



“If you choose not to decide you still have made a choice”¹

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Abstract

Stability is an essential feature both to taxonomy and nomenclature. However, zoology is recently being flooded with countless proposals of taxonomic and/or nomenclatural changes, some of which may be considered premature when poorly supported or based upon overestimated hypotheses. We emphasize that the choice of not proposing nomenclatural and/or taxonomic changes might be as relevant as proposing new hypotheses and, therefore, must be carefully considered. Despite being apparently obvious and intuitive, this option seems to be only rarely cogitated.

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“The objects of the Code 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. All its provisions and recommendations are subservient to those ends and none restricts the freedom of taxonomic thought or actions.” (Anonymous [ICZN] 1999)

The paragraph above, extracted from the preamble of the *International Code of Zoological Nomenclature* (Anonymous [ICZN] 1999—hereafter “the *Code*”), highlights its concern with stability, an essential feature to taxonomy—whose power lies in its communicative value (Härilin 1998)—and to nomenclature, once proper names are unmeaning words that we associate with the idea of an object (Mill 1882) and, therefore, if our idea of an object changes too frequently, its name will probably lose its effectiveness. However, zoological systematics is undergoing frequent and accelerated changes resulting mainly from two causes: (1) the development, application and automation of new methodologies and technologies such as the use of molecular-based characters for hypothesizing phylogenetic relationships (Hedges 2013; Vences *et al.* 2013) or the employment of molecular-based identification methods, such as DNA barcoding (Hebert *et al.* 2003; Godfray 2007); and (2) the ever growing capacity for publishing papers (e.g., Zhang 2006, 2011), greatly

¹ Excerpt of lyrics from the song “Freewill”, written by Neil Peart and performed by the rock band Rush.

enhanced after the legitimization of journals produced exclusively on electronic media (Anonymous [ICZN] 2008, 2012), regardless of some concerns about the long-term effects of this decision for zoological nomenclature (Dubois *et al.* 2013; Anonymous [ICZN] 2014).

The circumstances above result in a scenario in which zoology is continually flooded with countless proposals of taxonomic and/or nomenclatural changes. This phenomenon could be interpreted as an attempt to overcome or minimize the extensively discussed problem of taxonomic impediment (Wheeler *et al.* 2004; Godfray 2007; Carvalho *et al.* 2007, 2013; Ebach *et al.* 2011; Costello *et al.* 2013), representing an effective and rapid response in light of the biodiversity crisis (Wilson 1985). However, some of these changes may be considered premature when presenting severe nomenclatural problems (by not following the *Code*) or being based upon inconclusive, under-sampled, poorly supported or overestimated hypotheses of phylogenetic relationships.

In this scenario, ambiguous, unnecessary or premature changes are frequently motivated by some of the following factors: (1) the notion that taxonomic changes potentially yield a considerable number of citations, consequently raising the impact factor of the journals that publish them, a metric that was corrupted from its original purpose (to measure the quality of journals) and is currently applied to evaluate scientists (Valdecasas 2011; Alberts 2013); (2) the misconceived idea that taxonomy disregards the need for specialists (Godfray 2007; for a counter argument see Carvalho *et al.* 2007, 2013); (3) the malpractices of “taxonomic piracy”, which destabilizes taxonomy and generates a myriad of problems (Oliver & Lee 2010; Kaiser *et al.* 2013); (4) the disorderly usage of “grey nomenclature”, which generally precludes objective comparisons across studies and whose meanings (in taxonomic grounds) are often obscure, leading to ambiguous interpretations concerning their applications (Minelli 2017); (5) a misconception regarding the meaning of related, but distinct, terms such as taxonomy and nomenclature—the former associated with hypotheses based on data leading to the discovery, delimitation and establishment of taxa relationships, while the latter corresponds to a set of rules regarding names (the *Code*), which is applicable under any taxonomic paradigm (Dubois 2008; Pyle & Michel 2008). Due to the reasons above, this huge load of changes has been the target of some debates concerning its utility and necessity, as well as the best practices and malpractices in taxonomic studies (e.g., Burbrink *et al.* 2007; Carvalho *et al.* 2013; Hedges 2013; Kaiser *et al.* 2013; Vences *et al.* 2013; Minelli 2017).

It is indispensable to clearly state that, in our opinion, taxonomic or nomenclatural changes are obviously not harmful *per se*. On the contrary, some level of instability is necessary and it is probable to occur some provisional taxonomic noise (see Minelli 2017 for examples of current usage of species labels in the BOLD and GenBank databases) because every change towards a better organization and portrayal of the current knowledge implies instability, even if temporarily (Hedges 2013). Besides, phylogenetic systematics is based upon hypotheses and, if authors desire that taxonomy matches these hypotheses, it is natural that some instability will occur when the current hypothesis is replaced by another one (Härlin 1998). However, the proposition/adoption of a new phylogenetic hypothesis does not necessarily imply immediate taxonomic or nomenclatural changes and, if so, it is necessary to analyze carefully the context where the possible changes emerge, so that we only propose those we find to be based upon well-supported hypotheses, which, therefore, appear to be less subject of being rapidly replaced (Kaiser *et al.* 2013).

Similar recommendations to avoid the proliferation of unnecessary nomenclatural or taxonomic changes are given in some papers written specifically with this purpose (Kaiser *et al.* 2013; Vences *et al.* 2013) and will not be repeated or discussed here. We have no intention to propose or discuss rules on how to distinguish between robust and less-supported hypotheses or the criteria applied to reach a preferable classification. This issue is (and will always be) a matter of personal opinion and, therefore, extremely subjective. Any attempt towards a generalization underestimates the diversity

of situations where decisions must be taken and creates a false sense of objectivity by trying to conceal the subjectivity inherent to the practice of biological sciences.

The aim of this paper is to emphasize that the choice of not proposing nomenclatural and/or taxonomic changes might be as relevant as proposing new hypotheses and, therefore, must be, at least, carefully considered. Moreover, this attitude should not be considered counterproductive, nor as a renounce on expressing an opinion on the addressed subject, or a lack of credibility in the data obtained by the authors. On the contrary, to be justified (as every choice should be) the choice for “not deciding” (not proposing new hypotheses) must be based on the nomenclatural history of the zoological group and demands the same degree of knowledge on the studied taxonomic scenario as it would be necessary to propose any taxonomic or nomenclatural change. Thus, authors should discuss the consequences of choosing distinct taxonomic arrangements and, based on these aspects and on the constraints of the formulated hypotheses (e.g., under-sampled taxa, lack of type specimens or other relevant terminal taxa, poorly supported trees and suboptimal phylogenies), recommend the maintenance of a previous taxonomic arrangement. This attitude may contribute to the taxonomy and systematics of a particular group by highlighting limitations of the currently available data (which are inherent to any scientific framework) and indicating specific issues that should be addressed in future studies, instead of masking these limitations behind the false impression of “conclusion” generated by a poorly supported hypothesis.

Despite being apparently obvious and intuitive, this option seems to be only rarely cogitated and, when chosen, is frequently target of an unjustified prejudice according to which “no changes” would imply “no news”, or even “no results”. Therefore, it is extremely important that the academic community as a whole (mainly academic advisors, referees and editors) encourage students and authors to reflect on the changes they propose and to weigh the pros and cons of generating nomenclatural and/or taxonomic instability on a case by case basis. Only this attitude may restrain the existing prejudice and contribute to a more robust development of taxonomy and systematics.

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