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PROPOSALS TO AMEND THE CODE

Edited by Dan H. Nicolson (US)

Introductory comments on the *Draft BioCode*, from a botanical point of view

Werner Greuter¹ & Dan H. Nicolson²

Introduction

After an initial period of committee work, the *Draft BioCode* is now being released to the general scientific public. It will likely generate keen interest and lively debates, perhaps heated controversy. Providing a novel basis for a unified nomenclature of organisms for the future may at first sight seem a revolutionary, reckless enterprise, but we believe it is the appropriate and timely response of biological systematics to the challenges of a rapidly changing scientific and intellectual environment.

Much thought has already gone into the *Draft*, although refining it further remains necessary. Many questions that come readily to mind have been taken care of, although this may not always be immediately obvious. Some guidance for “new-comers” is needed, so as to enable them to compare what is being proposed with the current rules and procedures of botanical nomenclature. We foresaw this need when, last year, we circulated an earlier version among the members of the General Committee on Botanical Nomenclature. The following considerations build upon the corollary comments which, as Chairman and Secretary of the General Committee, we had jotted down on the occasion of that initial circulation. They have been somewhat expanded and updated.

The necessary background information is provided in a paper by IUBS President David Hawksworth (in *Taxon* 44: 447-456. 1995). The *Draft BioCode* itself is printed on the pages that follow. Three contributions in the ‘Points of View’ column, in this issue of *Taxon*, open the much-needed general debate on the bionomenclature theme. Zoologists and bacteriologists are embarking on the same type of exchanges and discussions in parallel. The first public *BioCode* meeting intended for biologists of all disciplines will take place during ICSEB V (17-24 August 1996) in Budapest.

Commentary

General points. – New terms are proposed for many of the familiar nomenclatural expressions such as “effectively published”, “validly published”, “legitimate” and “correct”. In this way, it is hoped in the future to avoid ambiguity that presently

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results from use of the same terms for different concepts, or of different terms for the same concept, by the current *Codes*. An overview of the new terms and their current equivalents is given in table 1 of the *Draft BioCode*. Harmonization of nomenclatural terminology is a matter of some consequence. It is among the remits of the Special Committee on Harmonization of Codes set up in Yokohama to report at the St Louis Congress (see Englera 14: 193. 1994; Taxon 43: 284. 1994), and the Committee is being asked to advise on this matter in particular. Independently, the International Commission for the Nomenclature of Cultivated Plants has already adopted the new terminology for the most recent edition of the *International code of nomenclature for cultivated plants* (Trehane & al. in *Regnum Veg.* 133, 1995).

Understandably, though regrettably, no examples can be listed in the *Draft BioCode*. While some may be supplied at a later stage, this will not be possible for many of the provisions, which deal exclusively with future names and situations. Notes and Recommendations have also been omitted for the time being, although some will no doubt be needed. Several articles and paragraphs of the current *Code* were dropped, either because they refer solely to situations of the past, or because they were found to be inapplicable or inappropriate in the new context.

Coverage. – Coverage delimitation against the current *Codes* is defined in Pre. 2-3, where it is made explicit that the *BioCode* is intended to govern only the nomenclature of the future. This means that (a) names existing prior to the starting-point date for the *BioCode* would not (except in specified cases) be affected by the new rules, and that (b) the current *Codes* for the major groups of organisms would remain operational for pre-*BioCode* names.

Rules governing the form of names are, as they must be, fully retroactive. The form of existing names may therefore be affected by such rules insofar as they deviate from those in one of the current *Codes*. The requirement of user-friendliness and the respect for traditions of long standing may result in different standardization rules, notably for the spelling of epithets, for the different major groups – such details to be covered in a future special Annex (foreshadowed in Art. 37.8-9). Differences in the terminations at the higher ranks will remain (Art. 25-26), adding to those already in existence between fungi, algae, and other plants.

Also retroactive are the rules governing the choice between competing names in order to establish which name is accepted (correct) for a taxon in a given circumscription, position, and rank (Art. 19). The new (across-kingdoms) homonymy rule (Art. 18) would not, however, be retroactive.

Ranks, priority. – The present ranks of the botanical *Code* are maintained in the *Draft BioCode*, and a few tentatively added: domain (above kingdom), in use for the pro-/eukaryotes, superfamily (in widespread use in zoology), and the option of adding the prefix super- to rank designations that are not already prefixed (Art. 3-4).

The *Draft BioCode* recognizes six groups of ranks (Art. 9.3); these are important because the principle of mandatory precedence (priority) is to operate only within three of them (Art. 19.8), and because vertical transfers of names across the boundaries of the groups is to be precluded (Art. 9.3). Both features would be major innovations for botanical nomenclature.

The three rank groups with mandatory precedence are those presently covered by the zoological *Code* (which does not deal with ranks outside these groups): family-group, genus-group, and species-group. For botany, the principle of precedence is to

remain facultative at the suprafamilial ranks, and to become so at ranks of subdivisions of genera other than subgenus and at infraspecific ranks other than subspecies (this provision would have retroactive effect). There can be little doubt that removal of mandatory precedence, when considered in the light of Principles VII and VIII, will have a stabilizing effect on nomenclature at these ranks.

Transfers of names (stat. nov.) across the subgenus-section and subspecies-variety boundary would no longer be possible (former such transfers to remain valid).

Coordinate status. – It is proposed that the rule presently prevailing in zoology be extended to botany. This would mean that in the family-group, genus-group, and species-group, establishment of any name will automatically establish coordinate names, with the same authorship and date, at all other ranks of the same group. This rule, which would not of course operate retroactively, would relay the autonym rule and differ from it mainly in two respects: (a) the date of establishment of the “autonym” (a term not used in the *Draft BioCode*) would usually be earlier (and more easily ascertained), and (b) “autonyms” would be established in an upward as well as downward direction in the taxonomic hierarchy.

Introducing coordinate status in the genus group has one major consequence: since any new subgeneric name will simultaneously be established at generic rank, its epithet must have the same form as a generic name and can no longer be a plural adjective. This rule (Art. 28.2), concerning the form of names, should logically be retroactive and, if so, would lead to the devalidation of former subgeneric names of which the epithets (contrary to Rec. 21B.1 of the *Tokyo Code*) are adjectival. Negative effects, if any, might be minimized by a minor change of Art. 28.3, whereby such names, rather than losing their nomenclatural status, would remain valid but become unranked (and infra-subgeneric).

Publication. – Some possible innovations, to account for recent progress in publication technology, have been tentatively incorporated into Art. 5.2. They would not be retroactive. The Special Committee on Electronic Publishing and Databasing (see Taxon 43: 285. 1994) is being asked for an opinion on the desirability of accepting new media such as non-erasable laser disks as publication vectors for new names.

Establishment of names. – Establishment under the *BioCode* includes registration as a last step after fulfilment of the present requirements for valid publication (Art. 8.1(e), 13). The idea of registration is familiar to botanists, being already foreshadowed in the *Tokyo Code* (Art. 32.1-2, 45.2). Procedures and mechanisms of registration are yet to be worked out in detail, in a special Annex, and may well be to some extent independent for the various major groups of organisms. Ultimate responsibility for the registration system is assigned to the International Committee on Bionomenclature in Div. III.7, but the IAPT, although not now explicitly mentioned, is likely to play an active role in the registration of names of botanical taxa.

At present, the requirement of Latin descriptive matter for the validation of names of new taxa is a unique feature of the botanical *Code*. The *Draft BioCode* (Art. 8.2) opts for a compromise between zoology (any language) and botany (Latin only), and assigns a pioneer role to palaeobotany (already requiring Latin or English).

Art. 8.3 would introduce an additional requirement for the establishment of names, that Zoologists are about to introduce in their forthcoming *Code*. This seems a good

idea, minimizing the risk of “inadvertent” establishment of new names when in botany the Latin requirement will no longer serve as a filter.

Limitations of precedence (priority). – While sanctioning concerns old names only and need not be provided for in a future *BioCode* (see also Art. 19.1, last sentence), adopted lists of names in current use, a much debated issue in botanical nomenclature, would become a newly available option (Art. 21), already included in the draft version of the next zoological *Code*. For the conservation of names (Art. 20) rank limitations would be abolished, by analogy to the current zoological *Code* and as a logical consequence of coordinate status of future names within rank groups. (The difference with respect to the present situation is in fact minimal, since limitation of precedence makes sense only in rank groups with mandatory precedence.) Conservation and rejection procedures would remain largely unchanged (Div. III.9).

Homonymy. – The major change with respect to the homonymy rule would be that, in the future, it would operate across the kingdoms (Art. 18.1). In order that this provision be applicable, it is necessary that lists of established generic names of all kinds of organisms be publicly available, ideally in electronic format – in which, we are told, they already exist but are not yet generally accessible. A list of inter-kingdom generic homonyms in current use is being prepared, and as a next step a list of binomina in the corresponding genera is planned, so that future workers may avoid the creation of new (illegal) homonymous binomina. Existing inter-kingdom homonyms would not lose their status of acceptable names, but would be flagged for the benefit of biological indexers and users of indexes.

Pre. 5, Art. 25.6, 26.2 and 28.1 would, for future names, preclude homonymy and confusability between names of organisms and those of viruses. Existing names are not affected by the proposed rules.

Spelling and gender of names. – Lively discussions are taking place among zoologists, aiming at the abolishment of gender of generic names and at the unchanged maintenance of adjectival epithet terminations upon transfer. This might ultimately result (we take an example from zoology) in *Passer domesticus* (L.), based on *Fringilla domestica* L., having to become known as *Passer domestica*. To those who are not Latin illiterates (an increasingly small number, we are told), and presumably to many biologists fluent in modern Romance languages, such a change would be very disturbing (to put it mildly). It would also impair predictability, forcing users of names to check in every case the original nomenclatural source, or at least to consult an authoritative compendium.

It is our belief that such nefarious new trends, which might well expand to botany, might best be checked (in the interest of all concerned, not only of the erudite) by providing fool-proof recipes to users and inventors of names, at three levels: (1) authoritative guidance on the appropriate gender of generic names (Art. 39.2-3) – already present for a substantial share of botanical names in *NCU-3* (Greuter & al. in *Regnum Veg.* 129. 1993); (2) similar guidance on the appropriate form, spelling and declination of epithets and word elements used in their formation (Art. 37.5-10); and (3), perhaps somewhat less urgently, guidelines on the appropriate genitive singular termination to be used in compounding and in the formation of suprageneric names. Concomitantly, an effort to standardize a number of presently allowed variant spellings (think of *sylvaticus/silvaticus*, *caespitosus/cespitosus*, *missouriensis/missouren-*

sis) might be possible, so as to make scientific names of organisms more predictable than at present (Art. 37.8-9). For future names, the registration procedure would offer a choice opportunity to prevent incorrect usage of gender, or non-standard spellings, from spreading (see Art. 37.2, 39.4).

Author citation. – The *Draft BioCode* signals a departure from traditional emphasis on (correct and full) author citations, now particularly popular with botanists. This may be a timely change, since botanical purism is showing signs of crackling (e.g., Garnock-Jones & Willis in *Taxon* 45: 285-286, 1996). Art. 40.1 foreshadows this changed attitude. Zoological tradition, which we believe is basically sound, has never been friendly toward the authors of new combinations. Under Art. 41, mention of the (post-parenthetical) author of a transfer would become optional. Otherwise, the draft rules for author citation closely follow the wording of Art. 46 of the *Tokyo Code*.

Ambiregna organisms. – While many of the provisions of the *BioCode* will come as a relief to workers in ambiregna groups, they will not completely solve their problems. Inevitably some rules will remain that are different for different groups of organisms, however defined. Boderline problems are notoriously difficult to solve, and are in fact insoluble unless and until a consensus is reached, among workers in the groups concerned, as to which is the appropriate borderline. As experience tells, such difficulties are surmountable if they can be dealt with under a single *Code*: there has never been a problem, under the botanical *Code*, in delimiting fungi from algae from other plants, or fossil from non-fossil taxa, and there used to be no problems with the “blue-greens” as long as bacteria and algae were dealt with under the same *Code*. It will be the task and privilege of a future *BioCode* to define which rules apply to dinophytes and dinoflagellates, to euglenids, trichomonads and trypanosomes. Div. III.4 provides the necessary mechanisms for doing so, and we have no doubt that they will work and lead to generally acceptable solutions.

Hybrids. – The Appendix for Hybrids is replaced by a single Article in the *Draft BioCode*, Art. 34. This terrific simplification has a change in philosophy at its base, but should in no way disrupt present and future usage of hybrid designations. By the new rule, taxonomy and nomenclature are disentangled, in conformity with Principle I. Nothing remains of the former statement on appropriate rank, or of the requirement of a single hybrid taxon per hybrid combination. The condensed formulae designating intergeneric (and worse, intersectional) hybrids are removed from the realm of nomenclature and confined to the fancy world where they belong, except that they can serve as surrogates of generic names in the formation of binomina. The danger that, in view of this “generic” function, they might have to be considered for purposes of homonymy (and thus indexed) has been avoided by a nice little trick: to consider the multiplication sign as part of these “names”.

Special topics. – Art. 25.1 aims at introducing a clearer definition of what the botanical *Code* calls “descriptive names” at the suprafamilial ranks. Such names are generally used in zoology, much more widely than in botany. As worded, the Article reflects current botanical (and zoological) practice.

Art. 36 on form-taxa, developed on the basis of Art. 59 of the botanical *Code*, attempts to cover new and treacherous ground. It is being actively and controversially discussed by mycologists and palaeobotanists. The zoological *Code* has no special provisions for naming organ genera (e.g. conodonts), and apparently none are

needed. Palaeobotanists may find it desirable to prevent the use of names of organ taxa for whole fossil organisms, or for different fossil organs, once the link is established. We doubt that palaeobotanists would want to take up, say, a name typified by pollen grains for a fossil leaf or wood sample when both prove to pertain to the same organism. Art. 36 is designed to solve that difficulty. On the other hand, there is growing uneasiness among mycologists concerning the present nomenclatural rules on fungal anamorphs. Whether and in what form Art. 36 of the present *Draft* will survive must depend on the preferences of those who are directly concerned.

The way ahead

The *Draft BioCode* includes, as its newest item, a Division III on authority and mechanisms that was still absent from its forerunners. It shows, among other things, how and under which procedural rules the *BioCode* can enter real life. The international scientific Unions (IUBS and IUMS) intend to use their prerogative, to govern bionomenclature, more directly in the future than they did in the past. However, the immediate patrons of the current *Codes*, the International Botanical Congresses in the case of botany, will have to agree before the *BioCode* can operate.

We must thus assume that the Nomenclature Section at St Louis in 1999 will be faced with a request to accept authority transfer from the botanical *Code* to the *BioCode*, conditional upon approval of similar requests by the two other bodies concerned. The date on which such transfer of authority may take effect will be decided by the new de-facto nomenclatural authority, an international committee in which botanists will be represented with two of nine members. [This may be the moment to point out that the fateful date, 1 January 2000, whose apparent prominence in the *BioCode* has caused such worry, is nothing more than an optimistic guess.]

Assuming all this will happen, the role of our botanical *Code* will change. It will still rule the names of the past, although its provisions on the establishment of names will see their effect limited in time, and relevant Recommendations may presumably be scrapped. Several editorial changes, including new notes and examples, will presumably be needed, and the next Editorial Committee will face a heavy work load. It may be desirable, and would certainly be feasible, to produce a combined edition integrating the old and new rules in a single body of text.

Independently of the (provisional or ultimate) fate of the *BioCode*, it is worth considering whether any of the provisions of this *Draft* are attractive enough to be incorporated into the botanical *Code* on their own merits. Terminology is an obvious candidate, as are provision on hybrid names, or the removal of mandatory priority (precedence) from certain ranks. Perhaps the Section at St Louis will be faced with proposals to incorporate the *BioCode* provisions one by one into the botanical *Code*, so that, should all be approved, it would make no difference to botanists whether and when the *BioCode* itself might eventually be installed.

All this is, we know, conjectural. Yet, scenarios of this kind must be borne in mind when considering the future. Botanists are not faced with the alternative of selling their soul or delivering the ultimate fight for salvation. The future of botanical nomenclature, whether alone or as part of a new biological venture, is open for manifold options, some full of promise. Let us ponder, and go for the best.