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Monophyly, parsimony and stability: threats to taxonomy

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ABSTRACT. The use of the concepts monophyly, parsimony and stability in the field of taxonomy is examined. It is argued that they are fundamentally inimical to sound taxonomy.

Key words: taxonomy, systematics, cladistics, reality, life

INTRODUCTION

In recent papers dealing with animal taxonomy and based on evolutionary thinking we often find three terms which seem to be important for the writers: (1) 'monophyly' or the avoidance of splitting; (2) 'parsimony' or economy in systematics and (3) 'stability' or a preference for a stable user-friendly system.

It has been pointed out by a Polish entomologist in Genus, an international journal of invertebrate taxonomy (HOŁYŃSKI 2005), how arguments for monophyly can work in an ironic way. However that kind of irony is a reality, and often backed up by references to 'parsimony' and 'stability'. Over-dependence on them can make it difficult to conduct and practise traditional taxonomy based on reality (= types). The result is a fashion increasingly divorced from reality, which lead to cloud-cuckooland.

In this short essay I present some brief remarks about how the concepts of 'monophyly', 'parsimony' and 'stability' are undermining taxonomists' work by their inappropriate application. I do not cite anybody's paper or results in particular because my intention is not to attack or harm anybody, but to stimulate

thought. I hope that my terms are self-explanatory so that there is no need for any special terminology. Finally I express my view that this paper is intended to be brief, generalized and simple – none of which are characteristic of life as we live it.

Monophyly

'Monophyly' has become a fashionable tool, out of place in the proper application of systematics, but a powerful weapon in the hands of people who are dismissive of taxonomy. By overemphasis on the importance of 'monophyly' systematists argue against the creation of monotypic genera by taxonomists, and the proposing of species-group names based on a single individual.

The observable reality that the type species of monotypic genera are distinct possessing unique morphology and different biology have, for them less significance or weight than that two species most probably share a common ancestor. Therefore, they see no need to recognise uniqueness, and as a result taxa based on a single specimen are dubious and question-marked in modern checklists.

This habit is counter-productive for taxonomy which is losing its force in science: papers establishing monobasic genera or species-group names on the basis of a single individual, are generally rejected by high-impact journals. Consequently taxonomists in positions where they are forced to collect impact points have to give up their traditional way of thinking and follow the fashion. There will be no monotypic genera and if there are any, their systematic placement will be declared as being unresolved.

Hundreds of taxa, each represented by a singleton are hidden in drawers undescribed because the curator of the collection is waiting for additional samples. However the possibility of repeating fieldwork to gather additional material diminishes with the passing years. But if we would show via describing them that these living organisms are unique, probably we would have more chance not only sample but also to keep them alive for the future.

Parsimony

The rule of parsimony used by clado-systematists for constructing phylogenetic relationships contradicts all the observations we have accumulated concerning the way how life is passing through time. Our experiments manifest that life is prodigal. The history of branching is complex and often generated by random effect or a series of effects almost impossible to reconstruct. Parsimony is a tool for gaining compatibility for the various cladograms built by computer programs.

This way of thinking is getting to be general. Because of this fashion, students are forced to apply cladistic methods for the sake of pure science. They probably never try to construct any kind of hypothetical tree using their own data, expertise

and logic, for fear of being accused of being subjective and non-scientific. So they blindly measure characters and are driven towards an increasingly unreal world of matrixes.

This method is counter-productive for taxonomy. Students will rarely develop a wider grasp of the group they study, which they will really need in the future when they have to judge what character it is important to qualify and what character it would be good to quantify in the taxon they are working on. Hence they will be unable to produce original work based on their own empirical capabilities and if their computer is knocked out they will be paralysed. Because of the applied methodology they will have learned, there will be no one capable of compiling and handling character matrices, or to be able to conduct the simplest mathematical calculation using paper and pencil. They will be shocked when they finally confront reality.

Life reveals that the populations we study are extremely diverse; yet we try to demonstrate that they are monophyletic, and display repeated convergence. This is no basis for effective science. Politicians and others committed to dubious theories of infinite human development will end up advocating the view that their survival is just a matter of sustaining one or two lineages, as biotechnology can solve the problem should we ever want to reconstruct the "lost world" of the past.

Stability

In the language of modern systematics, 'stability' is another important, often over-used word. People argue that taxonomy should be user-friendly and that means stability at all costs. Consequently, there is a fashion to create large genera for the sake of 'stability'. In modern checklists we are often faced with large 'monophyletic' genera, which ignore previous attempts to describe the diversity of given lineages, on the questionable grounds that previously established taxa were not monophyletic.

This is also counter-productive and unacceptable for sound taxonomy. For the sake of 'stability' we will have thrown away the knowledge of our predecessors and instead of providing further knowledge, we destroy what we already posses and provide sterile information. This is now the fashion, but fashion rarely stands the test of time. Indeed, behind the fashion for 'stability' there is often market-oriented thinking to the effect that an always-changing taxonomy is unacceptable and that experts are often fundamentally in conflict over taxonomic questions. The reality is that good (natural) taxonomy is easy to apply while bad (artefact) taxonomy is seriously flawed and intrinsically problematic, therefore the latter is always changing. Reaching stability in taxonomy is not a goal but a final point. As far as I am aware, there is no group of living organisms for which a stable taxonomy has yet crystallized.

Any taxonomy which posits supreme importance for 'stability' is certainly not a taxonomy that mirrors scientific reality. It is a 'taxonomy' driven by looking for

short term applications, and copious irrelevant citations, but which can offer an almost-immediate-feed-back. This is a contrived and entirely self-serving taxonomy.

Coda

The original meaning of evolution is "scrolling out the Book". Our Book is Life, and our method of scrolling out is the system of Binomial Nomenclature devised by CARL LINNAEUS. This Linnaean Binomial Nomenclatorial System is the physical, systematic tool of modern, scientific taxonomy. With the help of taxonomy we can detect how taxa are distributed geographically, spatially and temporally. We do not debate about how taxa appear nor how species are born. We deal with taxa which are as real as they were taxpayers, because they are (or were) members of a given ecosystem to which they contribute (or contributed). Thus all taxa are special in their life, because they all have a starting point, and an end, and they draw a unique three- dimensional pattern in time.

For me, in dealing with Life it is crucial to emphasize that life is diverse, rich and unique. 'Monophyly', 'parsimony' and 'stability', at least in their recent usage, are not my tools. They are counter-productive and only serve to obscure the reality on which I am working. On these points I am happy to be seen as a traditionalist.

It is fashionable to utter jeremiads on our "biodiversity crisis". But the crisis we face is more acute. It is a general crisis of life. Life diversity is decreasing at an

Thecloxurina atymna of the high Andes in Ecuador, Gualaceo (courtesy: P. BOYER)

alarmingly accelerated rate. Year by year there is less and less life, but there is more and more technical development with increasing diversity of lifeless goods. If we, taxonomists, who feel life's pulse, declare louder and louder that life is 'monophyletic', 'parsimonious' and 'stable' we are traitors to our discipline. We accumulate a lot of information about the genomics of various *Drosophila* species, but in spite of this we will not be able to blow life even into a single cell.

If we go on this way, we finish up only able to study the diversity, prodigy, unbalanced variability and dynamics of life in a single enormous, economically managed and well preserved world-wide collection amalgamated from the national collections of the world in absolute stability. There will be almost no life left under the open sky driven by the radiation of our glorious Sun as it was in myriad of forms in the past. We will not find *Thecloxurina atymna* (HEWITSON, 1870) JOHNSON, 1992 in any of the high mountains on planet Mars. We and our work will be useless.

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