



The new and improved PhyloCode, now with types, ranks, and even polyphyly: a conference report from the First International Phylogenetic Nomenclature Meeting

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Abstract

A report from the first International Phylogenetic Nomenclature Meeting is presented. The meeting revealed that the PhyloCode, once implemented, will itself not require adherence to the three major tenets of philosophy that proponents have claimed required its creation. These include the abandonment of (1) non-monophyletic taxa, (2) ranks, and (3) types.

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The first International Phylogenetic Nomenclature Meeting was held on 6–9 July 2004, in Paris, France. This meeting represented the fruition of more than a decade of argumentation against the current Codes of nomenclature (mainly the ICZN and the ICBN). The publication of the conference proceedings, expected next year, will mark the beginning of a new nomenclatural scheme that is supposed to be superior to current Codes.

Although the PhyloCode has been criticized in the scientific literature on many fronts (Nixon and Carpenter, 2000; Carpenter, 2003; Keller et al., 2003; Kojima, 2003; Schuh, 2003), the concept has held great sway with reporters; most articles on the subject fail to address both pro and con views, but instead show a decidedly pro-PhyloCode bias. The position that the current Codes are fundamentally and philosophically flawed, anti-evolutionary and antiquated sells quite well, and many reporters are eager to publish articles about vanguard scientists proposing renegade alterations in the dusty status quo. For example, the *New Scientist* (September 2004) recently called the PhyloCode “a more rational scheme” and characterized proponents as

“renegade biologists” and “rebels”. *Scientific American* (November 2004) chose to publish an introduction to and profile of Kevin de Queiroz himself, rather than examining the arguments for and against the proposed system; they characterized these “rebels” as “poised and eloquent” visionaries who have been “assailed” and “heckled” by conservative supporters of the “essential Linnaean system”. It is easy to paint such individuals with a veneer of genius, without ever examining their arguments.

That the PhyloCode is gaining popularity among the press while not gaining popularity among scientists is not inconsequential, but I will treat it no further here, except to say that one cannot blame PhyloCode supporters for taking support where they can get it. However, that the substantive arguments against the PhyloCode are being ignored, both by the press and by large portions of the systematic community, is of great consequence. The concomitant use of the PhyloCode and current Codes may soon be a reality, and this demands critical attention and scrutiny.

The first two days of the Paris meeting focused primarily on the philosophy and implementation of the code itself. Although on later days, specific taxonomic name changes were proposed (for example, various

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tetrapods, the Lamiaceae, Osteichtheys, Actinopterygii, and the Amniota “with emphasis on nonavian Reptilia”), these specifics are not as generally interesting as the framework of the new code itself. Accordingly my report deals only with this framework.

What has the PhyloCode become?

Rather than belabor some of the bizarre comments made at the meeting, like “systematists are lazy” (Nico Cellinese, Collections Manager of the Peabody Museum Herbarium) and “The derived loss of characters makes apomorphy-based definitions problematic” (Kevin Padian), I will focus instead on comments that were made at the meeting that summarize the status of the PhyloCode. As I will show, some of these are remarkably at odds with the long-heralded justifications for replacement of our current Codes.

On the first day of the Conference, Kevin de Queiroz provided a definition:

“Phylogenetic Nomenclature is an approach to biological nomenclature, which is the general discipline concerned with the names of groups of organisms, that is the names of taxa. Specifically, Phylogenetic Nomenclature is an approach that applies names to groups of organisms based on methods that specify the references of taxon names, that is the links between names and taxa, in terms of common descent. And this is simple enough, but there are a couple of things that deserve clarification.”

The clarification follows, and when the PhyloCode is viewed clearly, it is easily shown that its current form deviates sharply from the arguments that have advanced its creation. The central tenets of that argument have been that: (1) taxonomic regulations should require monophyletic taxa, (2) taxonomic regulations should be rankless, and (3) as typification is an anachronistic descendant of Aristotelean essentialism, types must be abandoned. On each of these points, PhyloCode proponents have either reversed or severely relaxed their position.

(1) *The meaning of common descent under the PhyloCode*

Early in the development of the argumentation that culminated with the PhyloCode, de Queiroz (1988) pointed out that, although polyphyly was, by then, mostly rejected, paraphyly was less so, and mentioned the debate between “cladists” and “gradists”, who insist on monophyly or permit paraphyly, respectively. de Queiroz (1988) dismissed polyphyletic groups as lacking historical unity, and addressed arguments for paraphyly. Ultimately, paraphyly, we were told, has a “nonevolutionary core” and it was linked to “classification” (as opposed to “systematization”, de Queiroz, 1988, p. 251; see also Griffiths, 1974; but see Keller et al., 2003). He

went on to say, “The persistent recognition of paraphyletic grade taxa is perhaps the best evidence that the Darwinian Revolution has not yet occurred in biological taxonomy. Paraphyletic grades are holdovers from preevolutionary taxonomies based on the *Scala Naturae*, or great chain of being” (p. 252). Could a more terse indictment of paraphyly, condemning its continuation, be written? Probably not. But, as de Queiroz had explained earlier in his talk, “there are a couple of things that deserve clarification”:

“The first is that phylogenetic Nomenclature should not be confused with phylogenetic or cladistic classification, in particular with the principle that taxa ought to be monophyletic. Although Phylogenetic Nomenclature is compatible with cladistic classification in that it is designed to name clades, which are equivalent to monophyletic groups, names can also be applied to monophyletic groups under the traditional approach. Which, though, as I’ll point out later, this has some problems. *Furthermore, the methods of Phylogenetic Nomenclature can, at least in principle be adapted to name paraphyletic and even polyphyletic groups.* Now that’s not to say that any of the practitioners of Phylogenetic Nomenclature would advocate such a practice. The point is that the approach of stating the references of taxon names in terms of common descent is a very general approach—one that’s compatible with diverse approaches to taxonomy” (emphasis added).

Now under the PhyloCode “stating the references of taxon names in terms of common descent” is general enough to include methods of stating references of taxon names in terms of symplesiomorphy and parallelisms—not only in terms of common descent. This undermines more than a decade of argumentation that the Zoological and Botanical Codes’ permission of non-monophyletic taxa is anathema in an evolutionary science (de Queiroz, 1988; de Queiroz and Gauthier, 1990; Cantino et al., 1997). In no uncertain words, de Queiroz (1988) advocated, “As long as taxa are viewed as classes, taxonomy will maintain independence from the concept of evolution” (p. 253). If the recognition of polyphyletic and paraphyletic groups is only possible if taxonomists view taxa as classes, and if classification is fundamentally incompatible with evolution, in what sense is the PhyloCode now promoting the “Darwinian Revolution” in systematics?

As is well known, the eradication of paraphyly (and the lingering remnants of polyphyly) was the aim of the Cladistic Revolution of the 1970s. Today, with few exceptions, active taxonomists, regardless of their preferred phylogenetic optimality criterion, agree that supra-specific taxa should be monophyletic. Even the few remaining proponents of paraphyletic taxa acknowledge their minority (e.g., Brummitt, 2002). But now, the new code that we are told will bring the “Darwinian Revolution” to systematics has adopted a permissive stance not only on paraphyly, but also on polyphyly. Of course, the current Codes do not insist upon mono-

phyly. But the PhyloCode purports to make nomenclature strictly phylogenetic, eradicate nonevolutionary taxonomy, parse classification from systematization, and finish Darwin's good work once and for all. The PhyloCode is supposed to "fix" this problem with the current Codes, but now it is clear that the PhyloCode will be agnostic on the issue of monophyly just as our standing nomenclatural rules are. Does this mean the PhyloCode is abandoning its *raison d'être*—the insistence that taxonomy must be strictly "phylogenetic?" Apparently, the answer is "yes."

(2) *The permission of ranks under the PhyloCode*

A second precept of the arguments leading to the PhyloCode is the superfluity of ranks in taxonomy (de Queiroz, 1997). We are told that ranks belong to "classifications" rather than "systematizations" and are nonevolutionary (de Queiroz and Gauthier, 1992, 1994; Cantino et al., 1997). But the most "revolutionary" recommendation offered—which we are told is only logically consistent with the philosophy that separates classification from phylogenetic systematization—is that ranks are best abandoned (de Queiroz and Gauthier, 1992, 1994; Cantino et al., 1997). Yet, at the PhyloCode meeting, de Queiroz said that the PhyloCode is "not to be confused with rank-free taxonomy". While "rank-based" taxonomy is "the antithesis of the PhyloCode, ranks are allowed in the PhyloCode". So ranks, which are not systematizations, but classifications, which are both pre- and nonevolutionary (de Queiroz and Gauthier, 1992, 1994; Cantino et al., 1997), and which hinder the "evolutionization of taxonomy" (de Queiroz, 1997) will now be a part of the "Darwinian Revolution" in taxonomy.

(3) *Specifiers: essentially types*

Perhaps the most surprising single statement I heard uttered at the meeting was again made by de Queiroz. In what is apparently a concession to critics who have pointed out the lack of significant difference between "specifiers" under the PhyloCode and "types" under the Zoological and Botanical Codes (Nixon and Carpenter, 2000; Keller et al., 2003), de Queiroz said:

"Iguanidae in a ranked system, the family is defined by its inclusion of the genus *Iguana* and the type, but in the PhyloCode, specifiers are used, *which are roughly analogous to types.*" (emphasis added).

This statement could not stand in more stark contrast with de Queiroz and Gauthier (1990, 1992, 1994) and de Queiroz (1994), all of which make the case that the use of type specimens is to define the essence of the species. Specifiers are supposed to avoid this essentialism of types. However, the acknowledgment of an intimate

similarity between "types" and "specifiers" undermines prior arguments that these two concepts derive from inherently opposing philosophies. Apparently, the architects of the PhyloCode now admit that "specification" amounts—whether roughly or essentially—to typification.

Conclusions

In recent years, a few systematists have begun articulating arguments that show the PhyloCode and its underlying philosophy to be less than desirable. Regarding monophyly, few practicing systematists recognize polyphyletic or paraphyletic taxa, even though the current Codes permit them. The PhyloCode will not differ in this respect. Arguments in favor of the use of ranks have also been offered. Rank-based names are not required for all clades under the current Codes, and systematists regularly name clades that correspond to no rank (Nixon et al., 2003). Ranked hierarchy provides information content in its structure, and part of this is conveyed in the use of endings that are associated with the rank (Schuh, 2003). Now the PhyloCode will permit the use of ranks as well. With respect to types, they are simply necessary for any taxonomy, because names must be linked to specimens (Schuh, 2003) if our system of nomenclature is to remain a scientific endeavor. The PhyloCode has rediscovered this, and will permit a system "roughly analogous to types."

The architects of the PhyloCode have reversed their positions on the three main points of contention that they have articulated for some 15 years—namely that taxonomy must be a monophyletic, rankless, system that rejects the type concept. Why have they done this? Perhaps it is an attempt to be everything to everyone—and in so doing invite an exodus from the current Codes to a new scheme. Perhaps they have been swayed by cogent arguments, as any honest scientists should. I do not fault them for this. When new information, or a better argument, comes to light, thinking people should change their position. Indeed, these actions are admirable. But in the case of the PhyloCode, in doing this supporters have surely ostracized their few core devotees who accept the arguments that ranks are of the nonevolutionary "classification" and not of darwinian "systematization", that types are essentialist, and that monophyly should be per force used. This justified acquiescence has rendered the entire effort moot, as the proposed PhyloCode now fails to uphold hardly an inkling of the essence of the philosophy behind it.

In the recent article in *Scientific American*, de Queiroz is quoted as having said, "The PhyloCode doesn't

matter—it's the principle that matters." But as evidenced at the Paris meeting, the PhyloCode has abandoned its philosophical foundation, possibly in an effort at pluralism. If the PhyloCode no longer embodies the allegedly important principles that gave it birth, and the "PhyloCode doesn't matter", what principles remain?

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