

Proposal for Changes to the PhyloCode, with Respect to Species

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The overarching goal of this proposal is to remove all mention of "species" from the PhyloCode. Detailed justifications for this goal are given in a supporting paper (Cellinese, Baum, and Mishler, in review); here we present a summary of the main arguments, along with specific proposals for change.

All agree that the PhyloCode is about naming clades, and removing ranks from nomenclature. Yet unfortunately there remain aspects in the current wording of the code that are not about naming clades and that retain rank considerations. These aspects all surround the traditional Linnaean rank of species. The PhyloCode currently states that "*In this code, the terms "species" and "clade" refer to different kinds of biological entities, not ranks*" (note 3.1.1.). While the concept of species implicitly endorsed by the PhyloCode, that of de Queiroz (2007), does indeed assume that species and clade are distinct entities, this is not universally accepted by any means. Many different species concepts are currently applied across the different biological domains (Mayden 1997). Some, like de Queiroz (2007) view species as lineages. Others (e.g. Mishler 1999; Pleijel 1999; Mishler and Theriot 2000 a,b,c; Baum 2009) view species as ranked or unranked clades. But this disagreement is not relevant to a Code of nomenclature that is (supposedly) rank-agnostic and concerned only with naming clades. The debate over species concepts does not need to be solved for the purpose of naming clades under the PhyloCode. Phylogenetic nomenclature can and should remain logically independent from the philosophical debate about species. Therefore, the PhyloCode need not and should not anoint any particular species concept as the correct one. By leaving the word "species" out of the entire document it will be clear that the PhyloCode is available to all systematists regardless of their views on the nature of species.

The PhyloCode as currently constructed works under the assumption that species are not clades, yet paradoxically brings species into the naming of clades in a couple of damaging ways. One is by its current ruling (Article 10.9) that traditional species names should be disallowed for clades. The current version of the PhyloCode, influenced by Dayrat et al. (2008), effectively applies special rules at the "species" level. When a clade happens to have identical content to a traditional species, the PhyloCode now mandates that that clade be given a new name, distinct from the traditional species name. In this way, the PhyloCode establishes parallel nomenclatural systems for species and species-approximating clades. We argue that this is illogical; as there are no ranks under the PhyloCode, there should not be an explicit or implicit rank of species. Phylogenetic nomenclature should accommodate clades whose content is identical to current species (under whatever species concept). We propose that the PhyloCode be modified to be neutral about species and thus to accommodate all users, including those who wish to be able to attach appropriate names to clades that approximate taxa at the traditional species level.

Another way in which the current version of the PhyloCode generates problems for itself is that it allows species to be used as specifiers for clade names (Art. 11), and relegates the governing of species names to the traditional Codes (Art. 21). This means that the PhyloCode is not a freestanding system of nomenclature. This is unwise; PhyloCode should be independent and self-contained. No rules in the PhyloCode should depend on rules in the traditional Codes, including rules for species names. This is easily solved by requiring that specifiers under the PhyloCode be museum or herbarium specimens (physical reference objects, possibly Linnaean types at the discretion of the taxonomist) at all levels, never Linnaean binomials per se. Linnaean species binomials are incompatible with phylogenetic taxonomy because they naturally imply the existence of a genus rank, and they are incommensurable with phylogenetic taxa because they are named using only one type (Cellinese, Baum, and Mishler, in review).

Since its purpose is to name clades, any mention of 'species' in the PhyloCode should be removed. We propose to streamline the PhyloCode to focus solely on rational procedures for naming clades with uninomials at any level including the traditional species level. The rules governing names of clades at and around the traditional species level should follow exactly the same rules and recommendations as at higher levels. We present specific proposals to change the PhyloCode below.

Proposals for modification of articles in the PhyloCode, showing current wording followed by proposed changes:

Preamble, item 1. *Biology requires a precise, coherent, international system for naming clades and species of organisms. Species names have long been governed by the traditional codes (listed in Preamble item 4), but those codes do not provide a means to give stable, unambiguous names to clades. This code satisfies that need by providing rules for naming clades and describing the nomenclatural principles that form the basis for those rules.*

Proposal: Remove mention of species. Replace this article with the following text: *Biology requires a precise, coherent, international system for naming clades of organisms. Taxonomic names have long been governed by the traditional codes (listed in Preamble item 4), but those codes do not provide a means to give stable, unambiguous names to clades. This code satisfies that need by providing rules for naming clades and describing the nomenclatural principles that form the basis for those rules.*

Art. 1.1. *The groups of organisms whose names are governed by this code are called taxa (singular: taxon). Taxa may be clades or species, but only clade names are governed by this code.*

Proposal: Remove mention of species. Replace this article with the following text: *The groups of organisms whose names are governed by this code are called taxa (singular: taxon). Only clade names are governed by this code.*

Art. 2.1. *In this code, a clade is an ancestor (an organism, population, or species) and all of its descendants.*

Proposal: Remove mention of species. Replace this article with the following text: *In this code, a clade is an ancestor (an organism or population) and all of its descendants."*

Art. 2.2. *In this code, the following categories of clades are recognized based on how they are conceptualized with respect to the components of a phylogenetic tree...*

Proposal: In the list of definitions, remove "species" and just leave "organisms."

Note 3.1.1. *In this code, the terms "species" and "clade" refer to different kinds of biological entities, not ranks.*

Proposal: Remove note 3.1.1 entirely.

Art. 9.4. *It is permissible to establish a name with a crown clade definition using an internal specifier that is not extant on the publication date under the following conditions: If that internal specifier is a species, either the specifier must have been extant as of 1500 CE or there must be specimens of the specifier species in existence that were collected when that species was extant. If that internal specifier is a specimen, the organism must either have died in or after 1500 CE or have been alive when it was collected.*

Proposal: Clarify that only specimens can be specifiers; remove reference to species. Replace this article with the following text: *It is permissible to establish a name with a crown clade definition using an internal specifier that is not extant on the publication date under the following condition: the internal specifier must be a specimen that either died in or after 1500 CE or was alive when it was collected.*

Art. 9.5. *If the author of a crown clade definition (Note 9.3.1) did not specify the meaning of "extant" or "crown clade", then subsequent authors are to interpret that definition as referring to organisms or species that were extant on its publication date (Art. 5).*

Proposal: Remove reference to species. Replace this article with the following text: *If the author of a crown clade definition (Note 9.3.1) did not specify the meaning of "extant" or "crown clade", then subsequent authors are to interpret that definition as referring to organisms that were extant on its publication date (Art. 5).*

Art. 9.7. *In order for a clade name to be established, the protologue must include a statement about the hypothesized composition of the clade (e.g., a list of included species or subclades or reference to such a list).*

Proposal: Remove reference to species; composition of the clade should include subclades and/or specimens. Replace this article with the following text: *In order for a clade name to be established, the protologue must include a statement about the hypothesized composition of the clade (e.g., a list of included subclades, if any; specimens examined/studied; or reference to such lists).*

Rec 9c (art. 9.10). *In order to facilitate the referral of species that are not specifiers of the clade name, the protologue should include a description, diagnosis, or list of synapomorphies.*

Proposal: All reference to species in this recommendation should be removed. Replace this article with the following text: *In order to facilitate the referral of specimens that are not specifiers of the clade name, the protologue should include a description, diagnosis, or list of synapomorphies.*

Art. 10.5. *The definition of a panclade name is branch-based and will take the form "the total clade composed of the crown clade [name of the crown clade] and all extinct organisms or species that share a more recent common ancestor with [name of the crown clade] than with any extant organisms or species that are not members of [name of crown clade]" or "the total clade of the crown clade [name of the crown clade]"....*

Proposal: All reference to species as specifiers should be removed from this article and its notes. Replace all instances of "organisms or species" with "organisms."

Article 10.9. *A clade name may not be converted from a preexisting specific or infraspecific epithet (ICBN and ICNB) or from a name in the species group (ICZN).*

Proposal: Remove Article 10.9 in its entirety.

Art. 11.1-11.10. *Specifiers are species, specimens, or apomorphies cited in a phylogenetic definition of a name as reference points that serve to specify the clade to which the name applies....*

Proposal: All reference to species as specifiers should be removed from these articles and notes. Replace "species, specimens, or apomorphies" with "specimens or apomorphies" throughout. Remove Note 11.1.1, Article 11.3, and recommendation 11.B.

Art. 13. *Homonymy.*

General proposal: That nominal author and year be considered officially part of every PhyloCode name (following up a suggestion by Dayrat, Schander, and Angielczyk, 2004, but applying it to all levels instead of only species). Names are only homonyms if they have identical spelling, author, and year. While useful at all levels, this change will in particular facilitate the conversion of species epithets under the rank-based codes to clade names under the PhyloCode, thus fulfilling the spirit of Article 10 by maximize continuity with existing literature.

Art. 13.1. *Homonyms are names that are spelled identically but refer to different taxa. In this code, all homonyms are established and identically spelled clade names based on different phylogenetic definitions. However, not all identically spelled clade names based on different phylogenetic definitions are necessarily homonyms because different definitions may refer to the same clade under some phylogenetic hypotheses but not under others.*

Proposal: Replace this article with the following text: *Homonyms are names that are spelled identically and have the same author and year, but refer to different taxa. In this code, all homonyms are established and identically spelled clade names based on different phylogenetic definitions. However, not all identically spelled clade names based on different phylogenetic definitions are necessarily homonyms because different definitions may refer to the same clade under some phylogenetic hypotheses but not under others.*

Note 13.2.2. *A species and its type specimen are considered to be the same specifier (see Note 11.1.1).*

Proposal: Remove Note 13.2.2 in its entirety.

Note 13.2.3. *Homonyms result when an author establishes a name that is spelled identically to, but defined differently than, an earlier established name. This situation can occur either*

when an author is unaware of the earlier establishment of an identically spelled but differently defined name ([Example 1](#)) or when an author knowingly adopts an earlier established name but proposes, either deliberately or inadvertently, a different definition for that name ([Example 2](#)). Although names in the second scenario can be considered the same name in the sense that one use is derived from the other (see [Note 9.8A.1](#)), the identically spelled names in both scenarios are treated as homonyms under this code because they have different definitions.

Proposal: Replace this note with the following text, and delete examples 1 and 2 entirely: *Homonyms result when one author establishes a name in the same year that is spelled identically to, but defined differently than, an earlier established name by that author in the same year.* [end of note]

Art. 13.3. *If two or more definitions have been established for identically spelled names, the only acceptable name (i.e., the combination of name and definition; see [Note 12.1.1](#)) is the first one established under this code. A later homonym, unless conserved, is not an acceptable name of any taxon.*

Proposal: Replace this note with the following text: *If two or more definitions have been established for identically spelled names by the same author in the same year, the only acceptable name (i.e., the combination of name and definition; see [Note 12.1.1](#)) is the first one established under this code. A later homonym, unless conserved, is not an acceptable name of any taxon.*

13.5. *If the oldest name of a taxon is not acceptable because it is a later homonym, it is to be replaced by the established name that has precedence....*

Proposal: Remove Article 13.5 in its entirety.

Art. 21.1-21.5. *This code does not govern the establishment or precedence of species names. To be considered available (ICZN) or validly published (ICBN, ICNB), a species name must satisfy the provisions of the appropriate rank-based code (e.g., ICNB, ICBN, ICZN). This article describes how species names governed by the rank-based codes are to be interpreted and used under this code...*

Proposal: Remove Article 21 in its entirety; it is superfluous since the PhyloCode does not govern the establishment or precedence of *any* name in the rank-based codes.

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