Australian Society of Herpetologists, Inc.

Position Statement

ASH (2016). Position of the Australian Society of Herpetologist on the increasing proliferation of names for taxa without adequate diagnosis or description and published without the benefits of peer review. Australian Society of Herpetologists Inc., Position Statement No. 2, February 12, 2016.

Purpose

This statement outlines the position of the Australian Society of Herpetologists, Inc., on the increasing proliferation of names for taxa without adequate diagnosis or description and published without the benefits of peer review.

Our position derives from and expands upon a motion put to and overwhelmingly supported by the membership at the General Meeting of 2013, namely:

> **Whereas** the Australian Society of Herpetologists recognises the importance of peer-review when proposing taxonomic decisions and the nomenclatural acts that follow from them, **acknowledges** that works published outside of the peer-review process are damaging the integrity of herpetological science, **does not condone** the naming of taxa for reasons that are unscientific or not based on a trail of [published] evidence, and **applauds** the efforts by the International Commission on Zoological Nomenclature to curb the misuse of nomenclature, …. " **therefore, be it resolved** that the Australian Society of Herpetologists joins the other listed societies in endorsing the point of view presented by Kaiser *et al*. in the March 2013 issue of Herpetological Review, namely that in the 21st Century, taxonomic decisions in herpetology and their nomenclatural consequences are acceptable only when supported by a body of evidence published within the peer-review process".

This position statement informs our checklist of extant Australian reptiles and amphibians recommended to researchers, government agencies, legislators and non-government organisations. The position statement does not consider taxonomy of fossils.

Position

The Society sees two elements that contribute to the recognition of a new taxon:

- **The name**, with longstanding and widely accepted guidelines governing the use of names provided by the International Commission for Zoological Nomenclature (ICZN) in the form of the International Code of Zoological Nomenclature (the Code).

- **The taxonomic concept**, founded in new evidence, new interpretation or new synthesis of previously published evidence, and presented in a form and by a process appropriate for the adoption of the new information into the body of science.

The evidence and argument that defines the new taxonomic concept needs to have been generated in accordance with best practice, which will vary over time as technical and conceptual advances are made, and as judged by peer review (see Appendix B). Original research or scholarship is normally presented via a scientific paper as defined by the Council of Science Editors in 1968 (CBE, 1968: 2). This definition includes a requirement for pre-publication peer review. Abstracts, conference

reports, theses, web pages, blogs and many other types of literature are published, but do not normally meet the test of a valid scientific paper (Day and Gastel, 2011: 11). The general acceptance of the CBE definition has greatly clarified both primary and secondary communication of scientific information, and has wide acceptance for sound reasons.

The Society regards anonymous peer review as a central tenet in the process in bringing new information, new interpretation or new synthesis of previously published information, into the accepted body of science. In following this time-honoured process, the new taxonomy is exposed to the rigorous scrutiny that is fundamental for the advancement of science. Peer review provides an independent assessment of the work against the accepted criteria. Are the results valid? Are the interpretations and conclusions drawn defensible? Once it survives peer review and is published, the work enters the body of science. Peer review also assesses the work to ensure that the results are presented with sufficient background on materials and methods (reproducibility) to ensure the work can continue to come under effective scrutiny, reinterpretation, testing and possible rebuttal after it is published. Thus, the scrutiny begins but does not end with pre-publication peer review.

> *Naming the taxon is part of the discovery process. The Society believes that the two parts of this process, naming and presenting new scientific evidence and interpretation or synthesis of existing published evidence, should occur together, in the same scientific paper.*
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> *The practice of naming taxa without an accompanying scientifically defensible diagnosis and description, and without adequate scrutiny through the agreed processes of independent scientific peer review, is unacceptable practice. Abstracts, conference reports, theses and documents privately published and distributed, bypassing rigorous independent peer review, are not regarded as publications for the purposes of implementing nomenclatural change.*
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> *Thus, the Society strongly recommends that the documents distributed under the banners Australian Biodiversity Record and Australasian Journal of Herpetology <u>not</u> be regarded as publications for the purposes of nomenclature, and the Society recommends that any names or nomenclatural acts proposed in those documents <u>not</u> be regarded as available.*

The publications by Wells and Wellington under the banner of Australian Journal of Herpetology are in a similar vein, but were not dealt with appropriately at the time by either the scientific community or the ICZN. Those names which later have come to be associated with a defensible taxonomic concept, published by others, have come into use. In some cases, these names have come into use without adequate diagnosis or description. The Society considered its position in regards to the documents produced under the banner of Australian Journal of Herpetology, but decided that these are an unfortunate historical legacy.

> *The Society thus agrees with limiting action to publications and documents privately produced and circulated from 1 January 2000, following the recommendation of Kaiser et al. (2013).*
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> *We further recommend that authors providing the first peer-reviewed scientific evidence (or peer-reviewed synthesis of existing evidence) for a taxon they believe warrants recognition at the level of species, genus or a higher taxon, propose and apply a new name to accompany their evidential description. This is a natural consequence of the recommendations above.*
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> *We believe that this will remove the incentive for those engaging in the prolific generation of names in the absence of defensible supporting science. In cases of contention, usage, influenced in part by the Society's position, will then be the arbiter.*

Appendix A

Checklist of Australian Reptiles and Amphibians

Two highly regarded and expertly curated international checklists of reptiles and amphibians already exist, both of which have as their foundation a scientific evidenced based, best practice approach to decision making. Both of these resources are comprehensive, thorough, expertly referenced and global. The site curators consult widely with experts in cases where taxonomic disagreements or uncertainties exist. The ASH Checklist of Australian Reptiles and Amphibians will use as its foundation the taxonomy presented in both of these resources.

- The ***Reptile Database*** (http://www.reptile-database.org, accessed 8 Dec 2014), curated by Drs Peter Uetz and Jirí Hošek, is a single resource that presents the current state of taxonomy for all reptiles of the World.
- The ***Amphibian Species of the World: an Online Reference Version 6.0*** (http://research.amnh.org/herpetology/ amphibia/index.html accessed 8 Dec 2014), curated by Dr Darrel R. Frost, is a single resource that presents the current state of taxonomy for all amphibians of the World.

As outlined in both of these resources, there are areas of genuine taxonomic disagreement among practicing scientists. For these cases, the ASH Taxonomic Committee will provide a clear rationale where an alternative taxonomic arrangement is recommended for an Australian species.

The ASH Checklist of Australian Reptiles and Amphibians therefore mirrors the taxonomy presented in the above resources, except for amendments that are flagged as such with a footnote.

Appendix B

Best Practice in making Nomenclatural Changes

1. Background

Since the matter was first considered in detail by Hennig (1966), consensus on how systematic research should be translated into taxonomic and nomenclatural change has been difficult to achieve. There is now a somewhat chaotic situation, with taxonomic and nomenclatural instability greatly reducing effective communication in the biological sciences (Bickham et al., 2007). This instability has a negative impact on science and the legal and scientific foundation of international conservation efforts, and so has become a matter of great concern to biologists in general (Godfray, 2002), and herpetologists in particular (Kaiser et al., 2013; Pauly et al., 2009; Rhodin et al., 2015).

This deterioration in the stability of nomenclature has arisen (not entirely) from the recent proliferation of names circulated in privately produced and circulated documents that have bypassed the normal channels for the publication of science, and bypassed peer review. Many of the names do not survive subsequent scrutiny, but confusion reigns until the science is done. Some that come to be used are not accompanied by adequate diagnosis or description, and so come into use as named entities that remain effectively undescribed. The Society believes that there is a need for a statement of what constitutes best practice in the science of taxonomy and associated nomenclature to guide those inside science and those drawing upon science, in working through what is currently a confusing array of poorly defined names and conflicting taxonomies applied to Australian reptiles and amphibians.

> *What is acceptable practice is governed by peer review, and will evolve over time with conceptual and technological advances, so a flexible approach to defining best practice is required. As such, this document describes best practice as an ideal, perhaps seldom achieved. It does not describe a set of attributes, though desirable, for which all are necessary to make a nomenclatural change. As with the fundamental tenets of experimental design, failure to meet one or more of recommendations for best practice does not necessarily invalidate a study, but rather requires that the study be presented with appropriate caveats.*

There are two elements to the recognition of a new taxon:

- **Naming**, governed by longstanding, widely accepted and formally stated guidelines.

- **Defining the taxonomic concept** to which the name applies, following time-honoured, widely-accepted but informal guidelines for the conduct and dissemination of science.

The conventions and obligations for the naming of new taxa are laid down in the articles and recommendations of the International Code of Zoological Nomenclature (the Code) (ICZN, 1999), including provisions for over-ruling the Code using the plenary powers of the International Commission for Zoological Nomenclature (ICZN) when a compelling case to do so is put to them by the taxonomic community.

The conventions and obligations for the naming of new taxa do not require the taxonomic concept being named to be scientifically defensible. Nomenclature and biological systematics are, in this sense, independent activities. For example, an unfalsifiable character (a red stripe present only in the absence of light) is inadmissible in science, but acceptable under the Code. Similarly the Code

requires a diagnosis that purports to distinguish the new taxon, whereas science would require that it does distinguish the taxon. In this way, the Code governing nomenclature does not intrude on the science of taxonomy. Nomenclature and the underpinning systematics are held at arms length (Tubbs, 1992).

> *Although the demarcation of science and nomenclature is well established, the two serve a common purpose, that of establishing a scientifically-based, agreed, classification for living organisms. So even though agreement on the rules governing the creation of names (the Code) does not require that a named entity is scientifically defensible, the science of taxonomy demands that it be scientifically defensible.*

2. Concepts

The species concept applied in the paper should be clearly evident and explicitly defined, making the distinction, if appropriate, between species and diagnosable clades within species, and optionally including a definition of the process by which species under this concept arise (speciation). This would normally be done by reference to the relevant literature.

Species concepts commonly in use are the Biological Species Concept (Mayr, 1963), the Evolutionary Lineage Species Concept (de Queiroz, 2005) and the Phylogenetic Species Concept (Cracraft, 1983). These concepts are not necessarily compatible.

Higher taxa (genera, families, etc) should similarly be established with a stated theoretical basis for changes at that taxonomic level. Such a concept should include the necessary (but not sufficient) requirement of monophyly. Again, this would normally be done by reference to the relevant literature.

One common concept of genera defines them as monophyletic aggregates of species to communicate their similarity to the exclusion of other species (the "anagenetic perspective", Bickham et al., 2007). A researcher adopting this approach might choose to name all substantial clades at some subjective level of diagnosis. Other researchers, in the interests of stability, would take a stricter phylogenetic perspective and only erect a new genus to resolve a paraphyly, one that is well supported by evidence (van Dijk et al., 2014: 333). They would then make a judgement to either bring existing genera into synonymy or divide the paraphyletic genus by naming a new genus and restricting the existing genus. An additional general consideration would be to avoid the creation of monotypic genera, generally regarded as undesirable in that they obscure relationships, unless the evidence for their distinctiveness were compelling.

Failure to define the concepts and approach to defining new taxa risks confusion or misunderstanding of the value of the work, particularly among those who work to different variants of the concept of species, genera or higher taxa, but who work with the same terminology.

3. Best practice for describing new species

For species, the authors should have

(a) Examined and undertaken a character analysis of the type specimens of all relevant species and their synonyms.
(b) Examined and undertaken a character analysis of sufficient available specimens from across the known geographical range of the proposed new species to ascertain variation in characters within the proposed species.

(c) Formulated a diagnosis that differentiates the taxa based on the character analyses.
(d) Nominated a whole adult specimen as Holotype, where available, and optionally lodged other specimens assigned to the same species to encapsulate ontogenetic variation, differences between the sexes, and indeed, to provide a verifiable limit to the morphological variation within the species being named – the species envelope for others to test subsequently. The type specimen(s) should be representative in the characters that diagnose the new species. The type(s) should be lodged with a recognised museum, normally a public (state or national) museum.

Failure to work to one or more of the above items risks that characters regarded as diagnostic may not apply to the type specimen(s) or may apply only to those populations of the species examined, or that those wishing to evaluate the work will not have access to the necessary specimens.

4. Best practice for describing new genera or higher taxa

Genera (and other higher taxa) should be demonstrably monophyletic, assuming paraphyly of genera and other higher taxa is considered unacceptable. The evidence for this may come from cladistic morphological analyses, molecular data or both. Once monophyly is established, characters that enable diagnosis of the new taxon should be demonstrably sufficient to enable other workers to confidently identify it. Justification of the existence of the newly named taxon must be based on morphological synapomorphies or, where these are not available, on equivalent molecular synapomorphies or well supported clades. Characters used for diagnosis can be more utilitarian and include symplesiomorphies (explicitly stated) where necessary, if such characters are convenient for day to day users of the taxonomy.

Genera (and other higher taxa) should be useful, in that they convey information on similarity of the species within and collective difference from species in other genera. The balance between the two is a matter for subjective judgement.

Thus, for genera, the authors should have

(a) Endeavoured to make nomenclatural changes based on multiple independent lines of evidence.
(b) Examined specimens and literature and conducted an character analysis to present comprehensive evidence and argument for the new taxonomic arrangement
(c) Formed a diagnosis to differentiate the new genus based on that character analysis using, where possible, shared derived characters (synapomorphies).
(d) Nominated a type species for the genus, the holotype of which should be representative in the characters that diagnose the new genus.

Analogous considerations apply to the level of Family and other higher level taxa.

In resolving paraphyly, it may become necessary to erect monotypic genera or monophyletic higher taxa. Many taxonomists regard monotypic taxa above the level of species as something to be avoided as they do not balance similarity among included species against collective difference, and because they are often not defined on synapomorphy (Bickham et al., 2007). In canvasing options for resolving paraphyly, as the primary objective, consideration should be given to minimizing the creation of monotypic taxa. Excessive splitting leading to numerous monotypic genera, as has

occurred in the marine turtles for example, can erode the information content of the taxonomic level of genus.

Authors are encouraged to consider the impact of premature publication of major nomenclatural change, on taxonomic stability (Spinks et al., 2015). Basing major nomenclatural changes, such as defining new genera or higher level taxa on incomplete evidence or limited application of available tools for gathering such evidence, admits an appreciable risk of the changes being overturned when the full gamut of available techniques are applied. This can lead to unwelcome and avoidable nomenclatural instability.

Concurrence of the Naming and the Science

The naming and the adequate and defensible scientific evidence supporting the taxonomic concept to which the new name is applied should occur together, in the same publication.

5. Peer Review

The taxonomic concept should be founded in new evidence or new interpretation or synthesis of existing published evidence, presented in a form and by a process appropriate for the adoption into the body of science and thus available for ongoing scientific scrutiny.

The peer reviewed journal chose for publication should be one with a demonstrable record of publication of taxonomic articles, and an editorial team including at least one reputable taxonomist. The Society welcomes the emergence of rapid turnover, peer reviewed journals specialising in taxonomy. Examples include *Zootaxa* and *Zookeys*.

6. Advocacy does not have a role

Species should not be defined in a context of evidence known to be inadequate, being driven by the precautionary principle or to serve conservation or management imperatives. To do so is regarded as intellectually dishonest and erodes the credibility of our science.

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