perth, Western Australia, specimen number: R146966 from Carosue Dam, 110 km North East of Kalgoorlie, Western Australia. The Western Australian Museum is a government controlled facility that allows access to its specimens for research purposes.

Diagnosis: *Acanthophis pyrrhus maryani subsp. nov.* is readily separated from both the two northern subspecies, namely *A. pyrrhus pyrrhus* Boulenger, 1898 from the Northern Territory and *A. pyrrhus armstongi* Wells and Wellington, 1985 from the coastal region of the Pilbara in Western Australia and nearby areas by the following suite of characters: 139-144 ventrals; 43-54 subcaudals; 15-31 undivided subcaudals; limited white pigment on the supralabials, with any present being heavily peppered with orange and numerous distinct black flecks at the margins of the dorsal cross-bands (these flecks being indistinct in the other two subspecies).

A. pyrrhus armstongi Wells and Wellington, 1985 has a higher ventral count (over 150) than *A. pyrrhus maryani subsp. nov.* (less than 144).

A. pyrrhus pyrrhus is readily separated from both the Western Australian subspecies by the dorsal colouration. The lighter cross bands are orangeish as opposed to yellow.

Both *A. pyrrhus pyrrhus* and *Acanthophis pyrrhus maryani subsp. nov.* have a noticeable region of dark pigment on the upper labials from the eye to the back of the head. This is not evident in *A. pyrrhus armstongi.*

Aplin and Donnellan (1999) provide further comparisons between the scale counts for the three subspecies, identified by them as northern, central and southern populations (see page 290, table 7).

Acanthophis pyrrhus maryani subsp. nov. is known from all drier parts of Western Australia south of the Pilbara region, and including areas immediately south and east of there, with the distribution not including the wetter parts of the south-west and also the southern margin of the state, which is where the species *Acanthophis antarcticus* (Shaw and Nodder, 1802) is found.

The subspecies is also found in adjacent parts of South Australia.

Etymology: Named in honour of Brad Maryan, of Western Australia in recognition of many decades of work involving western Australian herpetology and in the face of many years of improper harassment by officers of the Western Australian Wildlife Department (CALM).

ACANTHOPHIS PYRRHUS MOOREI SUBSP. NOV.

Holotype: A specimen number J455512 at the Queensland Museum, Brisbane, Queensland, collected from Durrie Station, near Birdsville, Queensland, Australia. The Queensland Museum is a government-owned facility that allows scientists access to their collection.

Paratypes: Three specimens, numbers J22451, 31646, 39570 at the Queensland Museum, Brisbane, Queensland, collected from Durrie Station, near Birdsville, Queensland, Australia. The Queensland Museum is a government-owned facility that allows scientists access to their collection.

Diagnosis: *Acanthophis pyrrhus moorei subsp. nov.* is most readily separated from other *A. pyrrhus* by build, being noticeably more stout than other three subspecies. This reflects also in the lower ventral count of 127-143 in females (n=4), versus 139-158 in the other three subspecies.

In other respects the subspecies is most similar to the nominate form of *A. pyrrhus* (which it would otherwise be identified as), but in contrast to that taxon, lacks tiny bluish flecks on the dorsum.

The subspecies *Acanthophis pyrrhus moorei subsp. nov.* is an outlier population from far south-west Queensland only known from the type locality. It is geographically separated from the NT population by an area of unsuitable habitat being riverine floodplains, including that of the Georgina River drainage. Also of note is that there appear to be no records of any *A. pyrrhus* from the Simpson Desert in the south-eastern Northern Territory and immediately adjacent parts of south-west Queensland, noting that the bulk of the habitat there is not unlike a lot of habitat near the heavily collected region of the NT/South Australian border area that also clearly lacks the species.

However unless and until all areas of hilly habitat in the region are properly surveyed, the absence of *A. pyrrhus* in the area should not be assumed with certainty.

Hilly areas to the north and east of Birdsville are inhabited by *A. woolfi* Hoser, 1998 (near Mount Isa and south of there), or *A. antarcticus* (Shaw and Nodder, 1802) (in the Brigalow belt of Western Queensland), or near the NT border *A. hawkei* Wells and Wellington, 1985.

The species *A. rugosa* Loveridge, 1948 (from southern New Guinea), *A. cummingi* Hoser, 1998, *A. lancasteri*, Wells and Wellington, 1985, *A. antarcticus* (Shaw and Nodder, 1802) and *A. woolfi* Hoser, 1998 are all readily separated from *A. pyrrhus* by their more stout build and lower ventral count (under 125).

The same applies in terms of the New Guinea and Islands taxa (west of New Guinea), described by Hoser in 1998 and 2002, all of which have under 125 ventrals.

Etymology: Named in honour of recently deceased Queensland-based herpetologist Mike (Pike) Moore of Brisbane,

in recognition of many decades keeping and breeding little-known species, in particular skinks.

ACANTHOPHIS ANTARCTICUS GRANTI SUBSP. NOV.

Holotype: A specimen number J83133 (a male) at the Queensland Museum, Brisbane, Queensland, collected from Magnetic Island, north Queensland, Australia. The Queensland Museum is a government-owned facility that allows scientists access to their collection.

Paratypes: Two specimens, numbers J76722 (a male) and J76721 (a female) at the Queensland Museum, Brisbane, Queensland, collected from Magnetic Island, north Queensland, Australia. The Queensland Museum is a government-owned facility that allows scientists access to their collection.

Diagnosis: The subspecies *Acanthophis antarcticus granti subsp. nov*. has been variously identified in the literature as both *Acanthophis antarcticus* (Shaw and Nodder, 1802), and *Acanthophis praelongus* Ramsay, 1877.

Based on morphology, the taxon is clearly a variant of *A. antarcticus*, based most notably on the presence of 21 as opposed to 23 mid-body scale rows in *A. praelongus*.

Ventral count for *Acanthophis antarcticus granti subsp. nov*. ranges from 118 to 126 in both sexes and 44-56 subcaudals in both sexes (Fearn, 2001).

Acanthophis antarcticus granti subsp. nov. is separated from the nominate form of *A. antarcticus* and the two western subspecies (*A. antarcticus schistos* Wells and Wellington, 1985 and *A. antarcticus cliffrosswellingtoni* Hoser, 2002) by the following suite of characters: a slightly raised supraocular; minimal keeling on the head and neck and minimal white pigmentation on the upper labials or in rare specimens where there is substantial white pigment on the upper labials, it is still prevented from entering the orbit by a distinctive zone of dark pigment (which is not seen in other *A. antarcticus*); the individual scales on the venter are characterised by being dark in the centre and light on the edges, as opposed to either immaculate or flecked in other *A. antarcticus.*

The subspecies *Acanthophis antarcticus granti subsp. nov*. is only known from Magnetic Island, north Queensland and large hills (ranges) on the immediately adjacent section of the Queensland coast around Townsville, Queensland, Australia.

Its average adult size is smaller than that of the other *A. antarcticus* subspecies, rarely exceeding 60 cm in total length.

Death Adders from the rainforest zone that commences midway between Townsville and Cairns are clearly a different taxon and attributed to *A. praelongus*, believed to be distributed in a continuous zone to the tip of Cape York and immediately adjacent offshore islands.

There is no evidence to suggest a natural hybrid zone between *A. antarcticus* and *A. praelongus* as suggested by Wilson and Swan (2003).

Furthermore, the original description of *A. praelongus* by Ramsay in 1877, stated that *A. praelongus* has a round pupil. That statement was in error. All snakes within the genus have an elliptical pupil.

Etymology: Named in honour of Scott Grant, of Colac, western Victoria, Australia in recognition of his public benefit work as licensed wildlife demonstrator.

ACANTHOPHIS GROENVELDI MUMPINI SUBSP. NOV.

Holotype: A dried specimen (head and skeleton) at the US National Museum (USNM), Washington, DC, United States of America, specimen number: 237694 from Kampung Anggai, Laiwui, Obi Island, Indonesia.

Diagnosis: In the normal situation the taxon *Acanthophis groenveldi mumpini subsp. nov.* would be identified as *Acanthophis groenveldi* Hoser, 2002 (the nominate subspecies).

However *A. groenveldi mumpini subsp. nov.* is as a rule most readily separated by the configuration of dark patches on the labials.

A. groenveldi mumpini subsp. nov. is separated from all other *Acanthophis* by the configuration of black blotches on the supralabials. There are no black marks on any of the first four supralabials (rarely a tiny speck on the first), followed by blotches on the following three. The first and most anterior of these is either a tiny elongate patch, or more commonly, a tick shape and still tiny. The following patch is large and at least four times the size of the first one.
By contrast in *A. groenveldi groenveldi* the first and second patch are much the same size, although the holotype for the species actually is unusual (and so far unique for the taxon) in that it completely lacks the first such black spot.

In *A. groenveldi mumpini subsp. nov.* the lower labials are characterised by a lack of pigment, with each scale possessing a tiny black patch in the centre of each scale. By contrast in *A. groenveldi groenveldi* (including the holotype) the equivalent patch in each supralabial is medium in size of clearly irregular shape in each scale (these same blotches forming broad triangles with the apex facing the lip in *A. laevis* Macleay, 1877, noting that *A. laevis* is the only other species or subspecies likely to be confused with *A. groenveldi mumpini subsp. nov.* or *A. groenveldi groenveldi*).

Acanthophis laevis has distinctive peppering on the upper parts of the upper labials, a trait not seen in *A. groenveldi.* The configuration of black spots on the upper labials in *A. laevis* is highly variable.

The distribution for the subspecies *Acanthophis groenveldi mumpini subsp. nov.* is Obi island, Moluccas (Muluku) Indonesia and the immediate outlier of Bisa. These are in the waters south of Halmahera and north of Ceram. Of note is that there are also further “wet” preserved specimens at the Museum of Zoology at Bogor, Indonesia from Obi Island.

The only other recognized smooth-scaled Death Adder species with a low ventral count (under 118) and therefore likely to be confused with *Acanthophis groenveldi* (either subspecies) is *Acanthophis macgregori sp. nov.*.

What does consistently separate *A. macgregori* from both *A. laevis* and *A. groenveldi* is the fact that the anterior infralabials are characterised by strong dark bars running into the jawline which are more than half the thickness of each scale. In *A. groenveldi* these scales are characterised by light pigment except for a black patch medium in size of clearly irregular shape in each scale (*A. groenveldi groenveldi)* or a tiny black spot (in *A. groenveldi mumpini subsp. nov.*). In *A. laevis* the condition is characterised by broad triangles with the apex facing the lip, but these bars never exceeding 50% of the width of the infralabial scales.

Acanthophis macgregori is also unusual in that most of the upper labials and adjacent scales are nearly completely black, save for three small well-separated white triangles above the upper jawline, which is a configuration not seen in any of the other *Acanthophis* species with ventral counts below 118 scales.

As yet there has been no genetic analysis of *A. macgregori*. However it can be safely assumed that DNA sequencing will separate *A. macgregori* from all other *Acanthophis*. However in the absence of DNA evidence, it can be said that physically *A. macregori* appears to be closest to *A. laevis* and *A. groenveldi*. (See for both species as described in Hoser 2002).

A. groenveldi mumpini subsp. nov. and the other smooth-scaled Death Adders characterised by ventral counts under 118 ventrals appear to be quite unlike *A. rugosus* Loveridge, 1948 and *A. lancasteri* Wells and Wellington, 1985 found to the mainland areas north and south of Tanimbar in adjacent New Guinea and Australia, both of which are notably heavily rugose in appearance and have 118 or more ventrals. However of note is that *Acanthophis macgregori sp. nov.* does have a slight keeling of scales on the neck (over and above normal snake scale formation), not seen in either *A. laevis* or *A. groenveldi* (both subspecies).

Hoser 2014 - Australasian Journal of Herpetology 23:22-34.

The northern and eastern New Guinea species, *A. barnetti* Hoser, 1998 and *A. crotalusei* Hoser, 1998, are readily separated from the other New Guinea Death Adder taxa by having over 118 ventrals and a lack of extreme rugosity on the head and neck as seen in *A. rugosus.*

A. barnetti Hoser, 1998 and *A. crotalusei* Hoser, 1998 are also distinguished by having considerably more labial pigment than *A. laevis*, *Acanthophis macgregori sp. nov.* and *A. groenveldi* including an absence of large light areas containing a small number of large black blotches or spots.
A. crotalusei is further separated from *A. barnetti* by its considerably more raised supraocular (very pointed) as well as a configuration of distinct speckling on the rear supralabials not seen in *A. barnetti.*

Etymology: Named in honour of Mumpini of The Museum of Zoology at Bogor, Indonesia in recognition a considerable contribution to herpetology over many years.

ACANTHOPHIS MACGREGORI SP. NOV.

Holotype: A specimen held in the Museum of Zoology, Bogor from Tanimbar, Lat: 7°30' Long: 131°30', specimen number MZB 338.

The dorsal colouration of the type specimen is typical for *Acanthophis* in that dorsally it has alternating darker and lighter crossbands.

Paratype: A specimen held in the Museum of Zoology, Bogor from Tanimbar, Lat: 7°30' Long: 131°30', specimen number MZB 2056. The dorsal colouration of the paratype specimen is also typical for *Acanthophis* in that dorsally it has alternating darker and lighter crossbands.

Diagnosis: *Acanthophis macgregori sp. nov.* is separated from all others in the genus by distribution, being the only species to occur on the Island of Tanimbar.

A. macgregori sp. nov. is separated from all other *Acanthophis* species except *A. laevis* Macleay, 1877 and *A. groenveldi* Hoser 2002 by its ventral scalation. The scale count is always under 118. Ventral scale counts for specimens counted to date for *A. macgregori* are 113.

What does consistently separate this species from both *A. laevis* and *A. groenveldi* is the fact that the anterior infralabials are characterised by strong dark bars running into the jawline which are more than half the thickness of each scale. In *A. groenveldi* these scales are characterised by light pigment except for a smallish dark spot in the centre of each scale. In *A. laevis* the condition is characterised by broad triangles with the apex facing the lip, but these bars never exceeding 50% of the width of the infralabial scales.

This species appears to be quite unlike *A. rugosus* Loveridge, 1948 and *A. lancasteri* Wells and Wellington, 1985 found to the mainland areas north and south of Tanimbar in adjacent New Guinea and Australia, both of which are notably heavily rugose in appearance. However of note is that *Acanthophis macgregori sp. nov.* does have a slight keeling of scales on the neck (over and above normal snake scale formation), not seen in either *A. laevis* or *A. groenveldi.*

Acanthophis macgregori sp. nov. is also unusual in that most of the upper labials and adjacent scales are nearly completely black, save for three small well-separated white triangles above the upper jawline.

As yet there has been no genetic analysis of *A. macgregori.* However it can be safely assumed that DNA sequencing will separate *A. macgregori* from all other *Acanthophis.* However in the absence of DNA evidence, it can be said that physically *A. macregori* appears to be closest to *A. laevis* and *A. groenveldi.* (See for both species as described in Hoser 2002).

A. macgregori is known to occur in red and greyish brown morphs.

Etymology: Named after former Victorian Policeman Andrew Macgregor for his efforts in trying to expose corruption in the Victoria Police and in the post year 2000 period in relation to the government version of events following the Port Arthur Massacre in Tasmania.

ACANTHOPHIS YUWONI SP. NOV.

Holotype: A female specimen held in the Zoological Museum of Amsterdam, The Netherlands, ZMA 16222 from the Kei Islands, Indonesia Approx. Lat: 5° 40' Long: 133°. Total length 39.9 cm, tail 6.7 cm 121 ventrals. The type specimen is over 100 years old and thus the colouration may be slightly different from that in life. The dorsal colouration of the type specimen is one of a brownish nature consisting of alternating darker and lighter cross-bands, the darker cross-bands being more than twice as broad as the lighter ones and with darker scales towards the anterior edges. The top of the head has dominantly darkish pigment, with a distinct light brown line down the anterior centre of the head. Some of the labials have dark blotches. The tail has a yellowish-almost white tip. The ventralia are dark brown with a pale edge.

Diagnosis: *A. yuwoni sp. nov.* is similar in many respects to *A. crotalusei* Hoser, 1998 and *A. rugosus* Loveridge, 1948, from which it can be readily separated by distribution. *A. yuwoni sp. nov.* is the only *Acanthophis* known from the Kei Islands. It is separated from *A. laevis* from nearby New Guinea, *A. groenveldi* from nearby Ceram and *A. macgregori* from nearby Tanimbar by it's higher ventral count (more than 118. There is no known overlap in this character between *A. yuwoni sp. nov*. and the other three species (*laevis*, *groenveldi* and *macgregori*). *A. yuwoni* is separated from all other *Acanthophis* by distribution. *A. rugosus* is readily separated from *A. yuwoni sp. nov.* by a characteristic darkening towards the anterior. The posterior supralabials or adjacent temporal shields of *A. yuwoni sp. nov.* are characterised by one or more large black blotches. This area is comprised of smaller blotches and/or peppering in *A. crotalusei. A. barnetti* Hoser, 1998 lacks prominent dark blotches on a whiteish background as seen in *A. yuwoni sp. nov.* and the smooth-scaled species characterised by under 118 ventrals.

Etymology: Named after Frank Bambang Yuwono, now of Melbourne, Australia, and formerly of Indonesia for his ongoing contributions to herpetology in a relatively understudied part of the world, namely the eastern Indonesian archipelago.

CONCLUSIONS

While it is argued by some that the use of subspecies is a form of unnecessary taxonomic exaggeration, I reject that thesis. Identification of discrete and differing populations also enables conservation priorities to be set in a way that may prevent contamination of wild gene pools in future, especially if there is a need to translocate specimens for any purpose.

This is an increasingly significant issue as greater numbers of licensed snake controllers operate in the Australian region. Under license, these people relocate so-called problem snakes to areas where they will not come into contact with people.

It is important that genetically distinct and morphologically distinct populations are maintained without the risk of contamination from such translocated snakes.

A WARNING ON ONGOING LIES, DECEPTION AND MISOINFORMATION BY WÜSTER AND HIS GANG OF THIEVES

Hoser (2012b and 2013) details extensive criminal, unethical and recklessly unscientific practices by Wolfgang Wüster and his gang of thieves.

While there is no need for me to repeat the material within those papers, I should note that the litany of illegal and unethical actions detailed within those papers is just a tiny fraction of the totality conducted by the obsessive Wüster and his gang.

Most significant of course is his ongoing censorship of my own publications and an attempt to ensure that the wider community do not get access to them.

Specific to Death Adders I should also draw attention to the

following. In 2005 Wüster published a paper that plagiarised the findings of my own earlier papers on Death Adders as well as the findings of my earlier papers on Taipans (*Oxyuranus*) and Mulga Snakes (*Cannia*) (e.g. Hoser 2001).

Plagiarisation, better known as theft of another scientist's data and findings without attribution to the original source is the lowest possible act of any so-called scientist.

In the normal course of events, tenure at a facility such as a university would be immediately terminated if such an act were committed and became known.

Plagiarisation is a form of scientific fraud.

In spite of the widespread knowledge of the repeated plagiarisation of the findings of others by Wüster, he remains a salaried staff member at the University of Bangor, Wales, UK.

For the time being, I'll overlook the ongoing allegations of sexual assault by Wüster of vulnerable young students at the same university.

Of more serious note (if that's possible), I should report here that Wüster continues to aggressively knowingly peddle dangerous and false information about Death Adders globally.

One such example is through his active control of the website known as "The Reptile Database" managed by his close friend, Peter Uetz.

Huge chunks of the otherwise useful website is devoted to attacking myself and others Wüster has an axe to grind against. Webpages under Wüster's direct control routinely give false and misleading information.

For the Death Adders pages, dangerously wrong information is endemic.

By way of example, as recently as 20 June 2014, the webpage for the species "*Acanthophis praelongus*" alleges the species is found in New Guinea and most of Australia (as opposed to the reality that it is confined to Cape York as stated in Hoser, 1998) and that *A. rugosus* of southern New Guinea is a synonym of the species.

Of course as far back as 1998, I established that they were two radically different species and even produced images in the relevant paper to show the fact (Hoser 1998), or for that matter the same is reported by Cogger (2014b).

Also the image on Uetz's "*Acanthophis praelongus*" page is of a bog-standard *Acanthophis antarcticus*, not an *A. praelongus*! This would be obvious to anyone who has read Hoser (1998, 2002) or any of a number of other vaguely accurate books or papers on the subject.

For the species *Acanthophis wellsei*, Hoser 1998, "The Reptile Database" runs with the Wüster lie that the taxon is synonymous with the radically different *A. pyrrhus*. The alleged basis of this position is that the taxon *A. wellsei* was "Not listed by COGGER 2000."

Besides the fact that in science, this position wasn't tenable in 2000, in June 2014 it was even less tenable as the book Cogger 2014 (Cogger 2014b), itself an update and a revision of Cogger (2000) did in fact include *A. wellsei* as a valid species!

Of course the fallback position of Wüster when his lies about Hoser-named species not being valid are too ridiculous to be believed is that I, Raymond Hoser, have somehow accessed someone else's files and stolen their work.

However of note, is that no other herpetological scientists besides myself has ever had their files stolen in illegal armed raids!

Now none of this is mere semantics or so-called nit-picking.

Wrong information about venomous snakes can have potentially fatal consequences.

Different species have quite different venoms and misidentification of dangerously venomous snakes such as Death Adders can have potentially fatal consequences.

The reckless actions of Wüster and his partner in crime Mark O'Shea spreading wrong information about venomous snakes have already caused at least one avoidable snake bite fatality (Hoser 2013), being that of Luke Yeomans in June 2011.

However several other avoidable snake bite deaths are also linked to the dangerous deliberate misinformation peddled by Wüster's gang throughout the scientific and general communities.

This includes the avoidable deaths of Aleta Stacey also in June 2011 and Karl Berry on 23 April 2013.
All three were snake handlers!

CONFLICT OF INTEREST

There are no conflict of interests in terms of this author and the content of this paper.

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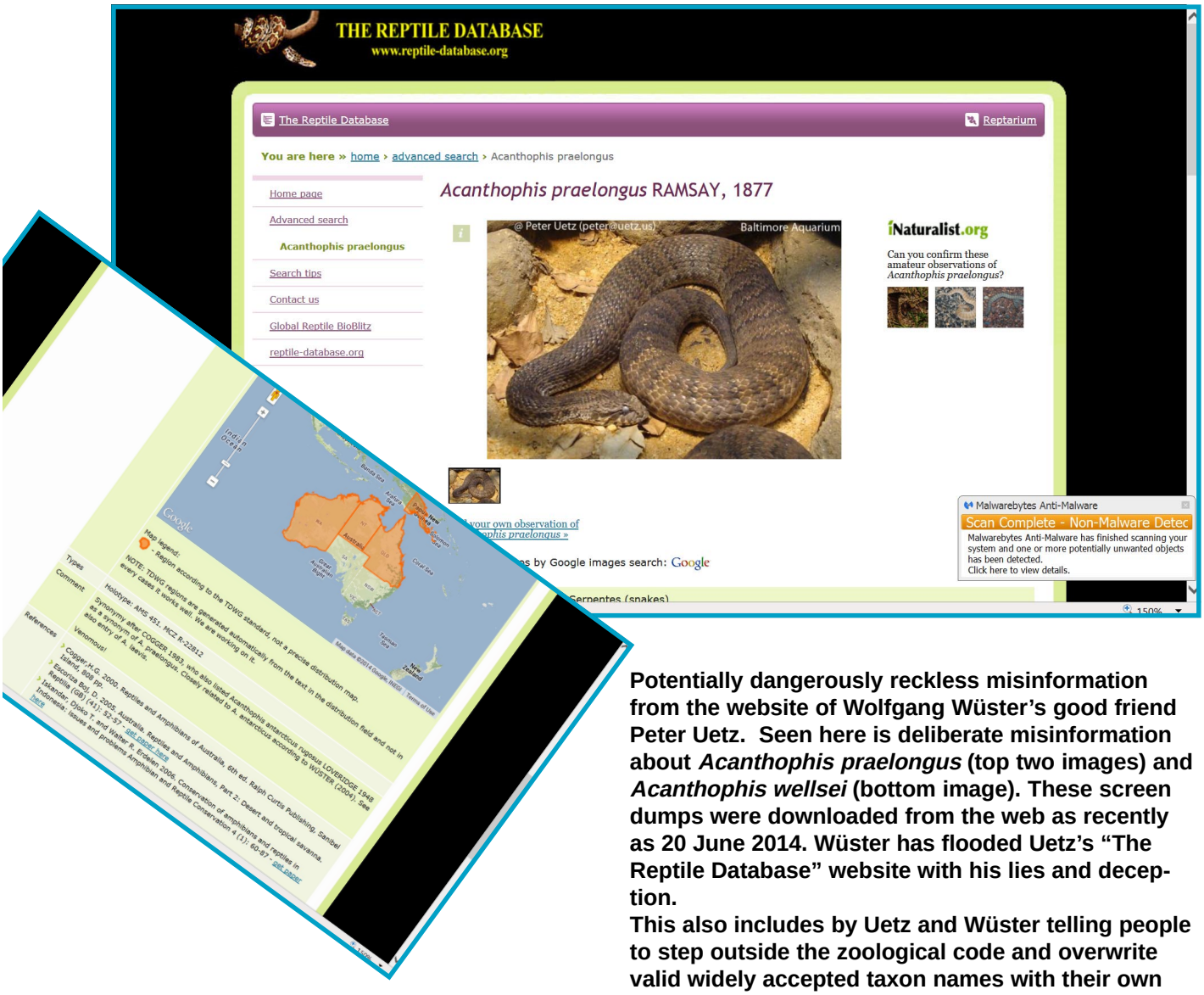
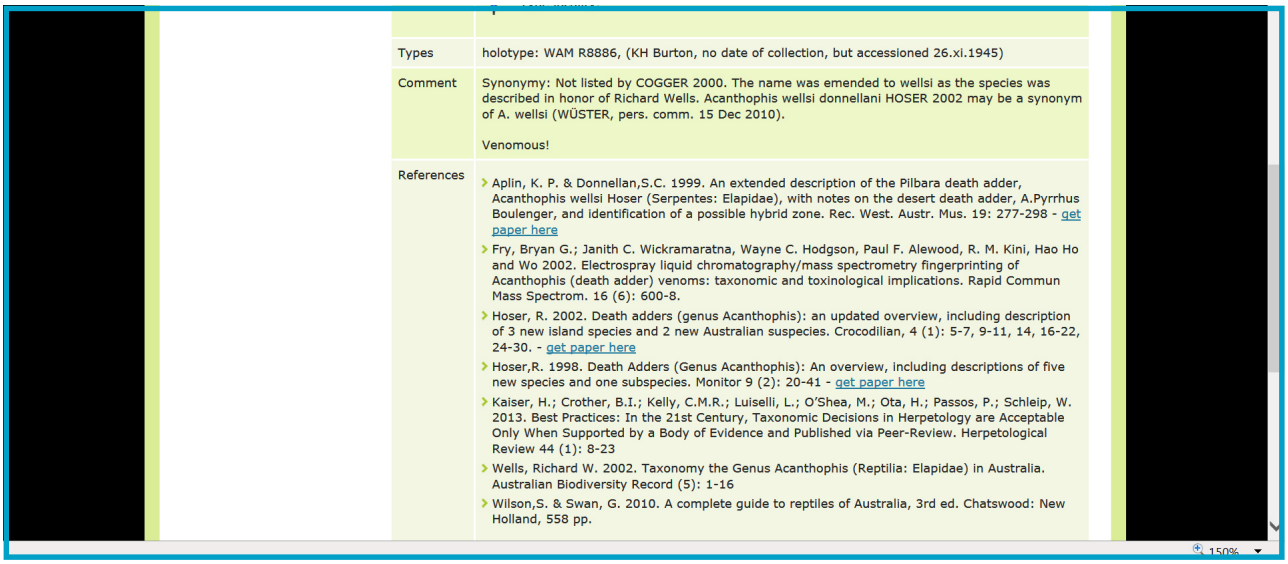


Potentially dangerously reckless misinformation from the website of Wolfgang Wüster's good friend Peter Uetz. Seen here is deliberate misinformation about *Acanthophis praelongus* (top two images) and *Acanthophis wellsei* (bottom image). These screen dumps were downloaded from the web as recently as 20 June 2014. Wüster has flooded Uetz's "The Reptile Database" website with his lies and deception.

This also includes by Uetz and Wüster telling people to step outside the zoological code and overwrite valid widely accepted taxon names with their own newly coined patronyms..



Types	holotype: WAM R8886, (KH Burton, no date of collection, but accessioned 26.xi.1945)
Comment	Synonymy: Not listed by COGGER 2000. The name was emended to wellsi as the species was described in honor of Richard Wells. Acanthophis wellsi donnellani HOSER 2002 may be a synonym of A. wellsi (WÜSTER, pers. comm. 15 Dec 2010). Venomous!
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Various authors 2014. Hate posts (attacking Hal Cogger) on the "Venomous Snakes" Facebook page dated 25 feb 2014, including posts by Karl Peterson, Danny Breetveld, Jeff Whitnack, Andrew Godambe, Karl Peterson, Kelley Hill and Bernie Kurt Spitzer.

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Note: Reference entries followed by a star, are available online.

DICHOTOMOUS KEY TO ALL THE SPECIES AND SUBSPECIES OF DEATH ADDER (GENUS *ACANTHOPHIS*)

1a Ventrals under 118 ... 2

1b Ventrals over 118 ... 5

2a Supralabials mainly black ... *Acanthophis macgregori*

2b Supralabials not mainly black ... 3

3a Infralabials characterised by blotches forming triangles with the apex at the jawline ... *A. laevis*

3b Infralabials characterised by either medium irregular blotches, or alternatively tiny spots ... *A. groenveldi. ...* 4.

4a Infralabials characterised by either medium irregular blotches ... *A. groenveldi groenveldi.*

4b Infralabials characterised by tiny spots ... *A. groenveldi mumpini*

5a 19 dorsal mid-body rows ... *A. wellsei* ... 6

5b 21 or 23 dorsal mid-body rows ... 8

6a Dorsal keeling that is well-developed in scale rows 1-4, but stops abruptly on flanks, and flared supraoculars ... *A. wellsei donnellani*

6b Dorsal keeling that is not well-developed in scale rows 1-4, and that does not stop abruptly on flanks, and supraoculars not flared ... 7

7a Darker dorsal bands wider than the lighter ones or the same width ... *A. wellsei hoserae*

7b Darker dorsal bands noticeably narrower than the lighter ones ... *A wellsei wellsei*

8a Over 127 ventrals, extremely flattish head and a strongly rugose body (including flanks) and tail ... *A. pyrrhus* ... 9

8b Body (including flanks) and tail not strongly rugose ... 12

9a Body pattern including distinctive yellowish bands ... 10

9b Body pattern of alternating reddish and orange bands ... 11

10a Over 150 ventrals ... *A. pyrrhus armstrongi*

10b Under 144 ventrals ... *A. pyrrhus maryani*

11a Tiny bluish flecks on the dorsum ... *A. pyrrhus pyrrhus*

11b Lacks tiny bluish flecks on the dorsum ... *A. pyrrhus moorei*

12a Anterior dorsal scales smooth or only weakly keeled ... 13
12b Anterior dorsal scales strongly keeled ... 21

13a Supraocular moderately to strongly raised, 21 dorsal mid-body rows ... 14

13b Supraocular not moderately to strongly raised ... 17

14a Relatively slim build, venter not characterised by dark light edged scales, 21 dorsal mid-body rows ... *A. praelongus*

14b Relatively stout build, 21 dorsal mid-body rows ... 15

15a Most of the upper labials and adjacent scales are nearly completely black... *A. macgregori*

15b Most of the upper labials and adjacent scales are not nearly completely black ... 16

16a Small spots or peppering on the rear supralabials and temporals ... *A. crotalusei*

16b Mainly white lower parts of upper labials, with black markings or spots, temporals brownish and without peppering ... *A. barnetti*

17a Dorsal pattern with relatively ill-defined cross-bands unless snake is puffed up for a defensive display, upper labials have a distinctive creamish bar on the lower margin ... *A. hawkei*

17b Dorsal pattern with relatively well-defined cross-bands including when snake is puffed up for a defensive display, white markings on the upper labials do not form a distinctive white-creamish bar ... *A. antarcticus* ... 18

18a White pigment on the upper labials is still prevented from entering the orbit by a distinctive and well-defined zone of dark pigment ... *A. antarcticus granti*

18b White pigment on the upper labials is not prevented from entering the orbit by a distinctive and well-defined zone of dark pigment or at least comes close to doing so ... 19

19a The colouration of the upper and lower lip scales (labials) is characterized by about six relatively thick creamy bars, interspersed with five thinner brownish (or greyish) bars which are sometimes slightly darker on the margins, and on the upper labials characterized by about five thinnish white and elongate triangles, the apex facing up, intersperced with initially thicker (at the front of the head), then thinner (towards the rear of the head) inverted triangles of darker pigment that is usually darker towards the rear of the head ... *A. antarcticus schistos*

19b The colouration of the upper and lower lip scales (labials) is not characterized by about six relatively thick creamy bars, interspersed with five thinner brownish (or greyish) bars which are sometimes slightly darker on the margins, and on the upper labials characterized by about five thinnish white and elongate triangles, the apex facing up, intersperced with initially thicker (at the front of the head), then thinner (towards the rear of the head) inverted triangles of darker pigment that is usually darker towards the rear of the head ... 20.

20a Lighter triangles on the front upper labials are generally indistinct or even absent, instead being replaced by dark pigment ... *A. antarcticus cliffrosswellingtoni*

20b Lighter triangles on the front upper labials are distinct and not replaced by dark pigment ... *A. antarcticus antarcticus*

21a Venter white and immaculate. Dorsal colouration a combination of reddish and yellowish orange bands, 21 dorsal mid-body rows. Minimal white pigment on the upper labials ... *A. woolfi*

21b 21-23 mid-body rows. Usually but not always considerable white pigment on the upper labials from within markings from the jawline up ... 22

22a 21 dorsal mid-body rows, supraoculars not raised, colouration usually but not always with darkening towards the anterior and rugose anterior not being angular ... *A. rugosus*

22b 23 dorsal mid-body rows ... 23

23a White triangular zig-zag markings on the lower parts of the upper-labials bordered by darker pigment. Dorsal colour pattern of dark grey to blackish and yellowish-brown cross bands ... *A. cummingi*

23b No white triangular zig-zag markings on the lower parts of the upper labials, pigment on upper labials variable ... *A. lancasteri* ... 24

24a Highly raised supraoculars; little or no anterior blackening in colour ... *A. lancasteri lancasteri*

24b Supraoculars moderately raised; distinctive anterior blackening of colour ... *A. lancasteri bottomi*