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Nomenclatural historians are kindly requested to respect the intent of the *Code*: "Nomenclatural parsimony" and the case of the Nose-horned Viper, *Vipera ammodytes* (Linnaeus, 1758)

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Abstract

Scientific biological nomenclature underpins all knowledge exchange on biodiversity and works best when the names of organisms are stable. However, science-driven changes to zoological nomenclature are essential to reflect advances in knowledge. In contrast, process-driven changes resulting from historical discoveries followed by strict application of the *Code* can destabilise nomenclature without representing any gain in taxonomic knowledge. We illustrate this problem using the example of the European Nose-horned Viper, *Vipera ammodytes* (Linnaeus, 1758): its Linnaean type was recently reassessed and found not to originate from the western Balkans, as long assumed, but from near Istanbul, European Türkiye. The transfer of the name *V. ammodytes ammodytes* from its long-standing prevailing usage to the eastern subspecies widely known as *V. a. montandoni* Boulenger, 1904 would greatly impede the interpretation of a large body of literature and complicate communication about an iconic, widely known venomous snake of public health importance. We emphasise the imperative of nomenclatural parsimony (i.e., the need to minimise changes) when deciding between different possible courses of action required by historical discoveries. We urge researchers into nomenclatural history to safeguard long-established, widely used names, including through petitions to the International Commission on Zoological Nomenclature.

Key words: taxonomy, nomenclature, herpetology, Viperidae, Linnaeus, nomenclatural stability, nomenclatural history, nomenclatural parsimony

Introduction

Zoological nomenclature exists to allow universal communication about animal taxa by providing unique, unambiguous, and universal labels for recognised units of biodiversity. The procedure for allocating scientific names to animal taxa identified through taxonomic research (but not the research itself) is governed by the *International Code of Zoological Nomenclature* (hereafter the *Code*) (International Commission on Zoological Nomenclature 1999, 2012).

Stability is key. To ensure stability, scientific names should remain inviolate unless new phylogenetic insights and discoveries of additional units of biodiversity need to be accommodated (Hillis 2019, 2020; Jiménez-Mejías *et al.* 2024; Mayr *et al.* 1971; Vences *et al.* 2013). Changes in the scientific names of animals can impede communication and information retrieval (Carrasco *et al.* 2016), the establishment of much-needed species lists (Lien *et al.* 2023; Thiele *et al.* 2021), and the formulation and implementation of conservation legislation (Zhou *et al.* 2016). There is therefore a strong case for minimising disruption to existing names (Hillis 2019; Vences *et al.* 2013) to enhance stability and facilitate information retrieval and communication.

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Nomenclatural parsimony. We propose the term "nomenclatural parsimony" ("economy of change" sensu Vences *et al.* 2013) for the principle that taxonomists should choose the pathway requiring the fewest changes to established nomenclature when change is necessary to reflect new discoveries. In the words of Hillis (2019: Fig. 1), "How can you fix the problem with the least disruption to the current taxonomy? ➔ Fix it ➔ Then leave the nomenclature the #@%& alone!".

Science-driven or process-driven? Nomenclatural instability arises for two distinct reasons: science-driven changes resulting from scientific developments improving our understanding of biological diversity, and process-driven changes based solely on the interaction of nomenclatural history and the regulatory framework of the *Code*.

'Science-driven' reasons for changes to the binominal name of a species may include the splitting of a species, or the assignment of a species to a different genus based on a reassessment of its phylogenetic affinities. While the underlying science or its translation into nomenclature may be contentious in some cases (Hillis 2019; Thiele *et al.* 2021; Vences *et al.* 2013), there is broad agreement that nomenclature should change to reflect our developing understanding of global biodiversity: the gain in systematic knowledge is felt to outweigh the cost in lost stability.

In contrast, what we here term 'process-driven' changes are nomenclatural adjustments prompted not by scientific findings but by reevaluating historical facts and acts and implementing their nomenclatural consequences as dictated by the *Code*. These include, but are not restricted to, reidentifications of type specimens, redefinitions of type localities, rediscoveries of forgotten synonyms or long-lost types, the re-gendering of genus names, reclassification of species epithets as nouns or adjectives, etc. All have in common that the cost in lost stability is high and not offset by a gain in biological knowledge. While such process-driven changes may cause little confusion within the specialist taxonomic community (e.g., Dubois 2010), in the case of more widely known and discussed species, they are likely to be perceived as an impediment by most of the wider user community and should be considered undesirable and minimised (e.g., Avella *et al.* 2025).

What does the *Code* say? The desire for nomenclatural parsimony and the avoidance of process-driven changes to nomenclature is expressed in multiple passages and several provisions of the *Code*. Most notably, the Preamble of the *Code* highlights as its aim "to promote stability and universality in the scientific names of animals and to ensure that the name of each taxon is unique and distinct. All its provisions and recommendations are subservient to these ends". Moreover, the Preamble also stresses that the key principles on which the *Code* rests can be set aside where their strict application threatens the stability of "a long-accepted name in its accustomed meaning". Similar statements are found in the introduction and Appendix B (General Recommendations) of the *Code.*

However, despite these clearly stated objectives, process-driven changes to established names remain common, and most likely more so than necessary (Böhme *et al*., in press). Two of the key concepts of the *Code* are the Principle of Priority, whereby the oldest validly published name for a taxon must be used, and the Type Concept, where the name-bearing type of a taxon is the specimen or group of specimens to which the name is anchored. These two concepts should theoretically ensure a stable nomenclature: with a fixed starting point (Linnaeus 1758), there can only be one, or at most a few, equally oldest available names for a taxon (in the latter case, the Principle of the First Reviser then allows a choice—*Code*, Art. 24.2), and, theoretically, a name-bearing type should unambiguously tie a nomen to a biological entity.

While the Principle of Priority and the Type Concept should ensure that each biological lineage is known by a single, universal nomen, the vagaries of the long history of naming animals may impose a significant burden of historical research on taxonomists. For instance, identifying name-bearing types often necessitates extensive research into the geographical origin, current location, and/or historical fate of old specimens to resolve complex problems of nomenclature (e.g., Bauer & Günther 2013; Dubois *et al.* 2024; Fritz & Schmidtler 2020; Wüster *et al.* 2024; Wüster & Tillack 2023).

Beyond targeted enquiries, purely curiosity-driven research into the nomenclatural history of a taxon may also reveal that the conjunction of the Type Concept and the Principle of Priority can generate nomenclatural instability by upending long-established and widely used scientific names. For instance, the discovery of overlooked older synonyms, the rediscovery of types previously believed to be lost, or the identification of name-bearing types as belonging to a different taxon than previously assumed (e.g., Holycross *et al.* 2008; Rösler *et al.* 2019) can all lead to either the replacement of well-established names by forgotten older names, or their assignment to different taxa than their previous use. Only an appeal to the Commission under Art. 81, a route requiring considerable effort (Rösler *et al.* 2025), can then perhaps rectify the situation.

To support its stated aim of "Stability and Universality" and prevent established, commonly used names from being destabilised, the *Code* contains multiple mechanisms to preserve prevailing usage against the literal interpretation of the *Code*. For instance, Article 23.9 prevents forgotten names unused since 1899 from displacing established names in prevailin g usage and allows taxonomists to fix the problem without referring it to the Commission. In other cases, the *Code* allows or even encourages authors to submit a request to the Commission in the *Bulletin of Zoological Nomenclature* (*BZN*) to set aside the relevant provisions of the *Code* and allow prevailing usage to be retained. Unfortunately, many authors making such discoveries seem reluctant to petition the Commission and instead leave the outcome to the default mandated by the unmoderated application of the *Code*, bringing about significant nomenclatural instability (Böhme *et al.*, in press).

The case of the Nose-horned Viper (*Vipera ammodytes*)

Overview of the *Vipera ammodytes* complex. As generally conceived, the widespread, iconic, and medically significant European Nose-horned Viper, *Vipera ammodytes* (Linnaeus, 1758), is distributed from northeastern Italy and southern Austria south and east to Greece, northern Anatolia, and Georgia. This species is iconic because of the protrusion on its snout, it is well-known to the general public, of conservation concern in several range countries (Happ *et al.* 1999; Happ & Wieser 2008; Plasinger *et al.* 2016; Tudor 2010), of public health importance due to the frequency of snakebites (Di Nicola *et al.* 2021; Dobaja Borak *et al.* 2023; Radonić *et al.* 1997) and therefore listed as a Category 1 species (Highest Medical Importance) for most range countries by the World Health Organization (2013), and it is the subject of a considerable body of toxinological literature (Georgieva *et al.* 2008; Križaj 2011; Osipov & Utkin 2023).

Vipera ammodytes was described by Linnaeus with "Habitat in Oriente" as the sole locality indication. For a long time, the type locality had been assumed to lie within the northwestern part of its range, namely the western Balkans, but it remained curiously ill-defined in the older literature (e.g., Boulenger 1896). Nevertheless, the northwestern populations have consistently been assigned to the nominate form, *V. a. ammodytes*, while three additional subspecies have been widely recognised since their descriptions: *V. a. meridionalis* Boulenger, 1903, from Greece and adjoining regions); *V. a. montandoni* Boulenger, 1904, from SE Romania, eastern Bulgaria, European Türkiye; and *V. a. transcaucasiana* Boulenger, 1913, from northern Anatolia and Georgia). This taxonomic arrangement has remained largely stable since Boulenger's descriptions (David & Ineich 1999; Di Nicola *et al.* 2021; Geniez 2018; Heckes *et al.* 2005; Klemmer 1963).

Further taxonomic refinements. Points of instability have revolved around science-driven rather than process-driven questions, including whether *V. a. montandoni* should be recognised as distinct from *V. a. meridionalis* (Golay *et al.* 1993; Heckes *et al.* 2005; Thanou *et al.* 2023; Tomović 2006), and whether *V. a. transcaucasiana* constitutes a distinct species (Nilson *et al.* 1999) or a subspecies of *V. ammodytes* (Geniez 2018; Ursenbacher *et al.* 2008). In addition, several colour variants in the northwestern parts of the range were recognised as additional subspecies: *V. a. gregorwallneri* Sochurek, 1974, *V. a. illyrica* Laurenti, 1768, and *V. a. ruffoi* Bruno, 1968. However, their recognition has remained an uncommon minority view in the literature that largely ceased after Tomović (2006) and Ursenbacher *et al.* (2008) demonstrated the cohesiveness of the northwestern populations (extending from southernmost Dalmatia to northeastern Italy).

Crucially, all previous revisions of the taxonomy of *V. ammodytes* neglected the fundamental step of exhaustively examining historical specimens and establishing the geographical origin of the Linnaean types for the species. Several authors attempted to restrict the type locality, and different options were retained by different subsequent authors. Mertens & Müller (1928) restricted the type locality to "Illyria" (i.e., the western Balkans), whereas Schwarz (1936) restricted it to Zara (now Zadar), Croatia, both without providing detailed reasoning and without legal basis (Dunn & Stuart 1951). Bruno (1968) stated that Linnaeus's physical specimen, UPSZTY 95, in the Uppsala collection, had been collected by Edvardo Carlesonio from below the walls of Castello Nuovo di Duino, Trieste, effectively selecting it as the lectotype of *V. ammodytes*, but he did not provide a source. None of these authors critically examined the Linnaean type. As a result, the attempted restrictions of the type locality of *V. ammodytes* to the northwestern parts of the range remained unchallenged and allowed *Vipera a. ammodytes* to become universally accepted as the trinomen for the northwestern populations.

To understand the usage pattern of these long-standing trinomina, we searched Google Scholar, as well as available books and other older sources, for all references containing the string "*Vipera ammodytes ammodytes*", and the terms *Vipera*, *ammodytes*, and *meridionalis,* and *Vipera*, *ammodytes*, and *montandoni*, verifying in each case that the names *meridionalis* and *montandoni* were indeed used as subspecific epithets for the relevant populations of *V. ammodytes*. As of 25 June 2025, this search has yielded 608 uses of the combination *Vipera ammodytes ammodytes*, 192 of *Vipera ammodytes montandoni*, and 346 of *Vipera ammodytes meridionalis*, all in the traditional sense outlined above (Table 1). Since the name *transcaucasiana* is not affected by any nomenclatural uncertainty, it was not included in this bibliographic analysis.

For the sake of clarity against a background of confusing proposals for nomenclatural changes, we will in the following paragraphs refer to the traditional concepts of *V. a. ammodytes*, *V. a. meridionalis*, *V. a. montandoni*, and *V. a. transcaucasiana* as the Northwestern, Southern, Eastern, and Trans-Caucasian Nose-horned Viper, respectively.

Science-based changes: Thanou *et al*. (2023). Recently, Thanou *et al.* (2023) analysed the genetic structure of the *V. ammodytes* complex using ddRADSeq-derived genome-wide single nucleotide polymorphisms (SNPs) and found a deep split between northwestern populations, from central Albania and Serbia northwestward, termed the North Balkan Clade (NBC), and a South Balkan Clade (SBC), which included the remaining populations from Greece and southeastern Romania to the Caucasus. The NBC corresponds to the previous concept of *V. a. ammodytes*, whereas the SBC regroups *V. a. meridionalis*, *V. a. montandoni*, and *V. a. transcaucasiana*. Additional genomic structure was uncovered within the SBC, but Thanou *et al.* drew no taxonomic conclusions (but see Cattaneo 2021 and Roussos 2015). Given the absence of admixture between the NBC and the SBC, Thanou *et al*. suggested that they should be considered as separate species, the NBC becoming *V. ammodytes* and the SBC *V. meridionalis*. Thanou *et al*. (2023) did not explicitly recommend for or against the recognition of subspecies, but noted that recognition of the traditional subspecies *meridionalis*, *montandoni*, and *transcaucasiana* as subspecies of *meridionalis* would be most compatible with their results. Dufresnes *et al.* (2024) adopted recognition of *V. meridionalis* as a species and *V. m. transcaucasiana* as its subspecies but did not mention the taxon *montandoni.* At the time of writing, they appear to be the only authors to have implemented the proposal of Thanou *et al*. On its own, the proposal of Thanou *et al*. (2023) would have limited implications for the nomenclature of the *V. ammodytes* complex and pose few problems for information retrieval: all recognised taxa would retain their key identifying specific or subspecific epithets, albeit as subspecies of *V. meridionalis* rather than *V. ammodytes* in the case of *montandoni* and *transcaucasiana*.

Process-based changes: an impactful type reassessment by Krecsák et al. (2024). In a remarkable and fascinating piece of historical sleuthing, Krecsák *et al.* (2024) upended this status quo when they determined that the origin of the Linnaean type of *V. ammodytes* (UPSZTY 95) lies in Belgrad Forest (Belgrad Ormanı), on the northwestern outskirts of Istanbul, Türkiye, rather than in the northwestern part of the range of the species. A morphological reanalysis of its taxonomic affinities confirmed its association with the Eastern Nose-horned Viper, hitherto called *V. a. montandoni*. As a result, under the provisions of the *Code*, the name *V. a. ammodytes* would be transferred from the Northwestern Nose-horned Viper to the eastern population (previously *V. a. montandoni*) (Figure 1), whereas what was *V. a. ammodytes* would become *V. a. illyrica* Laurenti, 1768, for which Krecsák *et al.* (2025a,b) proposed a neotype. If the Southern Nose-horned Viper (*meridionalis*) is considered distinct from the eastern taxon (formerly *montandoni*, now *ammodytes*), its name would remain unchanged as *V. a. meridionalis*; if the southern and eastern taxa are considered synonymous, *V. a. meridionalis* would become *V. a. ammodytes*, losing the epithet *meridionalis* that has received prominent use in the literature (Table 1). Implementation of the proposals of Thanou *et al.* (2023) together with those of Krecsák *et al*. (2024) would lead to the Northwestern Nose-horned Viper becoming *V. illyrica*, thereby losing all nomenclatural connection with the name *ammodytes.*

The combined nomenclatural impact of the proposals by Krecsák *et al*. (2024, 2025a,b) and Thanou *et al.* (2023) is dramatic, complex, and destabilising. A major source of uncertainty is the recognition or non-recognition of the eastern and southern taxa as distinct subspecies (Table 1). Given that the prior nomenclature would no longer map directly onto the new nomenclature proposed by Krecsák *et al*. (2024), hundreds of existing uses would be affected by the changes (Table 1). Contrasting with the upending of the nomenclature caused by the proposals of Krecsák *et al*., the name *illyrica* has, to the best of our knowledge, been used as valid only eleven times since the beginning of the 20th century (excluding Krecsák *et al*. 2024, 2025a,b), and always in addition to the simultaneous use of *V. a. ammodytes* in the same publication.

TABLE 1. Nomenclatural and bibliographic consequences of the nomenclatural changes to the *Vipera ammodytes* complex proposed by Krecsák *et al*. (2024, 2025). Taxa are referred to by the proposed common name in Row 2 for consistency. The consequences of several alternative scenarios and their consequences are modelled, based on the analysis of 1146 past uses of subspecific trinomina in 819 publications: recognition or non-recognition of the Southern and Eastern Nose-horned Vipers as different subspecies; recognition of the Northwestern Nose-horned Viper as a separate species from the remainder; and recognition or non-recognition of the Transcaucasian Nose-horned Viper as a separate species. The number of affected uses (n) is the number of uses of the name that would become outdated by a change to the lowest taxonomic rank, either as a species or as a subspecies. Simple changes in rank, between species and subspecies, are not counted, since the remaining stable nomen ensures continuing information transferability (e.g., a change of *V. a. meridionalis* to *V. meridionalis* is not counted because *meridionalis* is the continuing lowest-rank nomen; a change from *V. a. ammodytes* to *V. a illyrica* is counted because the nomen of the lowest rank changes).

A. Established Taxonomy					***n***
***Vipera ammodytes* as a single species**					
Common name for ease of cross-referencing	Northwestern Nose-horned Viper	Southern Nose-horned Viper	Eastern Nose-horned Viper	Transcaucasian Nose-horned Viper	
Main subspecies	*V. a. ammodytes* (Linnaeus, 1758)	*V. a. meridionalis* Boulenger, 1903	*V. a. montandoni* Boulenger, 1904	*V. a. transcaucasiana* Boulenger, 1914	
Number of uses in literature	608	346	192	n/a	0
Alternative classifications			*Vipera a. meridionalis*	*V. transcaucasiana*	192
Northwestern Nose-horned Viper as a distinct species from other lineages, following Thanou *et al*. (2023) and Dufresnes *et al*. (2024)					
Southern, Eastern, and Transcaucasian Nose-horned Vipers considered different subspecies	*V. ammodytes*	*V. m. meridionalis*	*V. meridionalis montandoni*	*V. meridionalis transcaucasiana*	0
B. Nomenclature following Krecsák *et al*. (2024)					
***Vipera ammodytes* as a single species**					
Southern and Eastern Nose-horned Vipers recognised as distinct subspecies, position of *transcaucasiana* open	*V. a. illyrica*	*V. a. meridionalis*	*V. a. ammodytes*	*V. a. transcaucasiana or V. transcaucasiana*	795
Southern and Eastern Nose-horned Vipers lumped into a single subspecies, position of *transcaucasiana* open	*V. a. illyrica*	*V. a. ammodytes*	*V. a. ammodytes*	*V. a. transcaucasiana or V. transcaucasiana*	1146
Northwestern Nose-horned Viper as a distinct species from other lineages, following Thanou *et al*. (2023)					
Southern, Eastern, and Transcaucasian Nose-horned Vipers recognised as distinct subspecies	*V. illyrica*	*V. a. meridionalis*	*V. a. ammodytes*	*V. a. transcaucasiana or V. transcaucasiana*	795

FIGURE 1. A problematic name change: under the proposals of (Krecsák *et al.* 2024), the name *Vipera ammodytes ammodytes* would pass from the Northwestern Nose-horned Viper (left – an individual from near Sarajevo, Bosnia and Hercegovina; Photo W. Wüster) to the Eastern Nose-horned Viper, hitherto widely known as *V. a. montandoni* (right – an individual from near Greci, Dobrogea, Romania; Photo A. Strugariu), causing many hundreds of past uses to become outdated and subject to confusion.

Seeds of nomenclatural confusion in toxinology. Implementing the proposals of Krecsák *et al*. (2024) would clearly have a profound impact on how the literature on the *V. ammodytes* complex is interpreted and sow the seeds of confusion for many years to come. In fact, these changes would make the scientific names used in at least 69% of the existing literature on the *V. ammodytes* complex outdated (Table 1). Moreover, the transfer of the name *V. a. ammodytes* from the Northwestern Nose-horned Viper that originally bore it to what was previously *V. a. montandoni* will cause grave difficulties for future workers seeking to compile and compare information on these taxa. Worse still, if the Eastern and Southern Nose-horned Vipers are deemed part of the same subspecies, which would be *V. a. ammodytes*, the entirety of the literature would be affected. In this context it is important to emphasise that the *Code* (Appendix B, Recommendation 1) explicitly states that "it is of especial importance that a name should not be transferred to a taxon distinct from that to which it is generally applied".

This confusion would be especially strongly felt in the toxinological literature, where the Nose-horned Vipers, particularly the northwestern and southern populations, are of considerable importance. These taxa differ profoundly in aspects of their venom composition: the dominant neurotoxin in the venom of the Northwestern Nose-horned Viper is the presynaptic monomeric phospholipase A_2 (PLA_2) ammodytoxin (Križaj 2011), whereas that of the Southern Nose-horned Viper is the postsynaptically active PLA_2 dimer vipoxin (Georgieva *et al.* 2008; Osipov & Utkin 2023). Both these taxa and their toxins have accumulated an extensive body of literature, with ammodytoxin in particular serving as a model reference toxin in the study of viperid phospholipases A_2 (Križaj 2011). Transferring the applicability of the combination *V. a. ammodytes* to the Southern and Eastern Nose-horned Vipers would represent a major source of confusion and impede communication and information retrieval for many years to come. Moreover, the toxinological literature has a long track record of being slow to adopt taxonomic innovation (Wüster & McCarthy 1996). It can therefore be anticipated that a confusing application of parallel systems of nomenclature would persist for many years.

This nomenclatural confusion could also confound antivenom distribution and purchases. Currently, multiple European antivenoms directed at *V. ammodytes* envenomations are available for the treatment of bitten patients (Lamb *et al.* 2017). There is no clinical or pre-clinical evidence of significant problems with a lack of cross-neutralisation across the subspecies of *V. ammodytes* (García-Arredondo *et al.* 2019), so a change in the nomenclature at subspecific level would have no consequences on treatment effectiveness. However, labelling of vials and changes of the medication package insert (summary of product characteristics) would become necessary should *V. illyrica* be recognised as a species in its own right, although this would also apply if the southern populations were recognised as *V. meridionalis*. Asynchronous changes in the use of nomenclature between producers and purchasers, such as national health ministries, could cause confusion when selecting antivenoms for national distribution in range countries.

Forestalling Nomenclatural Chaos

Author responsibilities and a case for the Commission. The reassessment of the geographical origin and affinities of the Linnaean name-bearing type of *Vipera ammodytes* (UPSZTY 95), its nomenclatural consequences, and the impact of those consequences on the wider community of users of scientific names represent a prime example of the need of authors of research into nomenclatural history to be mindful of the consequences of their actions. Article 75.6 is very clear and explicit in recommending that authors discovering "that the existing name-bearing type of a nominal species-group taxon is not in taxonomic accord with the prevailing usage of names and stability or universality is threatened thereby […] ***should*** maintain prevailing usage [Art. 82] and request the Commission to set aside under its plenary power [Art. 81] the existing name-bearing type and designate a neotype" [our emphasis]. Applying this to the case of the type of *V. ammodytes*, the *Code* thus clearly places the onus of action to maintain stability on Krecsák *et al*. (2024). Unfortunately, these authors did not follow this recommendation and instead invited other scientists concerned about the nomenclatural impact to go through the necessary steps.

In our view, the extent of prevailing usage of all three affected names in numerous fields outside the specialised systematic literature (Dubois 2010), and the disruption threatened by the new proposals, constitute an overwhelming case for the Commission to use its plenary power for the sake of nomenclatural stability. We are therefore in the process of petitioning the International Commission on Zoological Nomenclature to set aside the Linnaean holotype of *Coluber Ammodytes*, specimen UPSZTY 95, and to designate specimen NHMW 25274:6, from Trieste, Italy, as a neotype for the species. This specimen was described by Krecsák *et al.* (2025a,b), who designated it as the neotype of *Vipera Illyrica* Laurenti, 1768. Designation of the same specimen as neotype of *V. ammodytes* would have the effect of anchoring the name *ammodytes* to the Northwestern Nose-horned Viper, thus preserving prevailing usage, and *V. illyrica* would become an objective junior synonym of *V. ammodytes*. A request to set aside an extant Linnaean type is highly unusual, but not unprecedented (e.g., ICZN Case 3703: Nikolaeva *et al*. 2017; Opinion 2426: International Commission on Zoological Nomenclature, 2018). We strongly believe that there is an overwhelming case for this course of action to stabilise the nomenclature of this iconic, heavily studied, and widely discussed species.

While this Case is before the Commission, authors should follow Article 82.1 of the *Code* and maintain prevailing usage. The period during which a case to the Commission is officially under consideration (Article 82.1) only starts when receipt of the case is published in the *Bulletin of Zoological Nomenclature* (*BZN*) (Article 82.2). However, we here take the liberty of anticipating this process: the high volume of publications on the *V. ammodytes* complex creates the very real possibility of confusion if some but not all authors implement the nomenclatural consequences of Krecsák *et al*. (2024) prior to acknowledgement of receipt of the case.

Process-driven changes in nomenclature and the status and reputation of taxonomy. The case of the typification of the *V. ammodytes* complex illustrates the profound consequences that process-driven nomenclatural changes resulting from historical nomenclatural research can have on long-established scientific nomenclature. Here, a very thorough and historically fascinating piece of research threatens to destabilise the nomenclature of an iconic and much-discussed species complex of public health importance without adding anything to our knowledge of the biology of the species.

Most users of scientific names greatly value nomenclatural stability and ease of information retrieval and communication (Hillis 2019; Jiménez-Mejías *et al.* 2024; Mayr *et al.* 1971; Vences *et al.* 2013). This will certainly be the case for the large user community of toxinologists, for whom the *V. ammodytes* complex continues to be a rich source of material and research questions (Ferquel *et al.* 2007; Križaj 2011; Petrova *et al.* 2012). The excitement taxonomic historians may feel at the discovery of a type misidentification and its nomenclatural consequences is unlikely to be shared by those outside the taxonomic silo, who simply want stable labels for their study organisms. Changes to the nomenclature that do not reflect advances in knowledge are likely to be perceived as impediments rather than as helpful, leading to reputational damage to the entire discipline of taxonomy.

By describing, delimiting, and cataloguing the world's biodiversity, the science of taxonomy provides the essential underpinnings for all further research. Yet, the under-resourcing and undervaluation of taxonomy is a long-running issue (Ebach *et al.* 2011; Giangrande 2003; Löbl *et al.* 2023; Singh 2025). Faced with criticism over perceived taxonomic "anarchy" (Garnett & Christidis 2017), taxonomists have been emphatic in defending their science as a fully-fledged, rigorous scientific discipline with rich conceptual and theoretical underpinnings (Garnett *et al.* 2020; Thomson *et al.* 2018), rather than a service industry generating scientific names on demand (De Carvalho *et al.* 2005; Jackson *et al.* 2017).

However, this emphasis on taxonomy as a modern, hypothesis-driven and relevant scientific discipline is undermined by scenarios such as the one explored here, where the reassessment of an 18th century specimen, coupled with the seemingly arcane rules of the *Code*, disrupts the entire knowledge base of a medically, scientifically, and societally important group of animals. While taxonomy is indeed not an on-demand name factory, taxonomists would do well to remember that the esteem of their discipline is affected by its visible outputs, which for those outside taxonomy consist primarily of the scientific names of organisms. Actions have consequences: where process-driven changes to long-established nomenclature impede information retrieval and sow confusion without the benefit of conveying new biological insights, it is highly likely that the entire discipline will suffer reputational damage. It is virtually inevitable that this will ultimately affect its support and resourcing for taxonomy. We therefore argue that those researching the history of nomenclature have a responsibility to strive for the maximum possible economy of nomenclatural change, not only out of consideration for other users of nomenclature, but also out of self-interest, for the preservation of their own discipline.

Towards greater nomenclatural parsimony: making it easier to Do The Right Thing

While it is clearly essential for taxonomists to enact the principle of nomenclatural parsimony, it also behooves our discipline to consider ways of making Doing The Right Thing easier. While the *Code* exhorts taxonomists to petition the Commission to use its plenary powers to preserve prevailing usage, for instance in Article 75.6, the unfortunate reality is that this is a long-winded and complex process. Petitions to the Commission must be written, submitted to the *BZN*, and published there. Time is then required to receive and publish comments in subsequent issues, followed by another round of comments. Finally, the Commission must reach and publish its opinion in the *BZN*. This multi-stage process generally takes several years.

The do-it-yourself option. The Commission set a precedent for a more streamlined approach through the introduction of Article 23.9 in the 4th Edition of the *Code* in 1999. This allows a Do-It-Yourself approach, without recourse to the Commission, to the designation of *nomina oblita* if they have demonstrably remained unused since 1899 but threaten the status of a name widely used since 1900. Avella *et al.* (2025) suggested the introduction of similar rules for their concepts of *acta* and *facta oblita*, forgotten acts or facts, which, when rediscovered, threaten the stability of established names. The unexpected origin of the name-bearing type of *Vipera ammodytes*, reconstructed by Krecsák *et al*. (2024), would constitute one such *factum oblitum*. A provision analogous to Article 23.9, allowing the setting aside of types and the designation of neotypes without the need for a Commission opinion under certain clearly defined conditions, could reduce the procedural impediment to following the recommendations of Article 75.6. While the precise wordings and conditions of such provisions in a future edition of the *Code* require careful consideration and deliberation, it is our belief that they would significantly streamline the fulfilment of the aims of the *Code*.

Clearly, not all cases are suitable for such a fast-track process, and many will continue to require Commission intervention. However, here again, there is a need for simplifying and accelerating this process. In particular, we argue that streamlining the publication of cases, comments on cases, and Commission opinions would incentivise taxonomists to engage actively with the *Code* and the Commission, instead of allowing the *Code*-mandated default to perturb nomenclatural stability against the *Code*'s own recommendations.

The need for speed. The current process of publication of cases, comments, and opinions is lamentably slow. In most recent years, only a single issue of the *BZN* has appeared per annum. While the *BZN* unfortunately does not provide the dates of receipt and acceptance of submitted cases or comments, at least some of these must logically have waited a year or more from acceptance to publication. It also means that each case must wait at least one year for relevant comments to be published, and possibly another year or more for further comments or comments on comments, and another year, and sometimes much longer, for the Commission's Opinion to be published (7.5 years in the case of Case 3601; International Commission on Zoological Nomenclature 2021). In some cases, this delay has led to new realities becoming established and acquiring a momentum of their own, to the detriment of the universal acceptance of the *Code* (Wüster *et al.* 2021). In the 2020s, it seems anachronistic for accepted cases and comments on matters of acute current concern to be delayed by up to a year or more until publication. Changing the publication model of the *BZN* from one complete issue per year to a series of numbered individual articles, published online as soon as they have been accepted, would greatly accelerate the publication of cases without imposing restrictions on the crucial step of public scrutiny and commentary on such proposals.

Conclusions

It is not the intention of the authors to dismiss in any way the importance of research into the history of nomenclature, the discovery of taxa, and the life and work of early taxonomists and collectors. On the contrary, such research can help resolve complex problems in taxonomy where no prevailing usage exists (Dubois *et al.* 2024; Wüster *et al.* 2024). Moreover, papers such as those of Krecsák *et al.* (2024, 2025a) and many others provide fascinating glimpses into times gone by, into the lives and works of the pioneers who laid the foundations of our understanding of global biodiversity, and the hardships and sacrifices many had to endure (Denzer *et al.* 2025; O'Shea & Kaiser 2018). Equally, such research often shines a sobering light on the values, attitudes and practices of those bygone days, many of which most of us would abhor today (e.g., Molina 2001). There is intrinsic value in this research that enriches our understanding of the origins and development of our discipline. However, in our view, using this historical research to destabilise long-established and widely used scientific names, thereby impeding knowledge exchange in the middle of the ongoing biodiversity crisis, actually detracts from its value rather than adding to it, even though it may attract additional citations.

The case of the typification of *Vipera ammodytes* provides a poster child example of the potential impacts of process-driven nomenclatural changes on downstream users of scientific nomenclature and the consequences of author action or inaction to mitigate these impacts. We stress the need for authors of historical nomenclatural research to be mindful of the consequences of their findings, to abide by the principle of nomenclatural parsimony, and to follow the strong steer of the *Code*: process-driven nomenclatural changes are an impediment to the wider user community and ultimately harm the field of taxonomy itself. However, they can often be avoided by following the procedures suggested by the *Code* itself (Böhme *et al*., in press). Finally, we urge the International Commission of Zoological Nomenclature to identify ways of streamlining the procedures required to implement the strong recommendations of the *Code* for avoiding process-driven nomenclatural changes.

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