

# **A new taxonomy for the *Vipera latastei* species complex (Serpentes: Viperidae).**

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## **ABSTRACT**

The Lataste's Viper (*Vipera latastei*) species complex has been the subject of numerous studies in recent years and yet the taxonomy of the group has not been appropriately updated.

This paper presents a new taxonomy for the species complex recognizing eight species, for which names are available for three and five are formally described and named for the first time according to the rules of the International Code of Zoological Nomenclature.

Recognized as full species are the taxa *Vipera latastei* Bosca, 1878, *V. gaditana* (Saint Girons, 1977) and *V. monticola* (Saint-Girons, 1954).

Supported by robust molecular data, allopatry and morphological differences, two new species are described from North Africa, namely *Vipera hoserae* sp. nov. and *Vipera wellsii* sp. nov. and three from Spain, namely *Vipera wellingtoni* sp. nov., *Vipera britoi* sp. nov. and *Vipera veloantoni* sp. nov..

**Keywords:** Taxonomy; Snake; Viperidae; serpents; Viper; Europe; Spain; Portugal; Morocco; Algeria; Atlas Mountains; Rif Mountains; Hoser; Wells; Wellington; *Vipera*; *latastei*; *monticola*; *gaditana*; *nigricaudata*; new species; *hoserae*; *wellsii*; *wellingtoni*; *britoi*; *veloantoni*.

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## **INTRODUCTION**

The Lataste's Viper (*Vipera latastei*) species complex as currently recognized has a distribution centred on the Iberian Peninsula (Spain and Portugal), with outlying populations in northern Morocco, Algeria and Tunisia.

The taxonomic and phylogenetic history of *Vipera latastei* Bosca, 1878, related species and the entire *Vipera* genus (*Vipera* Laurenti, 1768) to date is summarised by Brito *et al.* (2006) and is not repeated here.

Most significantly in terms of the species *Vipera latastei* Bosca, 1878, the current state of play is that most herpetologists recognize either one species only, that being the nominate form, or alternatively, two species, the second being *Vipera monticola* (Saint-Girons, 1954), a taxon originally described as a subspecies and later elevated to full species.

That taxon was described from a holotype from the West High Atlas Mountains in Morocco.

In 1977, Saint-Girons erected a new subspecies *V. latastei gaditana* Saint Girons, 1977, which has been widely recognized in the literature since (e.g. Brito *et al.* 2006, Niskanen and Mappes 2005, Velo-Antón *et al.* 2012 and many others).

The holotype for "*gaditana*" is the southern part of Spain, west of the Gibraltar Strait.

Significant recent studies on the phylogeny, taxonomy and systematics of the *V. latastei* species complex, have shown there to be anything up to 20 discrete and allopatric populations of potential taxonomic significance as identified by Brito *et al.* (2006) (19) and Saint Girons (1977) (one other identified).

The current taxonomy proposed in this paper is based on a review of

the published literature and inspection of relevant material to conservatively assign local populations to one or more species.

## **MATERIAL, METHODS AND RESULTS**

The basis of the following revision included a review of the relevant literature as a starting point and working logically from there.

The results follow from this in the relevant species descriptions.

As mentioned already, using morphological data Britto *et al.* (2006) and Saint Girons (1977) identified 20 apparently allopatric populations and in each case were able to identify consistent morphological differences between each.

Britto *et al.* (2006) reduced their original 19 groups down to 9 which they regarded as having taxonomic significance and presented a series of tables identifying differences between each group.

More recently Velo-Antón *et al.* (2012) published a paper with a detailed molecular phylogeny relevant to the *V. latastei* species complex across their entire known range and including the holotype populations for each form.

They too identified groups worthy of recognition at the species level, the detail of which need not be repeated here except as relevant.

At the time this paper was published in 2012, I was working on a global audit of the Viperidae and had within this ambit intended publishing descriptions of unnamed forms within the *V. latastei* species complex.

However the publication of Velo-Antón *et al.* (2012) identified unnamed clades within the *V. latastei* species complex and so those authors had at the time an effective priority reservation on naming these taxa under the current edition of the *International Code of Zoological Nomenclature*.

Under the recommendations of the *International Code of Zoological*

*Nomenclature*, Third edition (Ride *et al.* 1999), Appendix A, the Code of Ethics reads as follows:

"Code of Ethics

1. Authors proposing new names should observe the following principles, which together constitute a "Code of Ethics".
2. A zoologist should not publish a new name if he or she has reason to believe that another person has already recognized the same taxon and intends to establish a name for it (or that the taxon is to be named in a posthumous work). A zoologist in such a position should communicate with the other person (or their representatives) and only feel free to establish a new name if that person has failed to do so in a reasonable period (not less than a year).
3. A zoologist should not publish a new replacement name (a nomen novum) or other substitute name for a junior homonym when the author of the latter is alive; that author should be informed of the homonymy and be allowed a reasonable time (at least a year) in which to establish a substitute name.

On that basis I deferred naming any new species within the *V. latastei* species complex for the duration of 2012 and 2013 in order to comply with the Code's ethics.

In fact I chose to allow an extra year (2014) for relevant authors of earlier studies including the most recently published Velo-Antón *et al.* (2012) to assign names to taxa they had identified in their papers and not yet named, but none chose to do so within the relevant time frame.

Noting the fact that all populations within the *V. latastei* species complex are potentially threatened by human activities, or consequences of them, even when resident in "conservation areas", I find that the need to properly identify each taxonomic group outweighs any potential benefit in delaying taxonomic recognition of each group any longer.

Hence I have chosen to do so herein.

I need not mention the ongoing human tidalwave of people, commonly "refugees" from Africa and the Middle-east currently overrunning areas inhabited by these relevant allopatric populations. See also Pleguezuelos *et al.* (2007).

It is not necessary for me to rehash earlier papers by relevant authors to remanufacture their evidence and fraudulently present it as "new" to ostensibly justify my taxonomic actions (as done by Reynolds *et al.* 2013a, 2013b, 2014), although in that case the authors sought to steal the works of others, without crediting them properly, these people being myself (Raymond Hoser) (Hoser 2004), as well as Wells and Wellington (1984, 1985); or similarly Maddock *et al.* (2015) who also sought to steal the work of Wells and Wellington (1985), by illegally renaming the taxon *Acanthophis lancasteri* Wells and Wellington, 1985.

Herein I merely cite and use the evidence acquired by earlier authors by means of proper and ethical citation of their works as a basis to effectively validate my taxonomic decisions.

The new nomenclature within this paper simply follows the taxonomic reality we are faced with.

This paper therefore presents a new taxonomy for the species complex recognizing eight species, for which names are available for three (mentioned already) and five are formally described and named for the first time according to the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

Recognized as full species are the taxa *Vipera latastei* Bosca, 1878, *V. gaditana* (Saint Girons, 1977) and *V. monticola* (Saint-Girons, 1954). I note that each of the latter two taxa were originally described by Saint-Girons as subspecies only.

Supported by robust molecular data showing a minimal divergence of 3 million years for each group named herein, allopatry and morphological differences, two new species are described from North Africa, namely *Vipera hoserae* sp. nov. and *Vipera wellsi* sp. nov. and three from Spain, namely *Vipera wellingtoni* sp. nov., *Vipera britoi* sp. nov. and *Viper veloantoni* sp. nov..

It is because of these obvious factors that I have absolutely no hesitation in describing the new forms as full species as opposed to merely subspecies, noting that by all widely used definitions of species to date, each taxon named herein properly qualifies.

While there is a considerable body of literature and evidence to support the taxonomic conclusions herein, the majority of the most significant material was published in the last 20 years, including the considerable amount of work by José C. Brito, Guillermo Velo-Antón and co-workers, noting that Brito and Guillermo Velo-Antón are not listed as a lead authors for some of the significantly relevant papers. It is for that reason two of the species level taxa are named in their

honour.

Literature significant and relevant in terms of the taxonomy, nomenclature and ongoing conservation requirements within the *Vipera latastei* complex include the following: Beerli *et al.* (1986), Bernis (1968), Billing (2000), Boscá (1878, 1879), Boulenger (1891, 1913), Brito (2003), Brito and Álvares (2004), Brito *et al.* (2006), Brodmann (1987), Busack and Salvador (1984), Daan and Hillenius (1966), Dobiey and Vogel (2007), Engelmann *et al.* (1993), Ferrer and Filella (2011), Garrigues *et al.* (2005), Gruber (1989), Kreiner (2009), Kwet (2010), Kwet and Trapp (2014a, 2014b), Malkmus (1982, 1995, 1997, 2013), Mallow *et al.* (2003), Martínez-Freiría *et al.* (2006, 2010), McDiarmid *et al.* (1999), Mediani *et al.* (2015), Mertens and Müller (1928), Obst (1983), Parellada and Santos (2002), Phelps (2010), Pillet (1994), Pleguezuelos *et al.* (2007), Saint Girons (1953, 1954, 1977), Santos *et al.* (2007), Schleich *et al.* (1996), Schlüter (2009), Schwarzer (1999), Schweiger (2009), Sochurek (1979), Trapp (2014), Trutnau (1975), Velo-Antón *et al.* (2012), Venchi and Sindaco (2006), Weima (2013), Westerström (2010), Wirth (2010) and sources cited therein.

In passing and for completeness snake, I mention a relevant online document.

On a website at:

<http://www.viborasdelapeninsulaiberica.com/viper-articles2.html>

Juan Timms Rangel and Raúl Doblado Regaño

published a document titled:

"*Vipera latastei abulensis* – a new subspecies of viper from the Central mountain range (Sierra de Gredos), in the Iberian Peninsula. Comparative data with the nominate race *Vipera latastei latastei* and the southern race *Vipera latastei gaditana*."

However the so-called description while containing useful information, was not in any way compliant with the *International Code of Zoological Nomenclature* (Third edition) (Ride *et al.* 1999), for several reasons:

Necessary identifying details of the alleged holotype were lacking and the document was only published online and hence not published according to the code, as later admitted by one of the authors.

The document on the website, downloaded in 2015 carried a date of 2005.

Furthermore on 16 August 2014 in a post at:

<http://fieldherping.eu/Forum/viewtopic.php?f=15&t=1988&start=10>

one of the authors disclaimed the work when he posted on that site via an administrator named "Mario".

He wrote:

"Hello Mario,

I did the *V. latastei abulensis* study quite a few years ago, at the time I was pretty sure this was a valid subspecies. Right now I am not so sure about it, in fact I tend to think it is just a separate population with morphological variations. The study has not been published, but I keep it on the website for the sake of information.

Cheers,

Juan"

Hence the the purpose of this paper and the nomenclature of this species, the name "*Vipera latastei abulensis*" is ignored as it is not available and cannot be affixed to any relevant taxon.

The name "*Rhinaspis latastei nigrocaudata* Reuss, 1933" is a junior synonym of *Vipera latastei* as recognized in this paper, meaning it is included within that population, even after the other species named and identified herein are accounted for.

#### **THEFT OF MATERIALS TO IMPEDE SCIENCE AND WILDLIFE CONSERVATION**

I also note the following: In 2006 an online petition sponsored by a group of animal-hating pseudo-scientists including 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 (Snakebusters®) and all my other herpetological activity to be shut down by the government of Victoria, Australia.

These men were successful in that after a ruthless five-year campaign, 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 also a reprisal for several publications I had made that were highly critical of corruption involving the relevant people (e.g. Hoser 1993, 1996, 2010). Myself, my wife and two vulnerable young daughters were arrested at gunpoint and held captive in the kitchen of the house for nine

hours while the facility was ransacked. Besides the unspeakable acts of killing captive snakes and criminal damage to cages and household goods, the raiding officers illegally shut down our business and 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, although much of the damage to the business and our reputation built up over more than 4 decades was irreparable.

Later proceedings resolved in 2014 and 2015, cleared me of dozens of fabricated criminal charges spanning some decades (Magistrates Court Victoria 2014), and a judicial finding that I was legally a cleanskin in that I had never acted illegally (VCAT 2015).

The government was ordered to pay me costs, restitution, compensation and damages (Court of Appeal, 2014), which as of mid 2015 remain unpaid.

Of greater relevance here is that at the time of the raid, 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 and 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 forty years gathering data, by which time I may be dead from old age, being aged 53 as of 2015, or publishing the relevant paper/s with minimal 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, 2014a and 2014b), Kaiser *et al.* (2013), Naish (2013) and Wüster *et al.* (2014), all part of the group of people effectively controlled by Wolfgang Wüster of Wales, UK, have been highly critical of the fact that I have assigned names to unnamed clades of snakes and more recently for other reptiles. Their unscientific and childish attacks, continued incessantly on social media such as Facebook and Twitter are rejected herein as destabilizing the nomenclature, impeding the progress of science and in some cases putting people's lives at risk. Their ridiculous comments and false and defamatory statements are systematically rebutted by Hoser (2012a, 2012b, 2013, 2015a-f), as well as Cogger (2013, 2014), Dubois (2014), Dubois *et al.* (1988), Eipper (2013), Mutton (2014a, 2014b), Shea (2013a-d), Thomson (2003), Thorpe (2013, 2014a-c), Wellington (2013, 2014a, 2014b), Wells and Wellington (1999), Wells (2013, 2014a, 2014b), and many others, so this history is not reviewed here.

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 (more than once) and therefore cannot be relied upon and incorporated into these contemporary publications.

I also note that I welcome redescriptions of the relevant taxa by later authors unfettered by illegal break ins and thefts by corrupt government officers and if fortunate, even funded by these people, and who will hopefully have time and money to be able to do a more thorough description of the same and other taxa.

One does however expect these and all other herpetologists to abide by the letter and spirit of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999) and all other relevant laws.

#### NOTES ON THE DESCRIPTIONS THAT FOLLO

Names as spelt for newly named taxa herein should not be changed under any circumstance unless mandatory under the relevant code of Zoological Nomenclature in force at the time, even if gender formation or name formation appears in any way to be incorrect.

In the event a first or subsequent revisor seeks to merge one or more taxa described herein, then the name to be used is that which is published first herein in page priority order in this paper.

That is as follows: *hoserae*; *wellsi*; *wellingtoni*; *britoi*; *veloantoni*.

As for all papers published by this author where new taxa are

named, including all those listed in "Zoobank" (at <http://zoobank.org>) as of this date, and including all published in *Australasian Journal of Herpetology* issue 27 in 2015 (pages 44-51) (as well as the later paper in issues 28 and 29), it is published in accordance with the provisions of the *International Code of Zoological Nomenclature* (the issue in force at the time, this being the fourth edition as of 2015), for the purposes of being a permanent scientific record and so that the names, combinations and the like are available for use by other scientists and users of scientific nomenclature.

This includes all names and combinations listed in pages 52 to 63 of *Australasian Journal of Herpetology* Issue 27, published in 2015 and those published in later issues of the same journal.

#### SPECIES *VIPERA HOSERAE* SP. NOV.

**Holotype:** A specimen at the Muséum national d'Histoire naturelle, Paris, France, specimen number: 1961.333 from the Rif Mountains in Morocco, North Africa. This is a government-owned facility that allows access to its holdings.

**Paratype:** A specimen from the Rif Mountains in Morocco, North Africa, held at the Museum of Natural History, London, United Kingdom, specimen number: BMNH 94.3.22.5. This is a government-owned facility that allows access to its holdings.

**Diagnosis:** The species *Vipera latastei* Bosca, 1878, including the taxa *V. gaditana* (Saint Girons, 1977), *V. monticola* (Saint-Girons, 1954), *Vipera hoserae* sp. nov., *Vipera wellsii* sp. nov., *Vipera wellingtoni* sp. nov. and *Vipera britoi* sp. nov. are defined as follows: A viper of typical viperine form. It has a triangular-shaped head and distinct nose horn present, with small central head scales, excluding the large supraoculars and sometimes frontal. The rostral scale clearly extends onto the front of the nose-horn which is usually covered by less than nine scales. The raised section is usually covered behind by 4 or more scales, versus 2-3 in *Vipera aspis* (Linnaeus, 1758). The rostral scale is 1.5 to 2 times as deep as wide as compared to 1.5 times or less in *V. aspis*. There are usually 2 rows of scales between the eye and the supralabials. There are usually, but not always 21 dorsal mid-body rows.

Colouration is usually a greyish ground colour, but may be brownish or sometimes reddish. The typical pattern is a wavy or zig-zag dorsal stripe with a darker edge. Belly is usually greyish or blackish, usually with lighter or darker spots. There is often some yellow on the underside of the tail.

*Vipera hoserae* sp. nov. is readily separated from all the other species within the *V. latastei* species complex by the following unique suite of characters: An average of 134 ventrals (range 133-135), 38 subcaudals in males (range 35-43), 38 subcaudals in females (range 37-40), 7 apical scales (range 6-8), 8 loreals (range 7-9), 21 dorsal mid-body rows, and about a third of specimens have a fragmented nasorostral.

The dorsal mid body scale row count of *V. monticola* (Saint-Girons, 1954) is 19, which readily separates that taxon from *Vipera hoserae* sp. nov., while the other African taxon *V. wellsii* sp. nov. is separated by having 23 dorsal mid-body rows (rarely 22 or 24).

The species *V. monticola* (Saint-Girons, 1954) is readily separated from all the other species within the *V. latastei* species complex by the following unique suite of characters: An average of 136 ventrals (range 134-138), 37 subcaudals in males (range 36-39), 37 subcaudals in females (range 35-40), 5 apical scales (range 4-6), 7 loreals (range 6-8), 19 dorsal mid body scale rows and the nasorostral is always entire.

The species *Vipera wellsii* sp. nov. is readily separated from all the other species within the *V. latastei* species complex by the following unique suite of characters: An average of 125 ventrals (range 121-130), 35 subcaudals in males (range 35-35), 35 subcaudals in females (range 32-37), 5 apical scales (range 4-6), 8 loreals (range 7-9), 23 dorsal mid-body rows (occasionally 22 or 24) and 80 per cent of specimens have a fragmented nasorostral.

All three non-Iberian species within the *V. latastei* complex can be readily separated from them by one or other of a combination of mid-body scale rows and apical scales, the like of which is not seen in Iberian animals, as well as the combinations of characters just given.

Only *V. hoserae* sp. nov. has 21 dorsal midbody rows, a trait shared with Iberian animals, but it is separated from them by the significantly higher number of apical scales.

The species *Vipera britoi* sp. nov. is readily separated from all the other species within the *V. latastei* species complex by the following unique suite of characters: An average of 142 ventrals (range 139-147) this being the highest count within the species complex; 42

subcaudals in males (range 39-46), 35 subcaudals in females (range 33-36), 5 apical scales (range 4-6), 8 loreals (range 7-9), 21 mid-body rows and a nasorostral that is always entire. *Vipera britoi sp. nov.* also differs from all others in the *V. latastei* species complex by females not only having wider heads than in males, but also by the unique trait of having larger head areas than males.

The ground colour of *Vipera britoi sp. nov.* is usually a distinctive silver-grey. The lower upper labials are whitish, with one or two dark triangles on them, with the base on the lip.

The species *Vipera wellingtoni sp. nov.* from the Sierra de Ronda Mountains, Spain, is identical in most respects to nominate *V. latastei* and *V. veloantoni sp. nov.* from the Sierra Nevada Mountains, Spain and separated from others in the *V. latastei* complex by the possession of the following unique suite of characters: An average of 139 ventrals (range 137-142), 42 subcaudals in males (range 39-44), 35 subcaudals in females (range 31-36), 5 apical scales (range 4-6), 7 loreals (range 6-8), 21 dorsal mid-body rows, nasorostral is usually entire.

In life, nominate *V. latastei* and *V. veloantoni sp. nov.* are characterised by an overall light greyish body colouration with a sharp edged zigzag pattern that is usually distinct, although red and brown specimens do occur. By contrast *Vipera wellingtoni sp. nov.* is almost always characterised by a strong reddish-brown colouration with or without a distinct zig-zag pattern.

*V. veloantoni sp. nov.* is characterised by a relatively thick white line across the rear upper labials, versus a thin line at the same point in *Vipera wellingtoni sp. nov.*, which readily separates the two taxa.

By contrast nominate *V. latastei* is separated from both *V. veloantoni sp. nov.* and *V. wellingtoni sp. nov.* by the possession of a fading lightening on the rear upper labials as opposed to any distinct white line.

Differently however, specimens of *V. latastei* from the north-east of Spain are characterised by a distinctive white bar running along the entire upper labial, which is also not seen in either of the other two species or for that matter any other Spanish species in the *V. latastei* complex.

*Vipera wellingtoni sp. nov.* is the largest species in the complex, with the following average sizes for each sex being 452.2 mm for males and 424.5 mm for females. In West Iberian and Catalonia, nominate female *V. latastei* do sometimes average larger sizes than for *Vipera wellingtoni sp. nov.*, but this is not the case in males from anywhere.

The species *Vipera gaditana* (Saint Girons, 1977) is readily separated from all the other species within the *V. latastei* species complex by the following unique suite of characters: An average of 131 ventrals (range 130-133), (lower than for all other Spanish species in the *V. latastei* complex), an average of 37 subcaudals in females (range 34-42), (being lower than for all other Spanish species in the *V. latastei* complex), 6 apical scales (range 5-7), 11 loreals (range 9-14), (being higher than for all other Spanish species in the *V. latastei* complex), 21 dorsal midbody rows and less than 25 per cent of specimens have a fragmented nasorostral.

The species from Africa as well as *Vipera gaditana* (Saint Girons, 1977) are separated from the other species by an increased division of cephalic scales as compared to the other taxa.

All the above defined species taxa are allopatric in distribution, three being found in North Africa and five on the Iberian Peninsula.

**Distribution:** Restricted to the Rif Mountain range and the Middle and High Atlas Mountains in Morocco, Africa.

**Etymology:** Named in honour of my mother, Katrina Hoser, born in Dagenham Essex, UK and now living in Lane Cove North, Sydney, NSW, Australia for valuable services to herpetology globally, and financially supporting the footwear industry and economic development in China.

#### **SPECIES VIPERA WELLSI SP. NOV.**

**Holotype:** A specimen, number 85.4.20.15 in the Museum of Natural History, London, UK, collected from Annaba (Bône), Algeria, Africa. This is a government-owned facility that allows access to its holdings.

**Paratypes:** Two specimens, numbers 89.12.7.5 and 1920.1.20.2546 in the Museum of Natural History, London, UK, collected from Annaba (Bône), Algeria, Africa. This is a government-owned facility that allows access to its holdings.

**Diagnosis:** The species *Vipera latastei* Bosca, 1878, including the taxa *V. gaditana* (Saint Girons, 1977), *V. monticola* (Saint-Girons, 1954), *Vipera hoserae sp. nov.*, *Vipera wellsi sp. nov.*, *Vipera wellingtoni sp. nov.* and *Vipera britoi sp. nov.* are defined as follows:

A viper of typical viperine form. It has a triangular-shaped head and distinct nose horn present, with small central head scales, excluding the large supraoculars and sometimes frontal. The rostral scale clearly extends onto the front of the nose-horn which is usually covered by less than nine scales. The raised section is usually covered behind by 4 or more scales, versus 2-3 in *Vipera aspis* (Linnaeus, 1758). The rostral scale is 1.5 to 2 times as deep as wide as compared to 1.5 times or less in *V. aspis*. There are usually 2 rows of scales between the eye and the supralabials. There are usually, but not always 21 dorsal mid-body rows.

Colouration is usually a greyish ground colour, but may be brownish or sometimes reddish. The typical pattern is a wavy or zig-zag dorsal stripe with a darker edge. Belly is usually greyish or blackish, usually with lighter or darker spots. There is often some yellow on the underside of the tail.

*Vipera hoserae sp. nov.* is readily separated from all the other species within the *V. latastei* species complex by the following unique suite of characters: An average of 134 ventrals (range 133-135), 38 subcaudals in males (range 35-43), 38 subcaudals in females (range 37-40), 7 apical scales (range 6-8), 8 loreals (range 7-9), 21 dorsal mid-body rows, and about a third of specimens have a fragmented nasorostral.

The dorsal mid body scale row count of *V. monticola* (Saint-Girons, 1954) is 19, which readily separates that taxon from *Vipera hoserae sp. nov.*, while the other African taxon *V. wellsi sp. nov.* is separated by having 23 dorsal mid-body rows (rarely 22 or 24).

The species *V. monticola* (Saint-Girons, 1954) is readily separated from all the other species within the *V. latastei* species complex by the following unique suite of characters: An average of 136 ventrals (range 134-138), 37 subcaudals in males (range 36-39), 37 subcaudals in females (range 35-40), 5 apical scales (range 4-6), 7 loreals (range 6-8), 19 dorsal mid body scale rows and the nasorostral is always entire.

The species *Vipera wellsi sp. nov.* is readily separated from all the other species within the *V. latastei* species complex by the following unique suite of characters: An average of 125 ventrals (range 121-130), 35 subcaudals in males (range 35-35), 35 subcaudals in females (range 32-37), 5 apical scales (range 4-6), 8 loreals (range 7-9), 23 dorsal mid-body rows (occasionally 22 or 24) and 80 per cent of specimens have a fragmented nasorostral.

All three non-Iberian species within the *V. latastei* complex can be readily separated from them by one or other of a combination of mid-body scale rows and apical scales, the like of which is not seen in Iberian animals, as well as the combinations of characters just given.

Only *V. hoserae sp. nov.* has 21 dorsal midbody rows, a trait shared with Iberian animals, but it is separated from them by the significantly higher number of apical scales.

The species *Vipera britoi sp. nov.* is readily separated from all the other species within the *V. latastei* species complex by the following unique suite of characters: An average of 142 ventrals (range 139-147) this being the highest count within the species complex; 42 subcaudals in males (range 39-46), 35 subcaudals in females (range 33-36), 5 apical scales (range 4-6), 8 loreals (range 7-9), 21 mid-body rows and a nasorostral that is always entire. *Vipera britoi sp. nov.* also differs from all others in the *V. latastei* species complex by females not only having wider heads than in males, but also by the unique trait of having larger head areas than males.

The ground colour of *Vipera britoi sp. nov.* is usually a distinctive silver-grey. The lower upper labials are whitish, with one or two dark triangles on them, with the base on the lip.

The species *Vipera wellingtoni sp. nov.* from the Sierra de Ronda Mountains, Spain, is identical in most respects to nominate *V. latastei* and *V. veloantoni sp. nov.* from the Sierra Nevada Mountains, Spain and separated from others in the *V. latastei* complex by the possession of the following unique suite of characters: An average of 139 ventrals (range 137-142), 42 subcaudals in males (range 39-44), 35 subcaudals in females (range 31-36), 5 apical scales (range 4-6), 7 loreals (range 6-8), 21 dorsal mid-body rows, nasorostral is usually entire.

In life, nominate *V. latastei* and *V. veloantoni sp. nov.* are characterised by an overall light greyish body colouration with a sharp edged zigzag pattern that is usually distinct, although red and brown specimens do occur. By contrast *Vipera wellingtoni sp. nov.* is almost always characterised by a strong reddish-brown colouration with or without a distinct zig-zag pattern.

*V. veloantoni* sp. nov. is characterised by a relatively thick white line across the rear upper labials, versus a thin line at the same point in *Vipera wellingtoni* sp. nov., which readily separates the two taxa.

By contrast nominate *V. latastei* is separated from both *V. veloantoni* sp. nov. and *V. wellingtoni* sp. nov. by the possession of a fading lightening on the rear upper labials as opposed to any distinct white line.

Differently however, specimens of *V. latastei* from the north-east of Spain are characterised by a distinctive white bar running along the entire upper labial, which is also not seen in either of the other two species or for that matter any other Spanish species in the *V. latastei* complex.

*Vipera wellingtoni* sp. nov. is the largest species in the complex, with the following average sizes for each sex being 452.2 mm for males and 424.5 mm for females. In West Iberian and Catalonia, nominate female *V. latastei* do sometimes average larger sizes than for *Vipera wellingtoni* sp. nov., but this is not the case in males from anywhere. The species *Vipera gaditana* (Saint Girons, 1977) is readily separated from all the other species within the *V. latastei* species complex by the following unique suite of characters: An average of 131 ventrals (range 130-133), (lower than for all other Spanish species in the *V. latastei* complex), an average of 37 subcaudals in females (range 34-42), (being lower than for all other Spanish species in the *V. latastei* complex), 6 apical scales (range 5-7), 11 loreals (range 9-14), (being higher than for all other Spanish species in the *V. latastei* complex), 21 dorsal midbody rows and less than 25 per cent of specimens have a fragmented nasorostral.

The species from Africa as well as *Vipera gaditana* (Saint Girons, 1977) are separated from the other species by an increased division of cephalic scales as compared to the other taxa.

All the above defined species taxa are allopatric in distribution, three being found in North Africa and five on the Iberian Peninsula.

**Distribution:** Known only to occur in the region of the Petite Kabylie Mountains and foothills, Algeria and immediately west of there in North Africa as well as near the capital Algiers, Algeria.

**Etymology:** Named in honour of Richard Wells (co-author of Wells and Wellington, 1984, 1985), currently of Lismore, NSW, in recognition of a significant contribution to herpetology in Australia over some decades going way beyond those cited papers.

#### **SPECIES VIPERA WELLINGTONI SP. NOV.**

**Holotype:** A specimen, number 94.5.25.12 in the Museum of Natural History, London, UK, collected from Costo del Rei, Spain. This is a government-owned facility that allows access to its holdings.

**Diagnosis:** The species *Vipera latastei* Bosca, 1878, including the taxa *V. gaditana* (Saint Girons, 1977), *V. monticola* (Saint-Girons, 1954), *Vipera hoseræ* sp. nov., *Vipera wellsi* sp. nov., *Vipera wellingtoni* sp. nov. and *Vipera britoi* sp. nov. are defined as follows: A viper of typical viperine form. It has a triangular-shaped head and distinct nose horn present, with small central head scales, excluding the large supraoculars and sometimes frontal. The rostral scale clearly extends onto the front of the nose-horn which is usually covered by less than nine scales. The raised section is usually covered behind by 4 or more scales, versus 2-3 in *Vipera aspis* (Linnaeus, 1758). The rostral scale is 1.5 to 2 times as deep as wide as compared to 1.5 times or less in *V. aspis*. There are usually 2 rows of scales between the eye and the supralabials. Usually, but not always 21 dorsal mid-body rows.

Colouration is usually a greyish ground colour, but may be brownish or sometimes reddish. The typical pattern is a wavy or zig-zag dorsal stripe with a darker edge. Belly is usually greyish or blackish, usually with lighter or darker spots. There is often some yellow on the underside of the tail.

*Vipera hoseræ* sp. nov. is readily separated from all the other species within the *V. latastei* species complex by the following unique suite of characters: An average of 134 ventrals (range 133-135), 38 subcaudals in males (range 35-43), 38 subcaudals in females (range 37-40), 7 apical scales (range 6-8), 8 loreals (range 7-9), 21 dorsal mid-body rows, and about a third of specimens have a fragmented nasorostral.

The dorsal mid body scale row count of *V. monticola* (Saint-Girons, 1954) is 19, which readily separates that taxon from *Vipera hoseræ* sp. nov., while the other African taxon *V. wellsi* sp. nov. is separated by having 23 dorsal mid-body rows (rarely 22 or 24).

The species *V. monticola* (Saint-Girons, 1954) is readily separated from all the other species within the *V. latastei* species complex by the following unique suite of characters: An average of 136 ventrals

(range 134-138), 37 subcaudals in males (range 36-39), 37 subcaudals in females (range 35-40), 5 apical scales (range 4-6), 7 loreals (range 6-8), 19 dorsal mid body scale rows and the nasorostral is always entire.

The species *Vipera wellsi* sp. nov. is readily separated from all the other species within the *V. latastei* species complex by the following unique suite of characters: An average of 125 ventrals (range 121-130), 35 subcaudals in males (range 35-35), 35 subcaudals in females (range 32-37), 5 apical scales (range 4-6), 8 loreals (range 7-9), 23 dorsal mid-body rows (occasionally 22 or 24) and 80 per cent of specimens have a fragmented nasorostral.

All three non-Iberian species within the *V. latastei* complex can be readily separated from them by one or other of a combination of mid-body scale rows and apical scales, the like of which is not seen in Iberian animals, as well as the combinations of characters just given.

Only *V. hoseræ* sp. nov. has 21 dorsal midbody rows, a trait shared with Iberian animals, but it is separated from them by the significantly higher number of apical scales.

The species *Vipera britoi* sp. nov. is readily separated from all the other species within the *V. latastei* species complex by the following unique suite of characters: An average of 142 ventrals (range 139-147) this being the highest count within the species complex; 42 subcaudals in males (range 39-46), 35 subcaudals in females (range 33-36), 5 apical scales (range 4-6), 8 loreals (range 7-9), 21 mid-body rows and a nasorostral that is always entire. *Vipera britoi* sp. nov. also differs from all others in the *V. latastei* species complex by females not only having wider heads than in males, but also by the unique trait of having larger head areas than males.

The ground colour of *Vipera britoi* sp. nov. is usually a distinctive silver-grey. The lower upper labials are whitish, with one or two dark triangles on them, with the base on the lip.

The species *Vipera wellingtoni* sp. nov. from the Sierra de Ronda Mountains, Spain, is identical in most respects to nominate *V. latastei* and *V. veloantoni* sp. nov. from the Sierra Nevada Mountains, Spain and separated from others in the *V. latastei* complex by the possession of the following unique suite of characters: An average of 139 ventrals (range 137-142), 42 subcaudals in males (range 39-44), 35 subcaudals in females (range 31-36), 5 apical scales (range 4-6), 7 loreals (range 6-8), 21 dorsal mid-body rows, nasorostral is usually entire.

In life, nominate *V. latastei* and *V. veloantoni* sp. nov. are characterised by an overall light greyish body colouration with a sharp edged zigzag pattern that is usually distinct, although red and brown specimens do occur. By contrast *Vipera wellingtoni* sp. nov. is almost always characterised by a strong reddish-brown colouration with or without a distinct zig-zag pattern.

*V. veloantoni* sp. nov. is characterised by a relatively thick white line across the rear upper labials, versus a thin line at the same point in *Vipera wellingtoni* sp. nov., which readily separates the two taxa.

By contrast nominate *V. latastei* is separated from both *V. veloantoni* sp. nov. and *V. wellingtoni* sp. nov. by the possession of a fading lightening on the rear upper labials as opposed to any distinct white line.

Differently however, specimens of *V. latastei* from the north-east of Spain are characterised by a distinctive white bar running along the entire upper labial, which is also not seen in either of the other two species or for that matter any other Spanish species in the *V. latastei* complex.

*Vipera wellingtoni* sp. nov. is the largest species in the complex, with the following average sizes for each sex being 452.2 mm for males and 424.5 mm for females. In West Iberian and Catalonia, nominate female *V. latastei* do sometimes average larger sizes than for *Vipera wellingtoni* sp. nov., but this is not the case in males from anywhere. The species *Vipera gaditana* (Saint Girons, 1977) is readily separated from all the other species within the *V. latastei* species complex by the following unique suite of characters: An average of 131 ventrals (range 130-133), (lower than for all other Spanish species in the *V. latastei* complex), an average of 37 subcaudals in females (range 34-42), (being lower than for all other Spanish species in the *V. latastei* complex), 6 apical scales (range 5-7), 11 loreals (range 9-14), (being higher than for all other Spanish species in the *V. latastei* complex), 21 dorsal midbody rows and less than 25 per cent of specimens have a fragmented nasorostral.

The species from Africa as well as *Vipera gaditana* (Saint Girons, 1977) are separated from the other species by an increased division of cephalic scales as compared to the other taxa.

All the above defined species taxa are allopatric in distribution, three being found in North Africa and five on the Iberian Peninsula.

**Distribution:** Known only to occur in the region of the Serrania de Ronda Mountains of southern Spain and immediately adjacent areas.

**Etymology:** Named in honour of Cliff Ross Wellington (co-author of Wells and Wellington, 1984, 1985), currently of Woy Woy, NSW, in recognition of a significant contribution to herpetology in Australia over some decades going way beyond those cited papers.

**SPECIES VIPERA BRITOI SP. NOV.**

**Holotype:** A specimen at the Museum of Natural History (Museum d'Histoire naturelle) Geneva, Switzerland (MG), number 1207.87, from Zamora, Spain. This is a government-owned facility that allows access to its holdings.

**Diagnosis:** The species *Vipera latastei* Bosca, 1878, including the taxa *V. gaditana* (Saint Girons, 1977), *V. monticola* (Saint-Girons, 1954), *Vipera hoseræ* sp. nov., *Vipera wellsi* sp. nov., *Vipera wellingtoni* sp. nov. and *Vipera britoi* sp. nov. are defined as follows:

A viper of typical viperine form. It has a triangular-shaped head and distinct nose horn present, with small central head scales, excluding the large supraoculars and sometimes frontal. The rostral scale clearly extends onto the front of the nose-horn which is usually covered by less than nine scales. The raised section is usually covered behind by 4 or more scales, versus 2-3 in *Vipera aspis* (Linnaeus, 1758). The rostral scale is 1.5 to 2 times as deep as wide as compared to 1.5 times or less in *V. aspis*. There are usually 2 rows of scales between the eye and the supralabials. Usually, but not always 21 dorsal mid-body rows.

Colouration is usually a greyish ground colour, but may be brownish or sometimes reddish. The typical pattern is a wavy or zig-zag dorsal stripe with a darker edge. Belly is usually greyish or blackish, usually with lighter or darker spots. There is often some yellow on the underside of the tail.

*Vipera hoseræ* sp. nov. is readily separated from all the other species within the *V. latastei* species complex by the following unique suite of characters: An average of 134 ventrals (range 133-135), 38 subcaudals in males (range 35-43), 38 subcaudals in females (range 37-40), 7 apical scales (range 6-8), 8 loreals (range 7-9), 21 dorsal mid-body rows, and about a third of specimens have a fragmented nasorostral.

The dorsal mid body scale row count of *V. monticola* (Saint-Girons, 1954) is 19, which readily separates that taxon from *Vipera hoseræ* sp. nov., while the other African taxon *V. wellsi* sp. nov. is separated by having 23 dorsal mid-body rows (rarely 22 or 24).

The species *V. monticola* (Saint-Girons, 1954) is readily separated from all the other species within the *V. latastei* species complex by the following unique suite of characters: An average of 136 ventrals (range 134-138), 37 subcaudals in males (range 36-39), 37 subcaudals in females (range 35-40), 5 apical scales (range 4-6), 7 loreals (range 6-8), 19 dorsal mid body scale rows and the nasorostral is always entire.

The species *Vipera wellsi* sp. nov. is readily separated from all the other species within the *V. latastei* species complex by the following unique suite of characters: An average of 125 ventrals (range 121-130), 35 subcaudals in males (range 35-35), 35 subcaudals in females (range 32-37), 5 apical scales (range 4-6), 8 loreals (range 7-9), 23 dorsal mid-body rows (occasionally 22 or 24) and 80 per cent of specimens have a fragmented nasorostral.

All three non-Iberian species within the *V. latastei* complex can be readily separated from them by one or other of a combination of mid-body scale rows and apical scales, the like of which is not seen in Iberian animals, as well as the combinations of characters just given.

Only *V. hoseræ* sp. nov. has 21 dorsal midbody rows, a trait shared with Iberian animals, but it is separated from them by the significantly higher number of apical scales.

The species *Vipera britoi* sp. nov. is readily separated from all the other species within the *V. latastei* species complex by the following unique suite of characters: An average of 142 ventrals (range 139-147) this being the highest count within the species complex; 42 subcaudals in males (range 39-46), 35 subcaudals in females (range 33-36), 5 apical scales (range 4-6), 8 loreals (range 7-9), 21 mid-body rows and a nasorostral that is always entire. *Vipera britoi* sp. nov. also differs from all others in the *V. latastei* species complex by females not only having wider heads than in males, but also by the unique trait of having larger head areas than males.

The ground colour of *Vipera britoi* sp. nov. is usually a distinctive

silver-grey. The lower upper labials are whitish, with one or two dark triangles on them, with the base on the lip.

The species *Vipera wellingtoni* sp. nov. from the Sierra de Ronda Mountains, Spain, is identical in most respects to nominate *V. latastei* and *V. veloantoni* sp. nov. from the Sierra Nevada Mountains, Spain and separated from others in the *V. latastei* complex by the possession of the following unique suite of characters: An average of 139 ventrals (range 137-142), 42 subcaudals in males (range 39-44), 35 subcaudals in females (range 31-36), 5 apical scales (range 4-6), 7 loreals (range 6-8), 21 dorsal mid-body rows, nasorostral is usually entire.

In life, nominate *V. latastei* and *V. veloantoni* sp. nov. are characterised by an overall light greyish body colouration with a sharp edged zigzag pattern that is usually distinct, although red and brown specimens do occur. By contrast *Vipera wellingtoni* sp. nov. is almost always characterised by a strong reddish-brown colouration with or without a distinct zig-zag pattern.

*V. veloantoni* sp. nov. is characterised by a relatively thick white line across the rear upper labials, versus a thin line at the same point in *Vipera wellingtoni* sp. nov., which readily separates the two taxa.

By contrast nominate *V. latastei* is separated from both *V. veloantoni* sp. nov. and *V. wellingtoni* sp. nov. by the possession of a fading lightening on the rear upper labials as opposed to any distinct white line.

Differently however, specimens of *V. latastei* from the north-east of Spain are characterised by a distinctive white bar running along the entire upper labial, which is also not seen in either of the other two species or for that matter any other Spanish species in the *V. latastei* complex.

*Vipera wellingtoni* sp. nov. is the largest species in the complex, with the following average sizes for each sex being 452.2 mm for males and 424.5 mm for females. In West Iberian and Catalonia, nominate female *V. latastei* do sometimes average larger sizes than for *Vipera wellingtoni* sp. nov., but this is not the case in males from anywhere.

The species *Vipera gaditana* (Saint Girons, 1977) is readily separated from all the other species within the *V. latastei* species complex by the following unique suite of characters: An average of 131 ventrals (range 130-133), (lower than for all other Spanish species in the *V. latastei* complex), an average of 37 subcaudals in females (range 34-42), (being lower than for all other Spanish species in the *V. latastei* complex), 6 apical scales (range 5-7), 11 loreals (range 9-14), (being higher than for all other Spanish species in the *V. latastei* complex), 21 dorsal midbody rows and less than 25 per cent of specimens have a fragmented nasorostral.

The species from Africa as well as *Vipera gaditana* (Saint Girons, 1977) are separated from the other species by an increased division of cephalic scales as compared to the other taxa.

All the above defined species taxa are allopatric in distribution, three being found in North Africa and five on the Iberian Peninsula.

**Distribution:** Restricted to the northern part of the Western Iberian Peninsula. It is believed that a population of the species may also occur in the south-west Iberian Peninsula as well.

**Etymology:** Named in honour of José C. Brito, of CIBIO, Centro de Investigação em Biodiversidade e Recursos Genéticos, Universidade do Porto, Campus Agrário de Vairão, Rua Padre Armando Quintas, nº 7, 4485-661 Vairão, Portugal, in recognition of his services to herpetology, in particular the taxa relevant to this paper.

**SPECIES VIPERA VELOANTONI SP. NOV.**

**Holotype:** A specimen at the Museum of Natural History (Museum d'Histoire naturelle) Geneva, Switzerland (MG), number 1353.02, from Sierra Nevada, Spain. This is a government-owned facility that allows access to its holdings.

**Paratype:** A specimen at the Museum of Natural History (Museum d'Histoire naturelle) Geneva, Switzerland (MG), number 1353.03, from Sierra Nevada, Spain. This is a government-owned facility that allows access to its holdings.

**Diagnosis:** The species *Vipera latastei* Bosca, 1878, including the taxa *V. gaditana* (Saint Girons, 1977), *V. monticola* (Saint-Girons, 1954), *Vipera hoseræ* sp. nov., *Vipera wellsi* sp. nov., *Vipera wellingtoni* sp. nov. and *Vipera britoi* sp. nov. are defined as follows:

A viper of typical viperine form. It has a triangular-shaped head and distinct nose horn present, with small central head scales, excluding the large supraoculars and sometimes frontal. The rostral scale clearly extends onto the front of the nose-horn which is usually covered by less than nine scales. The raised section is usually covered behind by 4 or more scales, versus 2-3 in *Vipera aspis*

(Linnaeus, 1758). The rostral scale is 1.5 to 2 times as deep as wide as compared to 1.5 times or less in *V. aspis*. There are usually 2 rows of scales between the eye and the supralabials. There is usually, but not always 21 dorsal mid-body rows.

Colouration is usually a greyish ground colour, but may be brownish or sometimes reddish. The typical pattern is a wavy or zig-zag dorsal stripe with a darker edge. Belly is usually greyish or blackish, usually with lighter or darker spots. There is often some yellow on the underside of the tail.

*Vipera hoserae* sp. nov. is readily separated from all the other species within the *V. latastei* species complex by the following unique suite of characters: An average of 134 ventrals (range 133-135), 38 subcaudals in males (range 35-43), 38 subcaudals in females (range 37-40), 7 apical scales (range 6-8), 8 loreals (range 7-9), 21 dorsal mid-body rows, and about a third of specimens have a fragmented nasorostral.

The dorsal mid body scale row count of *V. monticola* (Saint-Girons, 1954) is 19, which readily separates that taxon from *Vipera hoserae* sp. nov., while the other African taxon *V. wellsi* sp. nov. is separated by having 23 dorsal mid-body rows (rarely 22 or 24).

The species *V. monticola* (Saint-Girons, 1954) is readily separated from all the other species within the *V. latastei* species complex by the following unique suite of characters: An average of 136 ventrals (range 134-138), 37 subcaudals in males (range 36-39), 37 subcaudals in females (range 35-40), 5 apical scales (range 4-6), 7 loreals (range 6-8), 19 dorsal mid body scale rows and the nasorostral is always entire.

The species *Vipera wellsi* sp. nov. is readily separated from all the other species within the *V. latastei* species complex by the following unique suite of characters: An average of 125 ventrals (range 121-130), 35 subcaudals in males (range 35-35), 35 subcaudals in females (range 32-37), 5 apical scales (range 4-6), 8 loreals (range 7-9), 23 dorsal mid-body rows (occasionally 22 or 24) and 80 per cent of specimens have a fragmented nasorostral.

All three non-Iberian species within the *V. latastei* complex can be readily separated from them by one or other of a combination of mid-body scale rows and apical scales, the like of which is not seen in Iberian animals, as well as the combinations of characters just given.

Only *V. hoserae* sp. nov. has 21 dorsal midbody rows, a trait shared with Iberian animals, but it is separated from them by the significantly higher number of apical scales.

The species *Vipera britoi* sp. nov. is readily separated from all the other species within the *V. latastei* species complex by the following unique suite of characters: An average of 142 ventrals (range 139-147) this being the highest count within the species complex; 42 subcaudals in males (range 39-46), 35 subcaudals in females (range 33-36), 5 apical scales (range 4-6), 8 loreals (range 7-9), 21 mid-body rows and a nasorostral that is always entire. *Vipera britoi* sp. nov. also differs from all others in the *V. latastei* species complex by females not only having wider heads than in males, but also by the unique trait of having larger head areas than males.

The ground colour of *Vipera britoi* sp. nov. is usually a distinctive silver-grey. The lower upper labials are whitish, with one or two dark triangles on them, with the base on the lip.

The species *Vipera wellingtoni* sp. nov. from the Sierra de Ronda Mountains, Spain, is identical in most respects to nominate *V. latastei* and *V. veloantoni* sp. nov. from the Sierra Nevada Mountains, Spain and separated from others in the *V. latastei* complex by the possession of the following unique suite of characters: An average of 139 ventrals (range 137-142), 42 subcaudals in males (range 39-44), 35 subcaudals in females (range 31-36), 5 apical scales (range 4-6), 7 loreals (range 6-8), 21 dorsal mid-body rows, nasorostral is usually entire.

In life, nominate *V. latastei* and *V. veloantoni* sp. nov. are characterised by an overall light greyish body colouration with a sharp edged zigzag pattern that is usually distinct, although red and brown specimens do occur. By contrast *Vipera wellingtoni* sp. nov. is almost always characterised by a strong reddish-brown colouration with or without a distinct zig-zag pattern.

*V. veloantoni* sp. nov. is characterised by a relatively thick white line across the rear upper labials, versus a thin line at the same point in *Vipera wellingtoni* sp. nov., which readily separates the two taxa.

By contrast nominate *V. latastei* is separated from both *V. veloantoni* sp. nov. and *V. wellingtoni* sp. nov. by the possession of a fading lightening on the rear upper labials as opposed to any distinct white line.

Differently however, specimens of *V. latastei* from the north-east of

Spain are characterised by a distinctive white bar running along the entire upper labial, which is also not seen in either of the other two species or for that matter any other Spanish species in the *V. latastei* complex.

*Vipera wellingtoni* sp. nov. is the largest species in the complex, with the following average sizes for each sex being 452.2 mm for males and 424.5 mm for females. In West Iberian and Catalonia, nominate female *V. latastei* do sometimes average larger sizes than for *Vipera wellingtoni* sp. nov., but this is not the case in males from anywhere.

The species *Vipera gaditana* (Saint Girons, 1977) is readily separated from all the other species within the *V. latastei* species complex by the following unique suite of characters: An average of 131 ventrals (range 130-133), (lower than for all other Spanish species in the *V. latastei* complex), an average of 37 subcaudals in females (range 34-42), (being lower than for all other Spanish species in the *V. latastei* complex), 6 apical scales (range 5-7), 11 loreals (range 9-14), (being higher than for all other Spanish species in the *V. latastei* complex), 21 dorsal midbody rows and less than 25 per cent of specimens have a fragmented nasorostral.

The species from Africa as well as *Vipera gaditana* (Saint Girons, 1977) are separated from the other species by an increased division of cephalic scales as compared to the other taxa.

All the above defined species taxa are allopatric in distribution, three being found in North Africa and five on the Iberian Peninsula.

**Distribution:** Centred on the Sierra Nevada, southern Spain and immediately adjacent mainly hilly habitat to the north.

**Etymology:** Named in honour of Guillermo Velo-Antón of Centro de Investigação em Biodiversidade e Recursos Genéticos, Universidade do Porto, Campus Agrário de Vairão, R. Padre Armando Quintas, 4485-661 Vairão, Portugal, in recognition of his services to herpetology, in particular the taxa relevant to this paper.

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#### CONFLICT OF INTEREST

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