

## ***Montivipera xanthina* divided and a new subgenus of Eurasian Vipers for the *Vipera raddei* Boettger, 1890 species group (Squamata: Serpentes: Viperidae).**

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### ABSTRACT

Numerous species of European viper snake (Squamata: Serpentes: Viperidae) have been described in recent years. This includes most recently five new species in the *V. latastei* Bosca, 1878, complex by Hoser, (2015). Included were three new species from Europe and two more from northern Africa.

Continuing the formal division of putative viper species on the basis of morphology, distribution and genetics, this paper divides the putative species *Montivipera xanthina* Gray, 1849 as currently recognized into three easily defined species with one being further subdivided into two subspecies.

As no names are available for these taxa, all are named in this paper according to the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999) for the first time.

The need to formally recognize these species is urgent noting the environmental degradation going on where these snakes occur, potentially threatening populations, underpinned by the political instability in the relevant countries. This includes existential threats to governments and ruling elites, which means that wildlife conservation will probably not be a main priority of governments and most resident citizens for the foreseeable future.

Also the so-called *Vipera raddei* Boettger, 1890 species group is herein placed in a new subgenus *Apexvipera subgen. nov.*

This is in recognition of the group's morphological differences and deep divergence from the other species within the genus *Montivipera* Nilson *et al.* 1999, which is where they are currently placed.

**Keywords:** Taxonomy; Snakes; Vipers, Europe, Asia, Turkey, Greece, *Montivipera*; *xanthina*; new subgenus; *Apexvipera*; new species; *snakebustensorum*; *yeomansi*; new subspecies; *europa*.

### INTRODUCTION

Numerous species of European viper snake (Squamata: Serpentes: Viperidae) have been described in recent years, including most recently, five new species in the *V. latastei* Bosca, 1878, complex by Hoser, (2015). This included three new species from Europe and two more from northern Africa.

In that case, the basis of the division of one putative species into eight was divergent lineages easily identified on both morphological differences and allopatric distributions.

Each population was centred on one or more geographically disjunct areas of hilly habitat.

Two of the newly identified species had available names and as already mentioned, five others were named for the first time, resulting in eight named species for that complex.

Continuing the formal division of putative viper species on the basis of morphology, distribution and genetics, I looked at other putative viper species from across Eurasia and found several species to be composite.

The audit included a review of specimens and relevant literature.

However invariably there were available names for the divergent or different forms not widely recognized as new or widely known as "named" taxa and so no other papers have been published so far.

Exceptional to that was the south-eastern group known as the *Montivipera xanthina*, Gray, 1849 species complex. *Sensu lato* this species complex, includes several taxa from south-east Europe and the Middle East, most, if not all being treated as synonymous with *M. xanthina* at one time or other.

These are the putative species *M. albizona* Nilson, Andr n and Fl rdh, 1990, *M. bulgardaghica* Nilson and Andr n, 1985, *M. wagneri* Nilson and Andr n, 1984, *M. bornmuelleri* Werner, 1898 and *M. xanthina* Gray, 1849.

All these listed species appeared to be valid on the basis of morphological divergence and allopatric distributions. I should also mention that these snakes have been treated as being within the genus *Montivipera* Nilson *et al.* (1999) since that date, but were variously placed in *Vipera* Laurenti, 1768 or *Daboia* Gray, 1842.

Another species complex associated with *M. xanthina* and also

placed in the genus *Montivipera* is the so-called *M. raddei* Boettger, 1890 species group. Included herein are putative taxa as follows: *M. latifi* Mertens, Darevsky and Klemmer, 1967, *M. raddei* Boettger, 1890 and the putative subspecies *M. raddei kurdistanica* Nilson and Andr n, 1986, *M. raddei albicornuta* Nilson and Andr n, 1985 and *M. raddei kuhrangica* Rajabzadeh, Nilson and Kami, 2011.

None of the putative subspecies of *M. raddei* just listed appear to be terribly divergent from the nominate form to the extent that any should be recognized as full species as indicated by Rastegar-Pouyani *et al.* (2014) although St mpel *et al.* (2016) showed that the putative species *M. latifi* was the most divergent of the described forms and so has been retained as a species-level taxon for the purposes of this paper.

In terms of the two species groups, namely the *M. xanthina* and *M. raddei* groups, specimens from various geographical areas and ranges were generally divergent from one another, but generally conformed with the named species-level taxa.

However exceptional to that were the snakes still grouped within the putative species, *Montivipera xanthina*, Gray, 1849. These conformed to a series of at least four distinct and allopatric colour variations that appear to be sufficiently divergent on the basis of morphology to be treated as full species.

This paper was originally written dividing all four groups into full species, however in light of the molecular results of a paper by St mpel *et al.* (2016) that appeared as this paper was about to go to press, one of these has been conservatively downgraded to a subspecies of another based on an alleged divergence of 2 million years for two relevant populations.

Hence this paper divides the putative species *Montivipera xanthina*, Gray, 1849 as currently recognized into three easily defined species with one being further subdivided into two subspecies.

As no names are available for these taxa, all are named in this paper according to the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999) for the first time.

As mentioned in the abstract, the need to formally recognize these species is urgent noting the environmental degradation going on where these snakes occur, potentially threatening populations, underpinned by the political instability in the relevant countries. This includes existential threats to governments and ruling elites, which means that wildlife conservation will probably not be a main priority of governments and most of the resident citizens for the foreseeable future.

The so-called *M. raddei* species group was also deemed to be sufficiently divergent from the so-called *M. xanthina* complex as listed before to warrant being treated as a separate genus-level grouping. St mpel *et al.* (2016) gave a 12.5 MYA divergence between the two groups and so this paper conservatively treats the *M. raddei* species group as a subgenus which is formally named for the first time as *Apexvipera subgen. nov.*

I note that if these were mammals, there would be no hesitation for taxonomists to elevate the subgenus *Apexvipera subgen. nov.* to full genus status. This elevation may be done by later herpetologists in any event.

Notwithstanding the theft of relevant materials from this author in an illegal armed raid on 17 August 2011, which were not returned (Court of Appeal Victoria 2014 and VCAT 2015) and not returned in breach of various earlier court orders, I have made a decision to publish this paper.

This is in view of the conservation significance attached to the formal recognition of unnamed species and on the basis that further delays may in fact put these otherwise unnamed taxa at greater risk of extinction should their status in the wild unexpectedly change.

In July 2016, a military coup overthrew the elected government of Turkey. While the coup was itself overturned within hours, the sequence of events underpinned the political instability in the country (Akyol 2016).

By mid 2016, Greece was similarly unstable with three major bailouts of the government by other countries in the Eurozone and the prospect of a second vote to decide whether or not to leave the European Union (Smith 2016).

These situations confirm that the relevant viper species described within this paper are not likely to get any support from the governments of either country and so it is my intention that by offering them formal taxonomic recognition that people outside these countries may be able to assist in conserving the relevant taxa.

To underline the seriousness of the conservation threats to the relevant species, I note the relevant comments of Etting *et al.* (2013), who wrote in their abstract: "Armenian vipers (*Montivipera raddei*) have a restricted and fragmented distribution throughout portions of Armenia, eastern Turkey, and northwestern Iran. Over the past 40 years their population numbers have dropped by nearly 88% due to a combination of over-collection for the pet trade, conversion of habitat to agriculture and overgrazing by livestock."

Published literature relevant to *Montivipera xanthina* and associated species, including the so-called *M. raddei* species group and the taxonomic judgements within this paper include the following: Arakelyan *et al.* (2011), Ar kan *et al.* (2004, 2008), Bettex (1993), Bodson (2009), Boettger (1880, 1890), Boulenger (1896), Clark (2000), David and Ineich (1999), Edelman and Frank (2007), Engelmann *et al.* (1993), Etting *et al.* (2012, 2013), Franzen and Sigg (1989), Garrigues *et al.* (2005), Gaulke (2008), Glandt *et al.* (1998), Gray (1849), Herrmann *et al.* (1999), Hoser (2013, 2015), Joger and Meder (1997), Kasapidis *et al.* (1996), Kumlutas *et al.* (2004), Kwet (2010), Kwet and Trapp (2014a, 2014b), Lenk *et al.* (2001), Leviton *et al.* (1992), Mallow *et al.* (2003), McDiarmid *et al.* (1999), Mebert *et al.* (2016), Mertens (1952), Mertens *et al.* (1967), Nilson and Andren (1985, 1986), Nilson *et al.* (1988, 1989, 1990), Phelps (2010), Pyron *et al.* (2013), Radspieler and Schweiger (1990), Rajabzadeh *et al.* (2011, 2015), Rastegar-Pouyani *et al.* (2014), Sanz *et al.* (2008), Sch tti and Baran (1988), Sch tti *et al.* (1991), Schl ter (2009, 2010), Schmidt and Kunz (2005), Schmidler *et al.* (1990), Schneider (1983), Schweiger (2009), Schwarz (1936), Shine and Madsen (2004), Sigg (1987a, 1987b), Sindaco *et al.* (2000, 2006), Strauch (1869), St mpel and Trapp (2006), St mpel *et al.* (2016), Tiedemann and Grillitsch (1986), Trapp (2007, 2014), Trutnau (1975), Venchi and Sindaco (2006), Werning and Wolf (2007), Wirth (2014a, 2014b) and sources cited therein.

#### NOTES ON THE DESCRIPTIONS FOR ANY POTENTIAL REVISERS

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 genus or species, the order of priority of retention of names should be the order as listed in the keywords part of the abstract.

#### MONTIVIPERA SNAKEBUSTERSORUM SP. NOV.

**Holotype:** A preserved specimen at the California Academy of Science, California, USA, (CAS), specimen number: CAS HERP 135748, collected from Sultan Daglari, Aksehir, Turkey.

The California Academy of Science, California, USA allows access to its holdings.

**Diagnosis:** The three species of snake until now treated as *M. xanthina* Gray, 1849 can be readily separated from one another on the basis of consistent differences in dorsal colouration.

*M. snakebustersorum sp. nov.* is separated from all other species by having a dorsal colour of dark, blackish blotches over a whitish background, running along the dorsal midline, these merging along the body to form a configuration of a thickened tightened s-shaped marking along the lower neck or anterior part of the body. Anteriorly and posteriorly these blotches or large

spots tend to separate from one another, being surrounded by the whitish background.

*M. xanthina* Gray, 1849 as defined herein is separated from the other two species by having a similar patterning to *M. snakebustersorum* sp. nov. but with the blotches being orangeish-brown in colour and merging to become a distinctive mid-dorsal zig-zag along the anterior part of the body. The edges of the dorsal blotches or zig-zag have an obvious blackening, being slightly more prominent on the head and neck.

*M. yeomansi* sp. nov. is separated from the other species by one or other of: 1/ A dorsal pattern similar to *M. snakebustersorum* sp. nov. but with the large dorsal blotches along the forebody not merging to become a thickened tightened s-shaped marking along the lower neck or anterior part of the body. Instead at this part of the body, the blotches become large squarish blobs, that while usually separated by lighter whitish pigment, may occasionally touch one another at a small part of the border (subspecies *M. yeomansi yeomansi* subsp. nov.), or: 2/ A dorsal pattern consisting of greyish blotches, rather than blackish or brownish, merging on the neck to form s-shaped curves running along the dorsal midline on the neck and a line of interconnected irregular-shaped greyish blotches running along the forebody (subspecies *M. yeomansi europa* subsp. nov.).

The subgenus *Apexvipera* subgen. nov. are separated from the nominate subgenus *Montivipera* Nilson et al. 1999 by having a complete circumocular ring of scales. By contrast in *Montivipera* this ring is divided by the supraocular.

Vipers in the genus *Montivipera* are separated from other true viper genera by the following unique suite of characters: Supraocular shield large, erectile, the free border angular, separated from the eye by a series of small scales; nostril in a single nasal, which is partially fused with the naso-rostral; 23 mid-body rows; 150-180 ventrals.

Snakes in the tribe Viperini, as defined by Hoser (2013), which includes *Montivipera*, are separated from all other true vipers by the following suite of characters: pupil is elliptical, adults of the snakes are generally small (subtribes *Viperina* and *Montiviperina*) to medium or large (subtribe *Maxhoserviperina*) and more or less stoutly built. The head is distinct from the neck, of triangular shape, and covered with small scales in many species, although some have a few small plates on top. The dorsal scales are strongly keeled, the anal plate is divided, as are the subcaudals. Importantly this group are defined by the characteristic zig-zag pattern or similar running down their back, more-or-less along the dorsal midbody line, this pattern sometimes becoming a series of blotches or spots running longitudinally along the body (as in the genus *Daboia*). All are viviparous (live bearing). They are distributed in Eurasia and adjacent parts of North Africa.

The subgenus *Apexvipera* subgen. nov. are further defined and separated from other viper species by the following suite of characters: Snout rounded; vertical diameter of eye measuring hardly half its distance from the mouth. Rostral somewhat deeper than broad, not extending to the upper surface of the snout; head covered above with small feebly keeled scales; supraocular well developed, erectile, the free edge angular, separated from the eye by small scales, the eye being surrounded by a complete circle of 14 to 17 small scales (separating the subgenus from the other subgenus *Montivipera*); eye separated from the labials by two series of scales; nostril pierced in a single nasal, which is imperfectly separated from the naso-rostral; temporal scales keeled; 9 or 10 upper labials. 23 mid-body rows that are strongly keeled. 150-180 ventrals; anal entire; 23-32 subcaudals. Pale brown or greyish above, with a dorsal series of somewhat lighter reddish roundish spots which are dark-edged on the sides; these spots may be in pairs and alternating; sides with two series of dark brown spots; a dark / \ - shaped marking on the back of the head and a dark streak behind the eye; yellowish beneath, powdered with black, each scale with a transverse series of black and white spots (derived

from Boulenger 1896).

**Distribution:** Western Toros Daglari (generally west of Göksu Nehri) and hills immediately north (Sultan Daglari) in Turkey.

**Etymology:** Named in honour of the hard working team at Snakebusters: Australia's best reptiles shows, for more than a decades work including the core activity of wildlife displays and education in schools, events and for "Reptile Parties" a concept first pioneered by myself and associates more than 30 years ago and now being copied globally. The staff have also assisted in fieldwork in various places, accessing museum specimens on my behalf when travelling to relevant cities, and other logistical assistance in the research and conservation of various species. Included among those people honoured by the patronym "snakebustersorum" are the following: Ateaka Campbell, Tom Cotton, Scott Eipper, Judy Fergusson, Adelyn Hoser, Jacky Hoser, Shireen Hoser, Michael Laidlaw, Andrew Lamont, Louise McGoldrick, Simon McGoldrick, Dylan Mullins, Dara Nin, Andrew Paget, Demi Perkins, Christopher Pillot, James Proudly, Fred Rossignolli, Callum Sharples; Michael Smyth, Christopher Trioano, Judy Whybrow, Peter Whybrow, Andrew Wilson, all of Victoria, Australia at the relevant times they have been with the Snakebusters team engaged in core activities. Numerous other individuals who have worked with Snakebusters to a lesser extent or provided invaluable assistance's to the team are not named herein but should be treated as honoured by the patronym name.

**MONTIVIPERA YEOMANSI SP. NOV.**

**Holotype:** A preserved specimen at the Carnegie Museum of Natural History, (CM Herps Collection), Pittsburgh, Pennsylvania, USA, specimen number: CM Herps 69429 collected from Bornova, Izmir, Turkey. The Carnegie Museum of Natural History allows access to its holdings.

**Paratypes:** A preserved specimen at the Naturalis Biodiversity Center, Leiden, The Netherlands, specimen registration number: RMNH.RENA.31984, collected from Selcuk, South Izmir, Turkey, and:

Four preserved specimens at the Centennial Museum, University of Texas at El Paso in El Paso, Texas, USA, specimen numbers: H-16368, H-16369, H-16370 and H-16372 collected from Karyagdi Hill, Oke, Turkey.

**Diagnosis:** The three species of snake until now treated as *M. xanthina* Gray, 1849 can be readily separated from one another on the basis of consistent differences in dorsal colouration.

*M. snakebustersorum* sp. nov. (formally described above) is separated from all other species by having a dorsal colour of dark, blackish blotches over a whitish background, running along the dorsal midline, these merging along the body to form a configuration of a thickened tightened s-shaped marking along the lower neck or anterior part of the body. Anteriorly and posteriorly these blotches or large spots tend to separate from one another, being surrounded by the whitish background.

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*M. yeomansi* sp. nov. is separated from the other species by one or other of: 1/ A dorsal pattern similar to *M. snakebustersorum* sp. nov. but with the large dorsal blotches along the forebody not merging to become a thickened tightened s-shaped marking along the lower neck or anterior part of the body. Instead at this part of the body, the mid-dorsal blotches become large squarish blobs, that while usually separated by lighter whitish pigment, may occasionally touch one another at a small part of the border (subspecies *M. yeomansi yeomansi* subsp. nov.), or: 2/ A dorsal pattern consisting of greyish blotches, rather than blackish or brownish, merging on the neck



to form s-shaped curves running along the dorsal midline on the neck and a line of interconnected irregular-shaped greyish blotches running along the forebody (subspecies *M. yeomansi europa* subsp. nov.).

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generally small (subtribes *Viperina* and *Montiviperina*) to medium or large (subtribe *Maxhoserviperina*) and more or less stoutly built. The head is distinct from the neck, of triangular shape, and covered with small scales in many species, although some have a few small plates on top. The dorsal scales are strongly keeled, the anal plate is divided, as are the subcaudals. Importantly this group are defined by the characteristic zig-zag pattern or similar running down their back, more-or-less along the dorsal midbody line, this pattern sometimes becoming a series of blotches or spots running longitudinally along the body (as in the genus *Daboia*). All are viviparous (live bearing). They are distributed in Eurasia and adjacent parts of North Africa. The subgenus *Apexvipera* subgen. nov. are further defined and separated from other viper species by the following suite of characters: Snout rounded; vertical diameter of eye measuring hardly half its distance from the mouth. Rostral somewhat deeper than broad, not extending to the upper surface of the snout; head covered above with small feebly keeled scales; supraocular well developed, erectile, the free edge angular, separated from the eye by small scales, the eye being surrounded by a complete circle of 14 to 17 small scales (separating the subgenus from the other subgenus *Montivipera*); eye separated from the labials by two series of scales; nostril pierced in a single nasal, which is imperfectly separated from the naso-rostral; temporal scales keeled; 9 or 10 upper labials. 23 mid-body rows that are strongly keeled. 150-180 ventrals; anal entire; 23-32 subcaudals. Pale brown or greyish above, with a dorsal series of somewhat lighter reddish roundish spots which are dark-edged on the sides; these spots may be in pairs and alternating; sides with two series of dark brown spots; a dark / \ - shaped marking on the back of the head and a dark streak behind the eye; yellowish beneath, powdered with black, each scale with a transverse series of black and white spots (derived from Boulenger 1896).

**Distribution:** Western Turkey, immediately adjacent to the Aegean Sea and nearby Greece and Greek Islands with a distribution centred on hilly outliers of the main central Turkey ranges. The subspecies *M. yeomansi europa* subsp. nov. appears to be confined to eastern Greece and a small number of Greek islands in the northern Aegean Sea.

**Etymology:** Named in honour of Luke Yeomans, a well-known British Herpetologist, who died prematurely from a King Cobra bite at his UK facility on 29 June 2011.

His contributions to herpetology are numerous and include his pioneering work in breeding the Irian Jaya Dwarf Mulga Snake (*Pailsus rossignollii*) in the decade following my formal description of the taxa in 2000 (Hoser 2000). The results of his breedings appeared in a book about keeping and breeding Australasian elapid snakes by Scott Eipper (Eipper, 2012).

Besides being an extremely passionate and skilled herpetologist, Yeomans was also a wonderful human being who

never lost sight of the beauty of the reptiles he loved so dearly. However it is the things that went wrong during his life that should be highlighted as a warning to other potential herpetologists in future generations.

Yeomans first came to my attention in the early 1990's after he was prosecuted for the allegedly heinous crime of feeding live food to a reptile.

For this mortal sin, he was dragged through Britain's criminal courts, prosecuted, convicted and fined. Then he was held up for public hatred in Britain's notorious tabloid media.

The legal precedent now sits as a threat and if need be, a means to criminally charge any other reptile keeper who dares use live food for any reptiles, including such humble items as mealworms or crickets and then upsets anyone in a government authority.

Yeomans said he was originally "dobbled in" by another reptile person, the notorious Mark O'Shea, whom he said had an axe to grind against him. The relevant authority in this case, the RSPCA in the UK,

ran the prosecution.

I wrote about the case in the book "*Smuggled: The Underground Trade In Australia's Wildlife*", (Hoser, 1993) published in May 1993, and unexpectedly shortly thereafter met Yeomans in person at the Orlando Reptile Expo in the United States in August 1993.

That was when the League of Florida Herpetological Societies invited me there to give a talk about Australia's own draconian wildlife law enforcement.

As inferred already, it was the personality of Yeomans that impressed me rather than his herpetological skills, noting that in Orlando, I didn't get to see Yeomans working with reptiles!

My next contact with Yeomans was in the period postdating my description of the Irian Jaya Dwarf Mulga Snake (*Pailsus rossignollii*) in 2000 and him wanting to breed them in captivity. Ultimately he did this.

Beyond that, the next conversations related to the issue of safety for himself in his own reptile shows that he intended doing at a "King Cobra Sanctuary" that he was planning to open in the UK in mid 2011.

In this, I specifically mean the use of venomoid snakes as described by Hoser (2004).

These are snakes that have had their venom glands surgically removed in a virtually painless operation and where the snakes get to keep their fangs and are as far as they are concerned "normal".

By 2010, Yeomans had seen how in the previous 6 years myself and ten staff had done over 10,000 venomous snake shows with the world's five deadliest snakes and without any fatal or near fatal snakebites.

He had seen videos of myself taking bites from the snakes to prove they were safe and was well aware of the benefits of the venomoid snakes, not just for the safety aspect, but also the welfare of the snakes.

In fact Yeomans himself had previously owned a venomoid cobra!

Yeomans toyed with the idea of making all his large King Cobras venomoid because he feared that sooner or later he'd make a handling error and get bitten. However he decided against doing so and the reason for this is important.

He had no issues with the surgery and the false claims of cruelty to the snakes. In fact in terms of the venomoid snakes, there was no sensible reason for him not to get them except for one.

That reason was the expected attacks he would get from Mark O'Shea, a man he described as his sworn enemy, and Wolfgang Wüster, both loitering within the reptile fraternity and both of the UK and both of whom had been key sponsors of an anti-Hoser and antivenomoid petition website, run by a convicted wildlife

smuggler, David John Williams and his close friend Shane Hunter in Australia (Hunter 2006).

The petition called for the Australian government to shut down the Hoser business at gunpoint, which ultimately happened on 17 August 2011 and took four years of intense legal wrangling to get the illegal government actions overturned by the highest court in the Australian state of Victoria (Court of Appeal Victoria 2014, VCAT 2015).

Yeomans was in extreme fear that should O'Shea or Wüster become aware of him having venomoid snakes, that they would attack and undermine his reptile display business and worse still have him targeted by the RSPCA or some other powerful government-backed authority again.

With one "animal cruelty" conviction already, Yeomans decided the likelihood of attacks and another more serious conviction would terminally disable his business, including by landing him in jail for a lengthy term of imprisonment and so he decided instead to take the risk of keeping his snakes that he handled for shows "hot".

Besides the phone calls we had, Yeomans also sent numerous e-mails complaining about the reckless conduct of Mark O'Shea and his friend Wolfgang Wüster in terms of himself, even detailing how O'Shea had improperly had him expelled from the UK-based "International Herpetological Society".

Yeomans made countless comments about O'Shea in particular, whom he described as being a cross between a rat and a dog.

He said O'Shea was physically like a rat, as in small, bony and hairy and like a Shitzu dog in that he constantly "yapped", "shits you" and never shuts up.

I could devote several pages to the adverse comments made by Yeomans about O'Shea, Wüster and their unethical behaviour, but these are not particularly relevant beyond what has already been told in terms of how they made Yeomans choose not to protect himself with venomoid Cobras.

On 29 June 2011, Yeomans made the snake handling error that cost him his life.

Just days before his "King Cobra Sanctuary" was due to open to much fanfare, one of his "hot" snakes bit him and he died.

At just 47 years of age a herpetologist in the prime of his career was killed.

If Luke Yeomans had not been forced by these other self-styled "herpetologists" to put his life at unnecessary risk with snakes that could easily have been de-venomized, he would still be breeding rare and endangered reptiles and educating people at his new "King Cobra Sanctuary".

Much has been made in recent years of the threats to private individuals and their rights to be allowed to keep and study reptiles. The alleged threat is often identified as coming from outside the herpetological community. The usual bogeyman identified are militant animal rights groups and the like.

They are not the real enemy and never have been.

These people lack expertise in reptiles and do not carry any political or legal power in terms of reptiles and the law. Put simply, no one takes them seriously and they are not the people who come to court to give false and bogus "expert" evidence against (fellow) herpetologists. By contrast the real enemy is within the reptile community and those self-appointed "experts" who use this position to harass and attack others doing public good. The reckless conduct of O'Shea and Wüster, both holotype examples of self-appointed "experts" and "spokesmen" for herpetology (which they are not) were in effect directly responsible for the premature death of Yeomans.

Put simply, O'Shea and Wüster are directly culpable for the death of Yeomans and the grief it caused to his friends, family and others, as well as the damage caused to the wildlife conservation cause.

Here in Australia, in 2011 through to 2015, my family, my business, my friends and staff have been subjected to numerous

illegal armed raids, criminal charges and the like designed to destroy the Snakebusters business and wreck the conservation gains we had achieved over the previous decade.

While the raids, criminal charges and the like were conducted by (in this case) very corrupt government wildlife officers under the control of the corrupt and hateful Glenn Sharp of the Victorian Government Wildlife Department (DSE), the whole series of actions were in fact initiated by people within the reptile fraternity. In our case the main enemy was a group of newly established "reptile businesses", which included former employees of the government run zoo, part of the same department that regulates us, but for whom Wüster and O'Shea both provided their own brand of "expert evidence" in a court in 2015. Fortunately the allegations of Wüster and O'Shea were rejected by the presiding judge as unscientific claims poisoned by envy (VCAT 2015).

Because the other businesses and the government's own zoo business couldn't match the standards of Snakebusters, they simply used their powers to unlawfully close us down!

While we eventually won the legal battles, the cost in terms of time and money caused irreparable damage to myself, my family, the rest of the Snakebusters team and the wider wildlife conservation and research cause.

By naming a Eurasian snake species after Luke Yeomans, it is hoped that people who look into the etymology of the name, familiarize themselves with the story of his totally avoidable and premature death and see who are the culpable people. These being those who not only made his life at times unbearable in life, but also effectively brought it to a premature and abrupt end.

It's hoped that people realise that the enemies of herpetology are more likely to be within the reptile community rather than outside.

#### **MONTIVIPERA YEOMANSI EUROPA SUBSP. NOV.**

**Holotype:** A preserved specimen at the Naturalis Biodiversity Centre, Leiden, The Netherlands, specimen registration number: RMNH.RENA.23595, collected at Loutros, Greece. This facility allows access to its holdings.

**Diagnosis:** The three species of snake until now treated as *M. xanthina* Gray, 1849 can be readily separated from one another on the basis of consistent differences in dorsal colouration.

*M. snakebustersorum* sp. nov. is separated from all other species by having a dorsal colour of dark, blackish blotches over a whitish background, running along the dorsal midline, these merging along the body to form a configuration of a thickened tightened s-shaped marking along the lower neck or anterior part of the body. Anteriorly and posteriorly these blotches or large spots tend to separate from one another, being surrounded by the whitish background.

*M. xanthina* Gray, 1849 as defined herein is separated from the other two species by having a similar patterning to *M. snakebustersorum* sp. nov. but with the blotches being orangeish-brown in colour and merging to become a distinctive mid-dorsal zig-zag along the anterior part of the body. The edges of the dorsal blotches or zig-zag have an obvious blackening, being slightly more prominent on the head and neck.

*M. yeomansi* sp. nov. is separated from the other species by one or other of: 1/ A dorsal pattern similar to *M. snakebustersorum* sp. nov. (described above) but with the large dorsal blotches along the forebody not merging to become a thickened tightened s-shaped marking along the lower neck or anterior part of the body. Instead at this part of the body, the blotches become large squarish blobs, that while usually separated by lighter whitish pigment, may occasionally touch one another at a small part of the border (subspecies *M. yeomansi yeomansi* subsp. nov.), or: 2/ A dorsal pattern consisting of greyish blotches, rather than blackish or brownish, merging on the neck to form s-shaped curves running along the dorsal midline on the neck and a line of interconnected irregular-

shaped greyish blotches running along the forebody (subspecies *M. yeomansi europa subsp. nov.*).

The subgenus *Apexvipera subgen. nov.* are separated from the nominate subgenus *Montivipera* Nilson *et al.* 1999 by having a complete circumocular ring of scales. By contrast in *Montivipera* this ring is divided by the supraocular.

Vipers in the genus *Montivipera* are separated from other true viper genera by the following unique suite of characters:

Supraocular shield large, erectile, the free border angular, separated from the eye by a series of small scales; nostril in a single nasal, which is partially fused with the naso-rostral; 23 mid-body rows; 150-180 ventrals.

Snakes in the tribe Viperini, as defined by Hoser (2013), which includes *Montivipera*, are separated from all other true vipers by the following suite of characters: pupil is elliptical, adults of the snakes are generally small (subtribes *Viperina* and *Montiviperina*) to medium or large (subtribe *Maxhoserviperina*) and more or less stoutly built. The head is distinct from the neck, of triangular shape, and covered with small scales in many species, although some have a few small plates on top. The dorsal scales are strongly keeled, the anal plate is divided, as are the subcaudals. Importantly this group are defined by the characteristic zig-zag pattern or similar running down their back, more-or-less along the dorsal midbody line, this pattern sometimes becoming a series of blotches or spots running longitudinally along the body (as in the genus *Daboia*). All are viviparous (live bearing). They are distributed in Eurasia and adjacent parts of North Africa.

The subgenus *Apexvipera subgen. nov.* are further defined and separated from other viper species by the following suite of characters: Snout rounded; vertical diameter of eye measuring hardly half its distance from the mouth. Rostral somewhat deeper than broad, not extending to the upper surface of the snout; head covered above with small feebly keeled scales; supraocular well developed, erectile, the free edge angular, separated from the eye by small scales, the eye being surrounded by a complete circle of 14 to 17 small scales (separating the subgenus from the other subgenus *Montivipera*); eye separated from the labials by two series of scales; nostril pierced in a single nasal, which is imperfectly separated from the naso-rostral; temporal scales keeled; 9 or 10 upper labials. 23 mid-body rows that are strongly keeled. 150-180 ventrals; anal entire; 23-32 subcaudals. Pale brown or greyish above, with a dorsal series of somewhat lighter reddish roundish spots which are dark-edged on the sides; these spots may be in pairs and alternating; sides with two series of dark brown spots; a dark / \ - shaped marking on the back of the head and a dark streak behind the eye; yellowish beneath, powdered with black, each scale with a transverse series of black and white spots (derived from Boulenger 1896).

**Distribution:** This subspecies is confined to far south-east Greece, near the border of Turkey and a few immediately adjacent Greek Islands. As far as is known, both subspecies are allopatric.

**Etymology:** Named in reflection that it is a European viper species. The suffix should not be changed to "ensis" unless mandated by the *International Code of Zoological Nomenclature*.

#### **MONTIVIPERA YEOMANSI YEOMANSI SUBSP. NOV.**

**Holotype:** A preserved specimen at the Carnegie Museum of Natural History, (CM Herps Collection), Pittsburgh, Pennsylvania, USA, specimen number: CM Herps 69429 collected from Bornova, Izmir, Turkey. The Carnegie Museum of Natural History allows access to its holdings.

**Paratypes:** A preserved specimen at the Naturalis Biodiversity Center, Leiden, The Netherlands, specimen registration number: RMNH.RENA.31984, collected from Selcuk, South Izmir, Turkey, and:

Four preserved specimens at the Centennial Museum, University of Texas at El Paso in El Paso, Texas, USA,

specimen numbers: H-16368, H-16369, H-16370 and H-16372 collected from Karyagdi Hill, Oke, Turkey.

**Diagnosis:** See the diagnosis for *M. yeomansi europa subsp. nov.* within this paper for a formal diagnosis of this subspecies as well.

**Distribution:** Western Turkey, immediately adjacent to the Aegean Sea and nearby Greece and Greek Islands with a distribution centred on hilly outliers of the main central Turkey ranges. The subspecies *M. yeomansi europa subsp. nov.* appears to be confined to eastern Greece and a small number of Greek islands in the northern Aegean Sea, with the subspecies *M. yeomansi yeomansi subsp. nov.* found elsewhere in this range. As far as is known, both subspecies are allopatric.

#### **APEXVIPERA SUBGEN. NOV.**

**Type species:** *Vipera raddei* Boettger, 1890.

**Diagnosis:** The subgenus *Apexvipera subgen. nov.* are separated from the nominate subgenus *Montivipera* Nilson *et al.* 1999 by having a complete circumocular ring of scales. By contrast in the subgenus *Montivipera* this ring is divided by the supraocular.

Vipers in the genus *Montivipera* are separated from other true viper genera by the following unique suite of characters:

Supraocular shield large, erectile, the free border angular, separated from the eye by a series of small scales; nostril in a single nasal, which is partially fused with the naso-rostral; 23 mid-body rows; 150-180 ventrals.

Snakes in the tribe Viperini, as defined by Hoser (2013), which includes *Montivipera*, are separated from all other true vipers by the following suite of characters: pupil is elliptical, adults of the snakes are generally small (subtribes *Viperina* and *Montiviperina*) to medium or large (subtribe *Maxhoserviperina*) and more or less stoutly built. The head is distinct from the neck, of triangular shape, and covered with small scales in many species, although some have a few small plates on top. The dorsal scales are strongly keeled, the anal plate is divided, as are the subcaudals. Importantly this group are defined by the characteristic zig-zag pattern or similar running down their back, more-or-less along the dorsal midbody line, this pattern sometimes becoming a series of blotches or spots running longitudinally along the body (as in the genus *Daboia*). All are viviparous (live bearing). They are distributed in Eurasia and adjacent parts of North Africa.

The subgenus *Apexvipera subgen. nov.* are further defined and separated from other viper species by the following suite of characters: Snout rounded; vertical diameter of eye measuring hardly half its distance from the mouth. Rostral somewhat deeper than broad, not extending to the upper surface of the snout; head covered above with small feebly keeled scales; supraocular well developed, erectile, the free edge angular, separated from the eye by small scales, the eye being surrounded by a complete circle of 14 to 17 small scales (separating the subgenus from the other subgenus *Montivipera*); eye separated from the labials by two series of scales; nostril pierced in a single nasal, which is imperfectly separated from the naso-rostral; temporal scales keeled; 9 or 10 upper labials. 23 mid-body rows that are strongly keeled. 150-180 ventrals; anal entire; 23-32 subcaudals. Pale brown or greyish above, with a dorsal series of somewhat lighter reddish roundish spots which are dark-edged on the sides; these spots may be in pairs and alternating; sides with two series of dark brown spots; a dark / \ - shaped marking on the back of the head and a dark streak behind the eye; yellowish beneath, powdered with black, each scale with a transverse series of black and white spots (derived from Boulenger 1896).

**Distribution:** Iran, Turkey, Azerbaijan and Armenia.

**Etymology:** Named in reflection of them being the "top" (as in most sought after) viper snakes by many enthusiasts and hobbyist collectors in Europe, coupled with the word "vipera", as these snakes are vipers.



**Content:** *Montivipera (Apexvipera) raddei* (Boettger, 1890) (type species); *M. (Apexvipera) latifi* Mertens, Darevsky and Klemmer, 1967. However in terms of the putative taxon *M. (Apexvipera) latifi* one should note that its status as a full species has been questioned by the evidence of Rastegar-Pouyani *et al.* (2014). The subgenus *Montivipera* Nilson *et al.* 1999 defined by the above diagnosis, except for the reversal of relevant characters as indicated, includes all other species in the genus *Montivipera*, these being *M. albizona* Nilson, Andrén and Flärdh, 1990, *M. bornmuelleri* Werner, 1898, *M. bulgardaghica* Nilson and Andrén, 1985, *M. snakebustersorum* sp. nov., *M. wagneri* Nilson and Andrén, 1984, *M. xanthina* Gray, 1849 and *M. yeomansi* sp. nov..

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#### CONFLICT OF INTEREST

The author has no known relevant conflicts of interest.