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# REVIEW

# Confronting taxonomic vandalism in biology: conscientious community self-organization can preserve nomenclatural stability

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Self-published taxon descriptions, bereft of a basis of evidence, are a long-standing problem in taxonomy. The problem derives in part from the Principle of Priority in the *International Code of Zoological Nomenclature*, which forces the use of the oldest available nomen irrespective of scientific merit. This provides a route to 'immortality' for unscrupulous individuals through the mass-naming of taxa without scientific basis, a phenomenon referred to as taxonomic vandalism. Following a flood of unscientific taxon namings, in 2013 a group of concerned herpetologists organized a widely supported, community-based campaign to treat these nomina as lying outside the permanent scientific record, and to ignore and overwrite them as appropriate. Here, we review the impact of these proposals over the past 8 years. We identified 59 instances of unscientific names being set aside and overwritten with science-based names (here termed aspidonyms), and 1087 uses of these aspidonyms, compared to one instance of preference for the overwritten names. This shows that when there is widespread consultation and agreement across affected research communities, setting aside certain provisions of the *Code* can constitute an effective last resort defence against taxonomic vandalism and enhance the universality and stability of the scientific nomenclature.

ADDITIONAL KEYWORDS: aspidonym – *International Code of Zoological Nomenclature* – nomenclatural stability – nomenclature – taxonomic vandalism – taxonomy – Principle of Priority.

*'Erfüllen wir eine Pflicht gegen die Wissenschaft, die H. v. M[otschulsky] zur Befriedigung seiner unbegrenzten Autoreitelkeit und Mihisucht missbraucht, wenn wir gewissenhaft die wenigen Körner der M.'schen Arbeitsspreu sammeln, seine Arten und Gattungen deuten, um dafür von ihm geschmäht zu werden, oder erfüllen wir eine Pflicht gegen uns selbst, wenn wir ihn in seinen Etudes zu seinem Privatvergnügen drucken lassen, was er will und die entomologischen Zeit- und Vereinsschriften rein von seinen Arbeiten halten, weil wir ihren Werth kennen gelernt haben?'*

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*[Are we fulfilling a duty towards science, [a subject] that [Mr von Motschulsky] abuses for the satisfaction of his unlimited author vanity and ego addiction, if we conscientiously pick the few grains out of the chaff that is M.'s [taxonomic] work, interpret his species and genera, only to then be abused by him for doing so, or do we fulfil a duty towards ourselves by letting him print in his Etudes whatever he wants for his private pleasure, and keep the entomological society journals free of his works, because we have recognized their true value?]*

*Ernst Gustav Kraatz, 1862*

## INTRODUCTION

The highly regarded evolutionary biologist and conservationist E. O. Wilson once described the species diversity of Planet Earth as one of a handful of 'measurements […] crucial to our ordinary understanding of the universe', yet also the one which we are furthest from resolving (Wilson, 1985). In the intervening decades, we have succeeded only partially in addressing this knowledge gap, a task that has become all the more pressing due to the rapid loss of biodiversity caused by humanity's accelerating destruction of natural habitats through direct exploitation, pollution and climate change (e.g. Isbell, 2010; Dirzo *et al.*, 2014; IBPES, 2019; Powers & Jetz, 2019). The branch of biology charged with filling this gap is taxonomy, the science of biodiversity discovery, description and classification.

### Taxonomic stability and developing knowledge

Understanding species diversity and distributions forms the cornerstone for the formulation and prioritization of conservation policy and resources (Li & Quan, 2017; Woinarski *et al.*, 2017). Scientific names provide a universal labelling system for biodiversity, linking biological entities with relevant data and literature (Hillis, 2007). Agreed species lists, anchored in scientific nomenclature, underlie assessments of conservation threat status (e.g. accounts in the *IUCN Red List of Threatened Species*) and regulatory instruments, such as the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) as well as national legislation, such as the Endangered Species Act in the USA (Garnett *et al.*, 2020). Species lists produced by applying scientific methods are thus an evidence-based labelling system that facilitates information retrieval.

Any labelling system functions best when both the labels and the entities they designate are constant rather than changing. Alas, stable, agreed taxonomic lists have remained an elusive goal in most taxonomic disciplines (Garnett *et al.*, 2020). The lack of standardized taxonomic practice has been singled out as a hindrance to conservation (Garnett & Christidis, 2017), with a call for control of taxonomic judgement and practice from outside the immediate discipline. While this proposal has met stiff resistance (e.g. Jackson *et al.*, 2017; Lambertz, 2017; Thomson *et al.*, 2018), it illustrates the desire for taxonomic and nomenclatural stability among user communities.

This desire for stability remains unfulfilled for several reasons, both scientific and procedural. The notion of unchanging definitions of units of biodiversity clashes with the scientific method that treats taxa as hypotheses to be tested and challenged with further evidence, revised and redefined as the science dictates (Camargo & Sites, 2013; Pante *et al.*, 2015). New methods or approaches may reveal cryptic diversity within previously widely recognized species, or cause us to redefine the contents of higher level taxa (Isaac *et al.*, 2004; Mace 2004). However, while this ongoing work of biodiversity discovery and description challenges the development of agreed, definitive species lists, and is not always immediately appreciated by conservation practitioners (e.g. Garnett & Christidis, 2017), it is essential for efforts to catalogue and conserve the diversity of life. Reconciling advances in knowledge with the requirement for stability in taxonomy and nomenclature has been a long-standing topic of discussion in taxonomy (Hillis & Wilcox, 2005; Hillis, 2007, 2019, 2020; Pauly *et al.*, 2009; Wallach *et al.*, 2009; Vences *et al.*, 2013; Carrasco *et al.*, 2016; Pinna *et al.* 2018; de Queiroz, 2020), with stability being one of several competing philosophical and practical priorities in the taxonomic community.

### Taxonomic stability, nomenclatural stability, the *International Code of Zoological Nomenclature*, and the problem of 'taxonomic vandalism'

Beyond the science-based changes in taxon names caused by our evolving knowledge of biodiversity, additional instability stems from the artefact of the administrative book-keeping process of zoological nomenclature (as distinct from the scientific discipline of taxonomy). The formal naming process of natural organisms is governed by three internationally agreed codes, the *International Code of Nomenclature for Algae, Fungi, and Plants* (Turland *et al.*, 2018), the *International Code of Nomenclature of Prokaryotes* (Parker *et al.*, 2019) and, in zoology, the *International*

*Code of Zoological Nomenclature* (hereafter 'the *Code*'). The *Code*, currently in its 4th edition (ICZN, 1999), is administered by the International Commission on Zoological Nomenclature (ICZN; hereafter 'the Commission'). The aims of the *Code*, as stated in its Preamble, 'are to promote stability and universality in the scientific names of animals and to ensure that the name of each taxon is unique and distinct.' The central importance of this aim is emphasized by the following sentence in the Preamble, which states that 'All [of the *Code*'s] provisions and recommendations are subservient to those ends […]'.

One of the foremost means of promoting stability is the Principle of Priority, whereby the oldest name for a taxon published in a manner consistent with the *Code* (i.e. the oldest 'available' name) must be used by subsequent authors, for example in species lists. Simultaneously, the Preamble of the *Code* emphasizes the separation between the science of taxonomy and the purely administrative nature of nomenclature: 'none [of the *Code*'s provisions] restricts the freedom of taxonomic thought or actions'. This means that the requirements for publication and availability of scientific names laid out in the *Code* are purely procedural, and not related to the quality of the supporting scientific evidence: the science and ethics underlying the establishment of a new taxon name do not affect whether it is available or not – only adherence to the *Code*-mandated procedures counts. Nevertheless, the scientific work of subsequent authors becomes restricted because they are obliged to use the oldest available name by the *Code*.

The Principle of Priority, established on the assumption of good faith among taxonomists (Yanega in Jones, 2017), can thus become a loophole for unscrupulous authors who deliberately establish names by eschewing the scientific process while remaining consistent with the *Code*'s formal book-keeping requirements, usually in unreviewed and often self-published outlets. The Principle of Priority then forces later users to adopt these scientifically or ethically questionable names for taxa in need of a scientific name if no older available name exists. There is no other field of science in which the community of affected scientists is obliged to accept and follow the results of work produced outside a system of external critical review, and without supporting evidence. By making their nomenclatural creations available in perpetuity, the Principle of Priority thus bestows a degree of scientific immortality on authors of unscientific work that would simply be ignored in other disciplines. In other words, unethical use of the *Code* provides a loophole through which the nomenclatural products of unscientific and often unethical work can enter the scientific mainstream and acquire an unwarranted veneer of permanent scientific credibility.

This opportunity for self-immortalization has led a small number of authors to flood the literature on some organismal groups with large numbers of scientifically unfounded and often ethically objectionable new names for a plethora of taxa, but without providing adequate – or any – scientific justification. This taxonomic shotgun approach can involve the unsupported, speculative description of taxa based on distribution gaps or superficial differences, scooping the discoveries of other authors, or 'clade harvesting' from published phylogenies, in most cases without the generation of new data or new analyses, or even the examination of proposed type specimens. This phenomenon has existed throughout the history of taxonomy, often with long-lasting consequences. For instance, the notorious late 19th century 'Nouvelle École' in malacology continues to bedevil attempts to generate species lists of European molluscs (Dance, 1970; Bouchet, 2006). The exaggerated penchant for poorly justified taxon descriptions was termed the 'mihi itch' by the American coleopterist George Horn in 1884 (Anonymous, 1884; see history in Evenhuis, 2008), perhaps based on German entomologist Ernst Gustav Kraatz's (1862) earlier use of the German term *Mihisucht* (= ego addiction). Later authors termed the phenomenon 'nominomania' (Trewavas, 1957), 'nomenclatural mihilism' (Bruun, 1950; Dubois, 2008) or 'taxonomic vandalism' (Wells & Wellington, 1984; Jäch, 2007), the last of these having become the most widely used.

Taxonomic vandalism, or the threat thereof, constitutes a significant impediment to taxonomic research and communication across the spectrum of biodiversity (Borell, 2007; Jäch, 2007; Pillon & Chase, 2007; Oliver & Lee, 2010; Kaiser *et al.*, 2013; Páll-Gergely *et al.*, 2019). While ignoring these names until they are later validated through evidence-based science is common practice (Davis, 2004; World Spider Catalog, 2020), this becomes problematic during the elaboration of checklists (Bouchet, 2006), when the question of which questionable taxa to recognize and which to synonymize becomes a central issue: the nature of these lists forces authors to make a choice, although there is a case for stronger representation of alternative viewpoints and explanations of the underlying evidence even in checklists (Pauly *et al.* 2009). This can result in conflicting, parallel systems of nomenclature that hinder information retrieval (e.g. Meiri & Mace, 2007; Wüster & Bérnils, 2011; Pinna *et al.* 2018), generate uncertainty regarding the status of taxa and the appropriate name to use (e.g. Inagaki *et al.*, 2010, 2012), complicate the compilation of authoritative checklists required by policymakers and other biodiversity stakeholders (Davis, 2004; Bouchet, 2006), and, given the widespread desire for a stable, universal system of nomenclature, ultimately erode the scientific credibility of taxonomy (Kaiser, 2013).

Beyond nomenclature, unethical vandalism can also distort the scientific practice of taxonomy and the communication of new findings. Publishing papers in high-impact journals is crucial for academic career advancement, but these journals prioritize broad, conceptual work, such as phylogenies coupled with evolutionary or biogeographical analyses, over revisionary or descriptive taxonomy. However, publishing results that hint at the existence of unnamed lineages incurs the risk of losing the descriptions of these taxa to taxonomic kleptoparasitism (Oliver & Lee, 2010). Critically and individually assessing what often amounts to a flood of unscientific names, as required by the *Code* (e.g. Iverson *et al.*, 2001), or even just publishing critiques (e.g. Denzer *et al.*, 2016), wastes precious time and resources that would be better spent on scientific biodiversity research (Dubois, 2008). Moreover, this unproductive endeavour is incompatible with the present-day exigencies of academic career progression. This in turn potentially discourages desperately needed revisions of afflicted taxa, and ultimately deters researchers from a career in taxonomy, undermining efforts to describe our planet's biodiversity (Werner, 2006; Ebach *et al.*, 2011). By giving nomenclatural precedence to unjustified taxon names through its focus on purely procedural matters, the *Code* thus unwittingly enables taxonomic vandalism, begetting a toxic legacy of unscientific and unethical names that taint and undermine the practice and reputation of taxonomy as a whole. However, despite the long-standing recognition of the phenomenon and the widely acknowledged burden of the resulting 'synonymy load' (Dubois, 2008), we still lack a widely accepted mechanism for overcoming the problem presented by the large-scale establishment of nomina without a basis of evidence.

## Taxonomic vandalism in herpetology

Among zoological disciplines, herpetology has had to bear more than its fair share (i.e. its per-taxon name share) of unscientific taxonomy, from the 19th century to the present day. Some may say it is not possible to define what a 'fair share', or an expected share of taxonomic vandalism in a zoological discipline is. However, we argue that one may gauge the impact of taxonomic vandalism by considering what proportion of taxa in the entire discipline were illicitly created. Among reptiles, this number currently is *c.* 11% (1500 problem names out of a total of *c.* 14 000 reptile names listed on the *Reptile Database*), whereas it is estimated to be near 1% (*c.* 3000 problem names out of a total of *c.* 350 000 names; Stork *et al.* 2015) in beetles. Note that these are 'name comparisons' (taking all taxon names collectively), not 'entity comparisons' (discriminating on the basis of taxon level).

This surfeit of unscientific taxonomy applies both to palaeoherpetology (e.g. Dalton, 2008) as well as to the study of extant amphibians and non-avian reptiles, this review being focused on the latter. Thus, Boulenger (1885) described the publications of Queensland Museum curator Charles Walter De Vis as 'painful' and likely to 'do much harm'. German amateur herpetologist Albert Franz Theodor Reuss described dozens of scientifically unfounded taxa of viperid snakes in the 1920s and 1930s (Krecsák, 2007). Wells & Wellington (1984, 1985a, b) introduced industrial-scale mass naming of new taxa through a self-published and self-edited journal, naming 256 new taxa, including genera, species and subspecies, of Australian and New Zealand reptiles and amphibians. This resulted in attempts to suppress the works through a proposal to the ICZN (The President, Australian Society of Herpetologists, 1987), but the Commission declined to issue an opinion on this case, as it was taxonomic rather than nomenclatural in nature (ICZN, 1991). Every name proposed by Wells and Wellington must therefore be treated as published, and its availability assessed individually (e.g. Iverson *et al.*, 2001). This has resulted in a troublesome taxonomic burden with problems that persist to this day, including continuing controversy about the availability of some names, and in some cases dual, parallel nomenclatures for the same taxa (e.g. Williams *et al.*, 2006; Cogger, 2014; Maddock *et al.*, 2015; Wellington, 2016; Kaiser *et al.* 2020; Wüster, in press).

More recently and ongoing, the Australian author Raymond Hoser has taken the phenomenon to new levels, reminiscent of the aforementioned 'Nouvelle École' in malacology. As of January 2021, Mr Hoser is responsible for 1795 new nomina since the year 2000, of which 1453 are for reptiles, but also including 290 for frogs, four for spiders, two for fish and 46 for mammals, at a mean rate of 191.7 names per annum since 2012 (Table 1). All of these are single-authored, and all but 41 appeared in the self-published, self-edited and unreviewed *Australasian Journal of Herpetology* (hereafter *AJH*). As a result of these articles not following normal scientific publication practice, we do not consider Hoser's self-published works part of the scientific literature but they are available in Appendix 1 for our readers' information. Furthermore, throughout this review, Hoser taxon names are placed in quotation marks and not italicized to indicate that they are not used as valid nomina.

A number of recent names have contained attempts at toilet humour (e.g. 'Colleeneremia dunnyseat') or offensive terms (e.g. *Simoselaps* 'fukdat'), sometimes explained with disrespectful references to members of indigenous communities and their languages, in clear breach of Section 4 of the *Code*'s Code of Ethics. In addition, Hoser's papers are replete with

**Table 1.** New taxon names proposed by Raymond Hoser between 2000 and October 2020, by rank (left) and year (right)

| Taxon descriptions by rank | | Taxon descriptions by year | |
|---|---|---|---|
| Rank | Number of new names | Year (s) | Number of new names |
| Species | 582 | 2000–2011 | 70 |
| Subspecies | 228 | 2012 | 282 |
| Genus | 340 | 2013 | 255 |
| Subgenus | 333 | 2014 | 149 |
| Tribe | 173 | 2015 | 134 |
| Subtribe | 113 | 2016 | 115 |
| Family | 11 | 2017 | 94 |
| Subfamily | 13 | 2018 | 147 |
| Superfamily | 2 | 2019 | 145 |
| | | 2020 | 404 |
| **Total** | 1795 | | 1795 |

defamatory comments and accusations against anyone critical of his work, using intemperate and incendiary language clearly unacceptable in published scientific discourse. Moreover, Denzer *et al.* (2016) have shown that a large proportion (up to 80%) of Hoser's diagnoses and other sections of text appear to be "plagiarized" from academic sources (see also World Spider Catalog, 2020). The problems of Hoser's work have been discussed extensively (Aplin, 1999; Wüster *et al.*, 2001; Kaiser *et al.*, 2013; Kaiser, 2014; Rhodin *et al.*, 2015; Denzer *et al.*, 2016), and have also attracted considerable attention outside the specialist literature (Borell, 2007; Naish, 2013; Jones, 2017).

## Herpetology fights back: Kaiser *et al.* (2013)

The extent and rapid expansion of taxonomic vandalism in herpetology pose a critical threat to the viability of herpetological taxonomy and the reputation of the scientific enterprise in taxonomy. Given the lack of prospects for effective action by the Commission, a group of concerned herpetologists carried out a year-long consultation of herpetological stakeholders, and garnered widespread support across the community for an unprecedented, last resort call for action to defend the discipline. The resulting peer-reviewed Point of View (Kaiser *et al.*, 2013) was formally endorsed (by membership or executive committee votes) by 11 major international herpetological associations, including the World Congress of Herpetology, prior to publication. At its heart lay an appeal to reflect the unscientific and unethical nature of Mr Hoser's publications and names by treating them as lying outside the permanent scientific record (it is a requirement of the *Code* that taxonomic works must be produced for the permanent scientific record), and thus unavailable for nomenclatural purposes, pending a decision by the Commission. The recommendations of Kaiser *et al.* (2013) were also adhered to by the editorial teams of a multitude of scientific journals, either as a matter of policy (e.g. Measey, 2013) or in practice.

The publication of Kaiser *et al.* (2013) and a follow-up paper (Kaiser, 2014) led to multiple subsequent evidence-based taxon descriptions that treated Hoser's names as unavailable, and overwrote them with new, scientifically and ethically acceptable names. We propose the term aspidonym, or shielding name (from Greek *ασπίς* = shield, in reference to their role in shielding taxonomy and nomenclature from the impact of vandalism), for these names and use the term 'overwriting' for the act of replacing unscientific names with aspidonyms.

The proposals of Kaiser *et al.* (2013) and the subsequent overwritings of unfounded nomina caused understandable concerns over the possible weakening of the universal acceptance of the *Code* and the possibility of dual systems of nomenclature for many reptile taxa. Expressions of concern or disapproval appeared in the formal scientific literature (Cogger, 2014; Dubois, 2015; Cogger *et al.*, 2017, Dubois *et al.*, 2019), but especially in email discussion lists related to taxonomy and the *Code*.

## Assessing the impact of Kaiser *et al.* (2013)

The passing of 8 years since the publication of Kaiser *et al.* (2013), as well as the coming of age of the 4th edition of the *Code*, seems an opportune time to review

the impact of these recommendations on the stability and universality of the scientific nomenclature of reptiles and amphibians. We address this through surveys of the literature based on explicit, repeatable search criteria, designed to answer the following questions: (1) To what extent, in terms of establishment of taxon names and their subsequent usage, has the herpetological community rallied behind the recommendations of Kaiser *et al.* (2013)? (2) Have the recommendations of Kaiser *et al*. led to potentially confusing parallel systems of nomenclature, as feared by some critics, or has it produced a stable, science-based nomenclature?

To assess the reception of Kaiser *et al.* (2013) and Kaiser (2014), we searched for all publications citing these papers through Google Scholar, Web of Knowledge and ResearchGate, as well as opportunistic searches of books (e.g. Cogger, 2014). The discussion of these papers was scored for their overall tone (positive, neutral, negative), and any particularly pertinent comments were noted.

To assess the impact of the Kaiser papers' exhortation to ignore certain unscientific names coined since 2000, we compiled a list of overwritten names and their aspidonyms from the literature, as well as Hoser's website [http://www.smuggled.com/2-6-Synonyms-table-2019.pdf] and social media posts. For each taxon, we searched Google Scholar, the taxonomic index for *Herpetological Review* (Society for the Study of Amphibians and Reptiles, 2020), and published scholarly books such as field guides, volumes of peer-reviewed contributed papers, and faunal treatises available to us, for uses of both the overwritten name and the corresponding aspidonym as valid names for the taxon. In all cases, the full text of each paper was searched to verify that the name had been used as the valid name for a taxon, not as a synonym or in a discussion of the relative merits of different names. The few publications we were unable to source in full were not included in subsequent analyses. We included all papers published in the primary scientific literature, including papers published online as accepted manuscripts, and on preprint servers such as BioRxiv, but excluded theses and dissertations available solely from institutional repositories, reports by NGOs or government agencies, and conference abstracts. We also excluded deliberations over names in the *Bulletin of Zoological Nomenclature*.

As per Kaiser *et al.* (2013), we did not consider the *AJH* as part of the scientific literature and did not include it in our compilation. We compiled, but did not include in our analyses, data on two definite or potential aspidonyms that pre-date Kaiser *et al.* (2013), namely *Afronaja* Wallach *et al.*, 2009 (aspidonym for 'Spracklandus' as used by Hoser, 2009) and *Paralaudakia* Baig *et al.*, 2012 (aspidonym for 'Adelynkimberleyea' as used by Hoser, 2012d). Skinner *et al.* (2013) overwrote *Karma* and *Magmellia* Wells, 2009 with the aspidonyms *Silvascincus* and *Tumbunascincus*, respectively. As the stated revision date of 11 February 2013 of the Skinner *et al*. paper pre-dates the publication of Kaiser *et al.* (2013) on 18 March 2013, we treat Skinner *et al.* (2013) as pre-dating, and thus independent of, Kaiser *et al.* (2013), and exclude it from the statistics presented here.

## Impact of Kaiser *et al.* (2013)

Despite the inevitably controversial nature of the Kaiser *et al*. proposals, the reception in the published literature was overwhelmingly favourable. Of 103 articles citing Kaiser *et al*. (Supporting Information, Appendix S1), only six (6%), by two groups of authors, were mostly negative in tone. Several authors voiced concerns over the possible ramifications of the proposal (e.g. Cogger *et al.*, 2017) or criticized Kaiser *et al*. for seeking to constrain taxonomic action or to set aside portions of the *Code* in circumstances other than those already allowed by the *Code* (Dubois, 2015; Dubois *et al.*, 2019). Cogger (2014) highlighted that any science-based aspidonyms would be junior synonyms under the *Code*. A further eight citations were neutral, whereas the remaining 89 publications (86.4%) cited the paper in a broadly positive light, in support of the establishment of aspidonyms or in discussions about taxonomic issues.

The publication of Kaiser *et al.* (2013) was rapidly followed by several high-profile overwritings of listed unscientific names with aspidonyms, including for gerrhosaurid lizards (Bates *et al.*, 2013), the reticulated and Lesser Sunda pythons (Reynolds *et al.*, 2014), and a highly cited revision of typhlopid snake classification (Hedges *et al.*, 2014). We identified 59 names listed by Kaiser *et al.* (2013) or Kaiser (2014), or subsequently proposed in the *AJH*, that were overwritten by later authors (Table 2). These aspidonyms were coined in 38 separate papers authored by a total of 153 authors from 24 countries, published in 18 different journals. The trend in publications overwriting unscientific names with aspidonyms shows evidence of a steady increase (Fig. 1). In what may be a unique occurrence in zoological nomenclature, but symbolic of the depth of feeling in the herpetological community, two patronyms honouring a living Australian herpetologist, Hoser's (2015b) 'Melvillesaurea' and *Diporiphora* 'melvillae', were overwritten with aspidonyms by that same zoologist (Melville *et al.*, 2018, 2019)!

Of the 59 overwritten names covered here, only four (7%) were used as valid before 2013. *Leiopython* 'hoserae' (as used by Hoser, 2000) was used as valid

**Table 2.** List of names overwritten by aspidonyms since 2013 and subsequent use of both

| Overwritten name | Aspidonym | Authors | Country of authors | Grounds for aspidonym | Uses of aspidonym | Uses of overwritten name as valid |
|---|---|---|---|---|---|---|
| 'Funkisaurus' Hoser 2013f | *Broadleysaurus* | Bates *et al.*, 2013 | South Africa ×6 | Unethical, cite Kaiser *et al.* | 27 | None |
| 'Swilesaurus' Hoser 2013f | *Matobosaurus* | Bates *et al.*, 2013 | South Africa ×6 | Unethical, cite Kaiser *et al.* | 13 | None |
| 'Altmantyphlops' Hoser 2012e | *Amerotyphlops* | Hedges *et al.*, 2014 | USA ×3, France ×2 | Older synonym not acknowledged | 124 | None |
| 'Dannytyphlops' Hoser 2012e | *Cubatyphlops* | Hedges *et al.*, 2014 | USA ×3, France ×2 | Older synonym not acknowledged | 13 | None |
| 'Katrinahosertyphlops' Hoser 2012e | *Malayotyphlops* | Hedges *et al.*, 2014 | USA ×3, France ×2 | Older synonym not acknowledged | 14 | None |
| 'Lenhosertyphlops' Hoser 2012e | *Xerotyphlops* | Hedges *et al.*, 2014 | USA ×3, France ×2 | Older synonym not acknowledged | 116 | None |
| 'Maxhoserus' Hoser 2012e | *Indotyphlops* | Hedges *et al.*, 2014 | USA ×3, France ×2 | Older synonym not acknowledged | 300 | None |
| 'Mosestyphlops' Hoser 2012e | *Antillotyphlops* | Hedges *et al.*, 2014 | USA ×3, France ×2 | Older synonym not acknowledged | 18 | None |
| 'Ronhoserus' Hoser 2012e | *Madatyphlops* | Hedges *et al.*, 2014 | USA ×3, France ×2 | Older synonym not acknowledged | 25 | None |
| 'Candoiidae' Hoser 2013a | Candoiinae | Pyron *et al.*, 2014 | USA ×3 | Older synonym not acknowledged | Unascertainable due to homonymy | Unascertainable due to homonymy |
| 'Elliotttyphlopea' Hoser 2012d | *Lemuriatyphlops* | Pyron & Wallach, 2014 | USA ×2 | Cited Kaiser *et al.* | 3 | None |
| 'Broghammerus' Hoser 2004 | *Malayopython* | Reynolds *et al.*, 2014 | USA ×3 | Not published under Code, cite Kaiser *et al.* | 205 | 84 references |
| *Leiopython albertisii* 'bennetti' Hoser 2000 | *Leiopython montanus* | Schleip, 2014 | Germany | Cited Kaiser *et al.* | 3 | Before Kaiser *et al.*: Schleip, 2008; Schleip & O'Shea, 2010; after Kaiser *et al.*: Boundy, 2020 |
| *Leiopython* 'hoserae' Hoser 2000 | *Leiopython meridionalis* | Schleip, 2014 | Germany | Cited Kaiser *et al.* | 4 | Before Kaiser *et al.*: Schleip, 2008; Schleip & O'Shea, 2010; Natusch & Lyons, 2011, 2012; Reynolds *et al.*, 2014; after Kaiser *et al.*: Boundy, 2020 |

**Table 2.** Continued

| Overwritten name | Aspidonym | Authors | Country of authors | Grounds for aspidonym | Uses of aspidonym | Uses of overwritten name as valid |
|---|---|---|---|---|---|---|
| *Macrochelys* 'maxhoseri' Hoser 2013b | *Macrochelys suwanniensis* | Thomas *et al.*, 2014 | USA ×10 | Holotype designation considered invalid | 29 | None |
| *Macrochelys temminckii* 'muscati' Hoser 2013b | *Macrochelys apalachicolae* | Thomas *et al.*, 2014 | USA ×10 | Holotype designation considered invalid | 12 | None |
| 'Daraninagama' Hoser 2014a | *Malayodracon* | Denzer *et al.*, 2015 | Germany ×3, Spain ×1 | Older synonym not acknowledged | 8 | None |
| 'Oxysaurus' Hoser 2013g | *Solomonsaurus* | Bucklitsch *et al.*, 2016 | Germany ×3 | Cite Kaiser *et al.* | 3 | None |
| 'Shireenhosersaurea' Hoser 2013g | *Hapturosaurus* | Bucklitsch *et al.*, 2016 | Germany ×3 | Cite Kaiser *et al.* | 7 | None |
| 'Charlespiersonserpeniinae' Hoser 2013c | Ahaetuliinae | Figueroa *et al.*, 2016 | USA ×5 | Older synonym not acknowledged | 20 | None |
| 'Chrismaxwellus' Hoser 2013e | *Mopanveldophis* | Figueroa *et al.*, 2016 | USA ×5 | Older synonym not acknowledged | 12 | None |
| 'Cummingscincea' ('Cummingscincea') 'cummingae' Hoser 2015a | *Madascincus miafina* | Miralles *et al.*, 2016 | France ×1, Germany ×3 | Cite Kaiser *et al.* | 1 | None |
| 'Rubercaudatus' 'edwardsi' Hoser 2015a | *Madascincus pyrurus* | Miralles *et al.*, 2016 | France ×1, Germany ×3 | Cite Kaiser *et al.* | 1 | None |
| 'Clarascincus' Hoser 2015a | *Flexiseps* | Erens *et al.*, 2017 | Germany ×2, Netherlands ×2, France ×1 | Cite Kaiser *et al.* | 8 | None |
| 'Oxyscincus' Hoser 2015a | *Brachyseps* | Erens *et al.*, 2017 | Germany ×2, Netherlands ×2, France ×1 | Cite Kaiser *et al.* | 4 | None |
| 'Feretribolonotus' 'greeri' Hoser 2016a | *Tribolonotus parkeri* | Rittmeyer & Austin, 2017 | USA ×2 | Older synonym not acknowledged | 2 | None |
| *Montivipera* 'yeomansi' 'europa' Hoser 2016b | *Montivipera xanthina occidentalis* | Cattaneo, 2017 | Italy | No mention | 3 | None |
| *Stegonotus* 'adelynhoserae' Hoser 2012b | *Stegonotus melanolabiatus* | Ruane *et al.*, 2018 | USA ×3, Australia ×1, Indonesia ×2 | No mention | 5 | None |
| *Dasypeltis* 'saeizadi' Hoser 2013h | *Dasypeltis arabica* | Bates & Broadley, 2018 | South Africa ×1, Zimbabwe ×1 | Cite Kaiser, give extensive background | 3 | Saleh & Sarhan (2016) |
| *Dactyloperus* 'bradmaryani' 'bulliardi' Hoser 2018b | *Gehyra capensis* | Kealley *et al.*, 2018 | Australia ×6 | Older synonym not acknowledged | 3 | None |

**Table 2.** Continued

| Overwritten name | Aspidonym | Authors | Country of authors | Grounds for aspidonym | Uses of aspidonym | Uses of overwritten name as valid |
|---|---|---|---|---|---|---|
| *Ophiomorus* 'macconchiei' Hoser 2015a | *Ophiomorus kardesi* | Kornilios *et al.*, 2018 | Greece ×2, Turkey ×2 | Older synonym not acknowledged | 7 | None |
| *Lophognathus* 'wellingtoni' Hoser 2015b | *Lophognathus horneri* | Melville *et al.*, 2018 | Australia ×3, USA ×2 | Older synonym not acknowledged | 2 | None |
| 'Melvillesaurea' Hoser 2015b | *Tropicagama* | Melville *et al.*, 2018 | Australia ×3, USA ×2 | Older synonym not acknowledged | 7 | None |
| 'Skrijelus' Hoser 2014a | *Monilesaurus* | Pal *et al.*, 2018 | India ×5 | Older synonym not acknowledged | 13 | None |
| *Calotes* ('Tamilnaducalotes') Hoser 2014a | *Microauris* | Pal *et al.*, 2018 | India ×5 | Older synonym not acknowledged | 4 | None |
| 'Oxyrhabdiumiidae' Hoser 2013c | Cyclocorinae | Weinell & Brown, 2018 | USA ×2 | No mention | 7 | None |
| *Boulengerina* 'jackyhoserae' Hoser 2013d | *Naja* (*Boulengerina*) *guineensis* | Wüster *et al.*, 2018 | UK ×4, Senegal ×1, France ×2, USA ×3, DRC ×1, Belgium ×1, Germany ×1, Zimbabwe ×1 | Cite Kaiser *et al.* | 8 | None |
| *Montivipera* 'snakebustersorum' Hoser 2016b | *Montivipera xanthina varoli* | Afsar *et al.*, 2019 | Turkey ×4 | No mention | 1 | None |
| 'Adelynhoserserpenae' Hoser 2012a | *Metlapilcoatlus* | Campbell *et al.*, 2019 | USA ×3 | Older synonym not acknowledged | 11 | None |
| 'Cliveevattcolotes' 'steveteesi' Hoser 2018d | *Ptychozoon cicakterbang* | Grismer *et al.*, 2019 | USA ×8, Malaysia ×1, Cambodia ×1, Laos ×3 | Older synonym not acknowledged | 4 | None |
| 'Marlenegecko' 'shireenhoserae' Hoser, 2017 | *Oedura elegans* | Hoskin 2019 | Australia | Cite Kaiser, ASH statement | 2 | None |
| 'Adelynhosergecko' 'brettbarnetti' Hoser 2018e | *Lepidodactylus kwasnickae* | Kraus, 2019 | USA | Cites Kaiser *et al.*, extensive discussion | 2 | None |
| 'Adelynhosergecko' 'stevebennetti' Hoser 2018e | *Lepidodactylus mitchellii* | Kraus, 2019 | USA | Cites Kaiser *et al.*, extensive discussion | 2 | None |
| 'Bobbottomcolotes' 'potens' Hoser 2018e | *Lepidodactylus zweifeli* | Kraus, 2019 | USA | Cites Kaiser *et al.*, extensive discussion | 1 | None |
| 'Shireenhosergecko' 'jarradbinghami' Hoser 2018e | *Lepidodactylus aignanus* | Kraus, 2019 | USA | Cites Kaiser *et al.*, extensive discussion | 1 | None |

**Table 2.** Continued

| Overwritten name | Aspidonym | Authors | Country of authors | Grounds for aspidonym | Uses of aspidonym | Uses of overwritten name as valid |
|---|---|---|---|---|---|---|
| *Diporiphora* 'garrodi' Hoser 2015b | *Diporiphora gracilis* | Melville *et al.*, 2019 | Australia ×4 | No mention | 2 | None |
| *Diporiphora* 'melvillae' Hoser 2015b | *Diporiphora granulifera* | Melville *et al.*, 2019 | Australia ×4 | No mention | 1 | None |
| *Oopholis* (Philas) 'adelynhoserae' Hoser 2012c | *Crocodylus halli* | Murray *et al.*, 2019 | USA ×4 | No mention | 6 | |
| 'Alexteescolotes' Hoser 2018d | *Rhacogekko* | Wood *et al.*, 2020 | USA ×9, China ×1, Taiwan ×1 | Cite Kaiser *et al.*, extensive discussion | 3 | None |
| 'Extentusventersquamus' Hoser 2018c | *Archipelagekko* | Wood *et al.*, 2020 | USA ×9, China ×1, Taiwan ×1 | Cite Kaiser *et al.*, extensive discussion | 2 | None |
| 'Sparsuscolotes' Hoser 2018c | *Japonigekko* | Wood *et al.*, 2020 | USA ×9, China ×1, Taiwan ×1 | Cite Kaiser *et al.*, extensive discussion | 2 | None |
| 'Bobbottomcolotes' 'bobbottomi' Hoser 2018e | *Lepidodactylus sacrolineatus* | Kraus & Oliver, 2020 | USA ×1, Australia ×1 | Cite Kaiser *et al.* | 1 | None |
| 'Feresuta' 'hamersleyensis' Hoser, 2018a | *Suta gaikhorstorum* | Maryan *et al.*, 2020 | Australia ×4 | Cite Kaiser, ASH statement | 1 | None |
| Emydocephalus 'teesi' Hoser 2016c | *Emydocephalus orarius* | Nankivell *et al.*, 2020 | Australia ×5, France ×1, Denmark ×1 | Cite Kaiser *et al.* | 1 | None |
| *Oedura* 'bulliardi' Hoser 2017 | *Oedura nesos* | Oliver *et al.*, 2020a | Australia ×5, USA ×1 | Cite Kaiser, ASH statement | 1 | None |
| 'Phryia' 'paulhorneri' Hoser 2018b | *Gehyra arnhemica* | Oliver *et al.*, 2020b | Australia ×7 | Cite Kaiser, ASH statement | 1 | None |
| *Chelodina* ('Supremechelys') Hoser, 2014b | *Chelydera* | Shea *et al.*, 2020 | Australia ×3 | None given | 1 | None |
| 'Maxhoserus' Hoser, 2012d | *Virgotyphlops* | Wallach, 2020 | USA | None | 2 | None |
| 'Adelynhosergecko' 'sloppi' Hoser 2018e | *Lepidodactylus pollostos* | Karkkainen *et al.*, 2020 | Australia ×3, USA ×1, Indonesia ×2 | Cite Kaiser *et al.* | 1 | None |
| **Aspidonyms pre-dating Kaiser *et al.* (2013) – not included in analyses but provided here for information** | | | | | | |
| 'Spracklandus' Hoser 2009 | *Afronaja* | Wallach *et al.*, 2009 | USA ×1, UK ×1, Zimbabwe ×1 | *Spracklandus* unavailable; subject of Case 3601, pending. | 27 | None |
| 'Adelynkimberleyea' Hoser, 2012d | *Paralaudakia* | Baig *et al.*, 2012 | USA ×1, Germany ×2, Russia ×1 | None given | 111 | None |

in five publications pre-dating Kaiser *et al.* (2013), *Leiopython albertisii* 'bennetti' (as used by Hoser, 2000) was used twice, and *Dasypeltis* 'saeizadi' (as used by Hoser, 2013h) was used once (Table 2). 'Broghammerus' had been used extensively after the validation of the genus by Rawlings *et al.* (2008). The remaining overwritten names have never been used as valid anywhere other than in the *AJH*.

At the time of writing (January 2021), all but two aspidonyms pre-dating 2019 have subsequently been

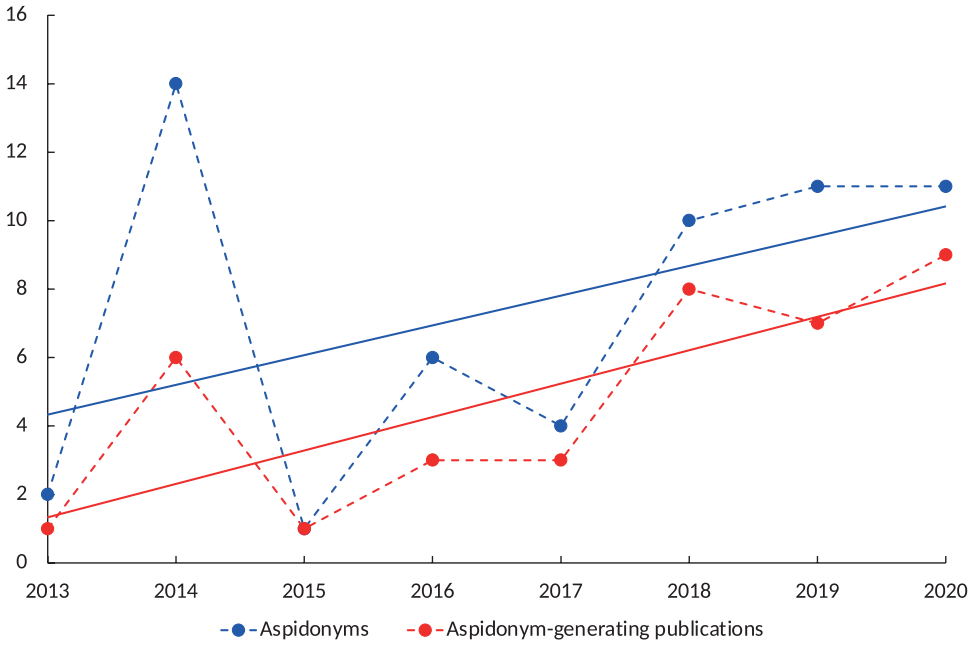


**Figure 1.** Time course of overwritings of unscientific herpetological names following publication of Kaiser *et al.* (2013), including both individual overwritten names and the number of publications involved, with trendlines.

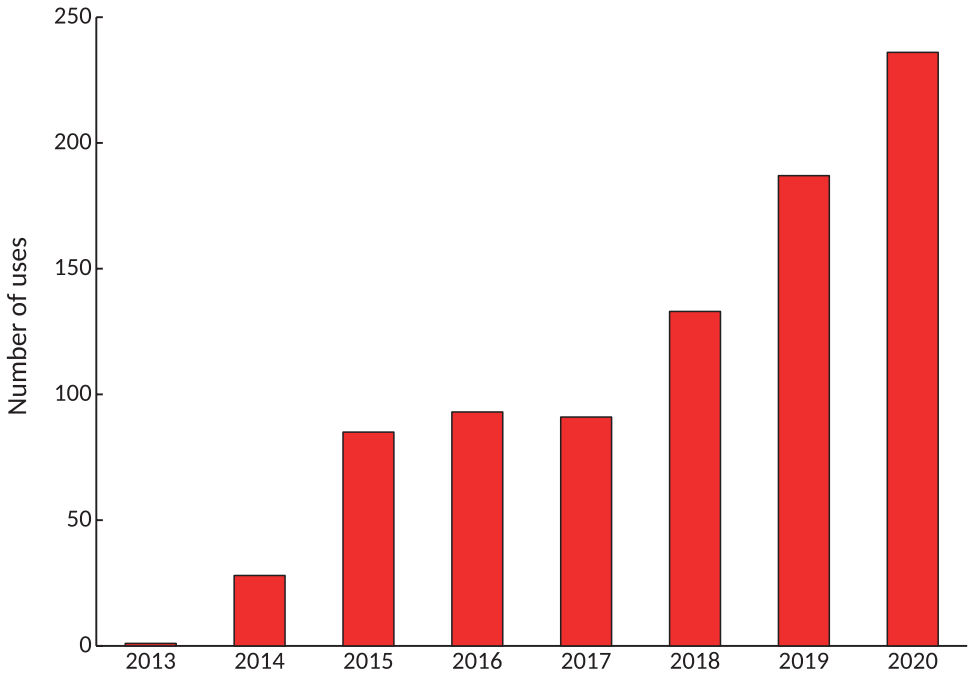


**Figure 2.** Number of publications using aspidonyms established since 2013.

used by other authors, as have most 2019 and 2020 names (Table 2), with a trend for increasing use (Fig. 2). Many have achieved high levels of subsequent use, with over 100 uses for *Amerotyphlops*, *Indotyphlops*, *Xerotyphlops* and *Malayopython*. In total, we recorded 1087 instances of the subsequent use of aspidonyms as the valid names for the taxon concerned, distributed across 848 separate publications authored by approximately 2600 separate individuals (Supporting Information, Appendix S2). Notably, eight aspidonyms (*Indotyphlops*, *Amerotyphlops*, *Madatyphlops*, *Xerotyphlops*, *Broadleysaurus*, *Macrochelys suwanniensis*, and the pre-Kaiser *et al.* aspidonyms *Afronaja* and *Paralaudakia*) already fulfil the numerical criteria of Article 23.9.1 (25 or more aspidonym uses, none for the overwritten name) that normally mandate the retention of prevailing usage, and several others can be expected to reach that threshold within the next few years.

In contrast, we found only a single instance of overwritten names being explicitly preferred to aspidonyms by a subsequent author: Boundy (2020) used the names *Leiopython* 'hoserae' and *L.* 'bennettorum' (as used by Hoser, 2000) in preference to *L. meridionalis* Schleip 2014 and *L. montanus* Schleip 2014, without further explanation. However, this author used aspidonyms for 17 other taxa. The only unscientific name in wider post-aspidonym use is 'Broghammerus': this name languished unused after its establishment in 2004, but gained some subsequent use after Rawlings *et al.* (2008) demonstrated the need for a separate genus for the reticulated and Lesser Sunda pythons (previously *Python reticulatus* and *P. timoriensis*) and adopted Hoser's name. Nevertheless, despite the convincing phylogenetic analysis of Rawlings *et al.*, a number of subsequent authors explicitly retained these species in the genus *Python* in preference to 'Broghammerus' (Zug *et al.*, 2011; Pyron *et al.*, 2013; Stuebing *et al.*, 2014). After the establishment of the aspidonym *Malayopython* by Reynolds *et al.* (2014), the use of 'Broghammerus' declined steeply, and it was eclipsed by the rapidly increasing use of *Malayopython*, which overtook its older synonym's citation rate within a year of publication, and its cumulative usage total within 3 years (Fig. 3). At the time of writing, *Malayopython* has accumulated over twice as many subsequent uses

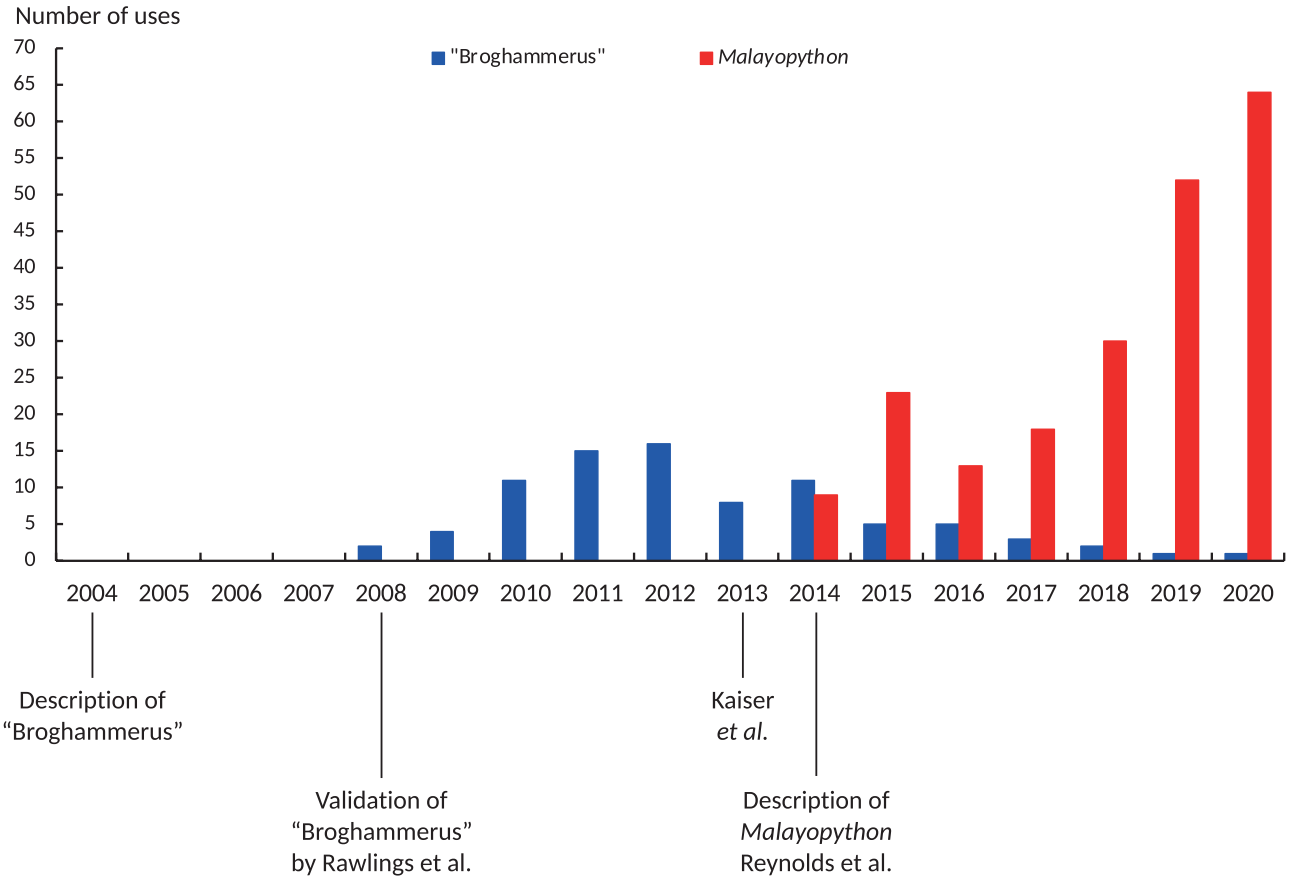


**Figure 3.** Usage count of the names 'Broghammerus' (as used by Hoser 2004) and *Malayopython* Reynolds *et al.* 2014 by year, as of 31 December 2020, in relation to key nomenclatural events.

(205) as 'Broghammerus' (84), indicating an imminent stabilization of the nomenclature in the literature (Fig. 3). Crucially, we did not find a single case where 'Broghammerus' was explicitly used as the valid name in preference to *Malayopython*.

## DISCUSSION AND CONCLUSION

In summary, our analyses reveal a pattern of virtually unanimous acceptance by the herpetological community of the proposals of the 'Kaiser Veto', as the Kaiser *et al.* (2013) paper was dubbed by Hoser (2014). Despite their revolutionary nature, it is clear that the herpetological community strongly backs the principle that scientifically unfounded or ethically questionable, unreviewed, privately published taxon descriptions have no place in 21st century taxonomy, and that the resulting nomina should not enter scientific discourse. Despite fears of a destabilized dual nomenclature (Cogger, 2014; Cogger *et al.*, 2017), the acceptance of the proposals of Kaiser *et al*. has been near-unanimous and community-wide, with consistent adoption of the newer, scientifically and ethically proposed aspidonyms over their unscientific senior synonyms. While some authors have been critical of violations of the Principle of Priority as a consequence of the Kaiser *et al.* (2013) (e.g. Dubois, 2015; Dubois *et al.*, 2019), we argue that their proposal and its consequences have instead advanced the fundamental aim of the *Code*, which is 'to promote stability and universality in the scientific names of animals and to ensure that the name of each taxon is unique and distinct'.

We believe that the rapid adoption of the Kaiser *et al*. proposals is due to several factors. Frustration with the long-standing inability of the *Code* and the Commission to prevent the output of unscientific taxonomic works from penetrating the scientific literature clearly lie at the root of the success of these proposals, which have informed taxonomic deliberations in taxa ranging from minnows to pinnipeds (Conway 2018; Valenzuela-Toro & Pyenson, 2019) and from gastropods to killifish (Páll-Gergely *et al.*, 2019; Freyhof & Yoğurtçuoğlu, 2020).

The extraordinary proliferation of unscientific names proposed by Mr Hoser in particular (1795 names since 2000; Table 1) almost certainly played a role in generating sufficient levels of exasperation in the herpetological community. The significant effort required to deal with unscientific taxonomy (e.g. Iverson *et al.*, 2001) makes the individual evaluation and rebuttal of hundreds of taxon names per year not only an egregious waste of researcher time, but also an unfair burden that could significantly impede academic career progression. In addition, numerous ethical lapses, such as the deliberate scooping of other authors (Aplin, 1999; Wüster *et al.*, 2001), "plagiarism" (Denzer *et al.*, 2016), the naming of groups defined by other authors but for which these authors themselves deferred the process of providing a name (Oliver & Lee, 2010), and the escalating denigration and defamation of science and scientists further enhanced the perception that action was required.

Crucially, the endorsement of multiple professional societies provided the institutional backing and moral authority that empowered subsequent authors to follow their taxonomic judgement, in accordance with the principles clearly espoused in the Preamble to the *Code*, and reject works widely regarded as unscientific. This action is entirely in keeping with the intent and letter of the *Code*, given the Preamble's emphasis that the Principle of Priority, while a key pillar of the *Code*, is subservient to the overall aim of 'promoting stability and universality in the scientific names of animals'. We also believe that it shows a measure of the acceptance of a shared responsibility by the current community of herpetologists not to leave the thankless task of cleaning up a mess of names to future generations.

The example of the 'Kaiser Veto' shows that community self-organization, driven by consensus among the affected researchers and underpinned by comprehensive consultation among stakeholders, upholds the integrity of science and the scientific process and can effectively overcome the divisive impact of large-scale unscientific taxonomy without leading to parallel nomenclatural systems, or to the suppression of genuine scientific debate and dissent. The explicit restriction of these proposals to a clearly defined set of the most egregious breaches of normal taxonomic standards within a specific time frame, with a strong consensus expressed through the support of multiple scholarly societies, and explicitly as a last-resort, rapid-response measure, forestalled a slide down a 'slippery slope', whereby these proposals would lead to a free-for-all in discarding senior synonyms (see Kaiser *et al.*, 2020), or enable a mob rule mentality in suppressing minority viewpoints. We suggest that the herpetological community's organized and unified response to the challenge of extreme taxonomic vandalism could stand as a model for other afflicted zoological disciplines (e.g. Davis, 2004; Jäch, 2007; Páll-Gergely *et al*., 2020).

While we recognize that unscientific taxonomy has existed since the origin of the Linnean system, we remind our readers that this has been to the detriment not only of individual taxonomists but of the standing of the entire discipline. The yearning for the right to ignore unscientific work so eloquently articulated by Kraatz (1862), quoted in the epigraph at the beginning of this paper, remains

as relevant today as it was then. We strongly reject the frequently heard argument that the long history of this problem should cause us to accept it into the future (e.g. Dubois, 2015; Ivie in Dubois, 2015). We argue instead that the 21st century is a long-overdue time to bring taxonomy in line with other sciences. We also reject accusations that our call to action constitutes a form of censorship (Ivie in Dubois, 2015): in line with the Preamble of the *Code*, anyone has the right to publish taxonomic views and hypotheses. However, while scientific freedom is essential to let human ingenuity unfold, taxonomic entities and their names are not ephemeral, as some hypotheses are, and they must be governed by carefully considered principles. The 'freedom of taxonomic thought or actions' rightly protected by the *Code* does not imply a duty on the part of taxonomists to honour the output of unscientific work.

The Preamble explicitly positions the provisions of the *Code* as a means to an end, namely a universal and stable zoological nomenclature, not as an end in itself. The herpetological community has embraced this principle, and Kaiser *et al.* (2013) provided the framework that allowed it to do so with minimal disruption to the scientific process. The support of the herpetological community is illustrated by the list of 464 researchers (Appendix 2) from 53 countries (Appendix 3) who have signed a statement supporting the continuation of the practices introduced by Kaiser *et al.* (2013). We hope that the Commission, in deciding on its course of action over pending cases relating to this matter (Case 3601, and subsequent requests deriving from its discussion: Hoser, 2013; Wüster *et al.*, 2014; Rhodin *et al.*, 2015), will respect the aims of the Code, clearly expressed in the Preamble and subsequent Articles (e.g. 23.2), as well as the clearly expressed professional position of the herpetological community. It will thereby help preserve the broader scientific community's respect for the *Code* and the work of the Commission. A decision against this new reality would delegitimize 1087 subsequent uses of aspidonyms in 848 publications (vs. none for all but three of Hoser's names), some of which already meet the numerical criteria for retention on grounds of prevailing use according to Article 23.9.1. It would also threaten the fundamental aim of the *Code*, a stable and universal zoological nomenclature. Like others before us (e.g. Denzer *et al.*, 2016), we argue that zoologists have not only a right but indeed a duty to uphold the principles of science against malicious, unscientific taxonomic work, preferably within the letter of the *Code*, but, with deep regret and only as a last resort, outside it if necessary.

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**Conflict of interest:** W.W., M.O'S. and H.K. were also authors of Kaiser *et al.* (2013). We believe our methods and results to be transparent and repeatable, but feel compelled to note the potential for a conflict of interest in their interpretation.

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## SUPPORTING INFORMATION

Additional Supporting Information may be found in the online version of this article at the publisher's web-site:

**Appendix S1.** Citations of Kaiser *et al.* (2013) and Kaiser (2014), with an assessment of their judgement of the proposals therein.

**Appendix S2.** List of publications using aspidonyms.

## APPENDIX 1

The self-published works by Raymond Hoser listed here are used in the main text as needed to provide context, but not to endorse their content or methodology, or their status as part of the permanent scientific record, as intended by the Code. *AJH* = *Australasian Journal of Herpetology*.

**Hoser RT. 2000a.** A revision of the Australasian pythons. *Ophidia Review* **1:** 7–27.

**Hoser RT. 2004.** A reclassification of the Pythoninae including the descriptions new genera, two new species and nine new subspecies. Continued. *Crocodilian – Journal of the Victorian Association of Amateur Herpetologists* **4:** 21–39.

**Hoser RT. 2009.** A reclassification of the true cobras; species formerly referred to the genera *Naja*, *Boulengerina* and *Paranaja*. *AJH* **7:** 1–15.

**Hoser RT. 2012a.** A new genus of jumping pitviper from Middle America (Serpentes: Viperidae). *AJH* **10:** 33–34.

**Hoser RT. 2012b.** Three new species of *Stegonotus* from New Guinea (Serpentes: Colubridae). *AJH* **12:** 18–22.

**Hoser RT. 2012c.** A review of the taxonomy of the living crocodiles including the description of three new tribes, a new genus, and two new species. *AJH* **14:** 9–16.

**Hoser RT. 2012d.** A five-way division of the agamid genus *Laudakia* Gray, 1845 (Squamata: Sauria: Agamidae). *AJH* **14:** 17–23.

**Hoser, R.T. 2012e.** A review of the extant scolecophidians ("blindsnakes") including the formal naming and diagnosis of new tribes, genera, subgenera, species and subspecies for divergent taxa. *AJH* **15:** 1–64.

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**Hoser RT. 2013b.** An updated taxonomy of the living alligator snapping turtles (*Macrochelys* Gray, 1856), with descriptions of a new tribe, new species and new subspecies. *AJH* **16:** 53–63.

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**Hoser RT. 2013e.** *Chrismaxwellus*: a new genus of colubrid snake from south-west Africa. *AJH* **20:** 26–29.

**Hoser RT. 2013f.** A revised taxonomy for the lizard families Gerrhosauridae and Cordylidae. *AJH* **21:** 2–32.

**Hoser RT. 2013g.** Monitor lizards reclassified with some common sense (Squamata: Sauria: Varanidae). *AJH* **21:** 41–58.

**Hoser RT. 2013h.** A new egg-eating snake from the southern Arabian Peninsula (Squamata: Serpentes: Colubridae: Colubrinae: Boigini). *AJH* **21:** 59–63.

**Hoser RT. 2014a.** A logical new taxonomy for the Asian subfamily Draconinae based on obvious phylogenetic relationships and morphology of species (Squamata: Sauria: Agamidae: Draconinae). *AJH* **22:** 9–59.

**Hoser RT. 2014b.** A taxonomic revision of the Giant Long-necked Terrapin, *Chelodina expansa* Gray, 1857 species complex and related matters of taxonomy and nomenclature. *AJH* **24:** 3–11.

**Hoser RT. 2015a.** A revision of the genus level taxonomy of the Acontinae and Scincinae, with the creation of new genera, subgenera, tribes and subtribes. *AJH* **28:** 1–64, **29:** 65–128.

**Hoser RT. 2015b.** Australian agamids: eighteen new species from the genera *Amphibolurus* Wagler, 1830, *Lophognathus* Gray, 1842, *Rankinia* Wells and Wellington, 1984, *Diporiphora* Gray, 1842, *Tympanocryptis* Peters, 1863, as well as three new genera and six new subgenera. *AJH* **30:** 37–64.

**Hoser RT. 2016a.** A re-evaluation of the Crocodile Skinks, genus *Tribolonotus* Duméril and Bibron, 1839 sensu lato including the division of the genus into three, description of three new species, a new subspecies and the placement of all within a new tribe. *AJH* **32:** 33–39.

**Hoser RT. 2016b.** *Montivipera xanthina* divided and a new subgenus of Eurasian vipers for the *Vipera raddei* Boettger, 1890 species group (Squamata: Serpentes: Viperidae). *AJH* **33:** 12–19.

**Hoser, RT. 2016c.** A previously unrecognized species of sea snake (Squamata: Serpentes: Elapidae: Hydrophiinae). *AJH* **33:** 25–33.

**Hoser RT. 2017.** A further break-up of the Australian gecko genus *Oedura* Gray, 1842 sensu lato as currently recognized, from four to seven genera, with two new subgenera defined, description of fourteen new species, four new subspecies and formalising of one tribe and five subtribes. *AJH* **34:** 3–35.

**Hoser RT. 2018a.** *Feresuta* a new genus of West Australian snake and the formal description of a new species in the same genus. *AJH* **37:** 20–23.

**Hoser RT. 2018b.** A divided *Gehyra* makes sense! Assigning available and new names to recognize all major species groups within *Gehyra* Gray, 1834 sensu lato (Squamata: Gekkonidae) and the formal description of nine new species. *AJH* **37:** 48–64.

**Hoser RT. 2018c.** A significant improvement to the taxonomy of the gecko genus *Gekko* Laurenti, 1768 sensu lato to better reflect morphological diversity and ancient divergence within the group. *AJH* **38:** 6–18.

**Hoser RT. 2018d.** A revised taxonomy of the gecko genus *Ptychozoon* Kuhl and Van Hasselt, 1822, including the formal erection of two new genera to accommodate the most divergent taxa and description of ten new species. *AJH* **38:** 19–31.

**Hoser RT. 2018e.** A revised taxonomy of the gecko genera *Lepidodactylus* Fitzinger, 1843, *Luperosaurus* Gray, 1845 and *Pseudogekko* Taylor, 1922 including the formal erection of new genera and subgenera to accommodate the most divergent taxa and description of 26 new species. *AJH* **38:** 32–64.

## APPENDIX 2

The following list includes 464 supporters of our initiative, who recorded their support by signing and submitting formal statements of approval.

A

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Freed, Paul
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Fry, Bryan

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Georges, Arthur
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Glaw, Frank
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Köhler, Jörn
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Strugariu, Alexandru
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## APPENDIX 3

Supporters for our successful approach to stabilize herpetological nomenclature wrote in from the 53 countries listed below.

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Bolivia
Brazil
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Bulgaria
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Colombia
Costa Rica
Czech Republic
Ecuador
Finland
Germany
Greece
Honduras
India
Indonesia
Iran
Ireland
Israel
Italy
Ivory Coast
Japan
Jordan
Madagascar
Mexico
Morocco
Nepal
Netherlands
New Zealand
Pakistan
Panama
Poland
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Romania
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Senegal
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South Africa
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Sri Lanka
Switzerland
Thailand
UK – England
UK – Scotland
UK – Wales
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Venezuela
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