

# ICBN CLARIFICATION NEEDED: USE OF RANKS

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## ABSTRACT

The current (2000) International Code of Botanical Nomenclature is open to divergent interpretation regarding the use of ranks. Article 4.1 outlines secondary ranks to be used between the principal ranks of family and species and below species. Article 4.2 states that ranks prefixed by "sub-" (termed here as "tertiary" rank, immediately subsidiary in sequence and relative order to principal or secondary ranks) are used to increase the number of ranks to a "greater number" than formed in 4.1. Some taxonomists, in contrast, apparently interpret these Articles such that tertiary ranks may be used without reference to secondary ranks (e.g., subgenus in a genus without sections or series; subspecies in species without varieties or forms). Alternate formulations are offered for Articles 4 and 5 that may more clearly express the intent of the Code: FORMULATION 1 if the intent is to mandate that tertiary ranks between family and species, and below species, be used only in conjunction with secondary ranks; FORMULATION 2 if the intent is that tertiary ranks may be used without reference to secondary ranks.

## RESUMEN

El actual Código Internacional de Nomenclatura Botánica (2000) está abierto a interpretaciones diversas respecto al uso de los rangos. El Artículo 4.1 esboza los rangos secundarios para usar entre los rangos principales de familia y especie, y especie e inferiores. El Artículo 4.2 establece que los rangos con el prefijo "sub-" (llamados aquí rango "terciario", inmediatamente siguientes en secuencia y orden relativo a los rangos principales o secundarios) se usan para incrementar el número de rangos a un "numero más grande" que los formados en 4.1. Algunos taxónomos, por el contrario, interpretan aparentemente estos Artículos de modo que los rangos terciarios pueden usarse sin referencia a los rangos secundarios (ej. subgénero en un género sin secciones o series; subespecies en especies sin variedades o formas). Se ofrecen formulaciones alternativas para los Artículos 4 y 5 que pueden expresar más claramente la intención del Código: FORMULACIÓN 1 si la intención es de exigir que los rangos terciarios entre familia y especie, y por debajo de especie, se usen sólo en conjunción con rangos secundarios; FORMULACIÓN 2 si la intención es que los rangos terciarios puedan usarse sin referencia a los rangos secundarios.

The Articles of the International Code of Botanical Nomenclature (Greuter et al. 2000, the "Saint Louis Code") are "mandatory" rules (Preface, p. vii), and they are generally carefully and rigorously followed by taxonomic botanists. Such nomenclatural prescriptions are intended to provide a stable method of naming and to avoid creation of superfluous names. Valid publication must be in accordance with the Articles.

The 2000 Code is open to divergent interpretation regarding the use of ranks and associated implications for valid nomenclatural practice. As Articles 4.1 and 4.2 are written, ranks in 4.2 (i.e., ranks in addition to those in 3.1 and 4.1)



are used in a classification after associated ranks in 3.1 and 4.1 are used, i.e., rank subgenus is used in a genus after there are named sections and/or series in the classification; similarly, rank subspecies is used in a species in which varieties and/or forms already are in use. Current practice, however, is inconsistent regarding which ranks must be used and which ranks are optional. We place the following observations and suggestions on record with the hope that they may lead to clarification of this part of the Code.

Rules pertaining to sequence and relative order of ranks are found primarily in Articles 3, 4, and 5. A closely related pair of these rules—Articles 4.1 and 4.2—is the focal point of apparent ambiguity.

**Article 4.1.** *“The secondary ranks of taxa in descending sequence are tribe (tribus) between family and genus, section (sectio) and series (series) between genus and species, and variety (varietas) and form (forma) below species.”*

**Article 4.2.** *“If a greater number of ranks of taxa is desired, the terms for these are made by adding the prefix sub- to the terms denoting the principal or secondary ranks. A plant may thus be assigned to taxa of the following ranks (in descending sequence): regnum, **sub**regnum, divisio or phylum, **sub**divisio or **sub**phylum, classis, **sub**classis, ordo, **sub**ordo, familia, **sub**familia, tribus, **sub**tribus, genus, **sub**genus, sectio, **sub**sectio, series, **sub**series, species, **sub**species, varietas, **sub**varietas, forma, **sub**forma.” [bold added]*

Article 4.1 outlines secondary ranks to be used below principal ranks. Article 4.2 states that ranks prefixed by “sub” and immediately subsidiary in sequence to principal or secondary ranks are used to increase the number of ranks (presumably for a “greater number” than formed in 4.1).

Recommendation 26A.2 appears to be consistent with the intent of the ICBN in using the “sub” ranks in conjunction with ranks provided in 3.1 and 4.1:

**Recommendation 26A.2** *“A subspecies not including the type of the correct name of the species should, where there is no obstacle under the rules, be given a name with the same final epithet and type as a name of one of its subordinate varieties.”*

Article 3 specifies the principal ranks “in descending sequence” as kingdom, division or phylum, class, order, family, genus, and species. Articles 4.1 and 4.2 deal with secondary ranks (4.1) and “tertiary ranks” (4.2—those prefixed by “sub,” although the phrase “tertiary rank” is not used by the ICBN, it is a useful one and apparently consistent with the intent of the Code). Article 5.1 emphatically fixes the relative order of ranks.

**Article 5.1.** *“The relative order of the ranks specified in Art. 3 and 4 must not be altered (see Art. 33.7 and 33.8).”*

Examples in clarification in 33.7 indicate that

**1)** principal ranks must be assigned in relative order (e.g., species may not contain genera);



- 2) secondary ranks must be used within the principal rank to which they are subsidiary (e.g., section must be used within the rank of genus); and
- 3) a secondary rank can be subsidiary only to a secondary rank earlier in relative order (e.g., forms cannot be divided into varieties).

Based on the 4.2 sequence and relative order of ranks, although not explicitly given in example by the Code, varieties cannot be divided into subspecies. Varieties can be clustered within subspecies rank.

#### Changes instituted in the 1994 Code

The structure of Articles 4.1 and 4.2 in the 2000 (Saint Louis) Code was first instituted in the 1994 ("Tokyo") Code (Greuter et al. 1994), which divided Article 4.1 of the 1988 Code (Greuter et al. 1988) into two parts (4.1 and 4.2). The newly structured Articles 4.1 and 4.2 remained unchanged in the 2000 Code and were not suggested for modification by the Vienna botanical congress for the forthcoming 2006 Code (Fred Barrie, pers. comm.). The 1988 Code has the following:

**Article 3.1.** "The principal ranks of taxa in ascending sequence are: species (*species*), genus (*genus*), family (*familia*), order (*ordo*), class (*classis*), division (*divisio*), and kingdom (*regnum*). Thus, except for some fossil plants (see Art. 3.2), each species is assignable to a genus, each genus to a family, etc."

**Article 4.1.** "If a greater number of ranks of taxa is required, the terms for these are made either by adding the prefix *sub-* to the terms denoting the ranks or by the introduction of supplementary terms. A plant may thus be assigned to taxa of the following ranks (in descending sequence): *regnum*, *subregnum*, *divisio*, *subdivisio*, *classis*, *subclassis*, *ordo*, *subordo*, *familia*, *subfamilia*, *tribus*, *subtribus*, *genus*, *subgenus*, *sectio*, *subsectio*, *series*, *subseries*, *species*, *subspecies*, *varietas*, *subvarietas*, *forma*, *subforma*."

No distinction in the 1988 Code was made among ranks below principal ranks. The phrase "secondary ranks" (referred to in the 1988 Code as "supplementary terms") was first introduced in the 1994 Code. The two proposals for change relating to 1988 Article 4.1 (Silva 1993; Greuter & McNeill 1993) were rejected by general vote (McNeill 1993) but were referred to the Editorial Committee, which adopted them in slightly modified form (Greuter, McNeill, & Barrie 1993).

In the original proposal by Silva for modification of Article 4.1 (1993, p. 186), identification of secondary ranks was done with the intention, at least in part, that "proliferation of ranks by use of a prefix should be restricted to ... principal and secondary ranks." In discussion of the proposals at the nomenclature sessions (prior to the Editorial Committee meeting), Rapporteur-général Greuter noted the following, regarding what was to become Article 4.2: "What Silva had attempted, and perhaps partly achieved, was to bring a coherent logic into the hierarchy of ranks—where hierarchy meant, not the taxonomic hierarchy but a classification of ranks by their importance" (Greuter et al. 1993, p. 40).



### Difference in Interpretation of the 2000 Code

The wording of Articles 4.1 and 4.2 in the 2000 Code directly implies that tertiary ranks are used between family and genus, between genus and species, and below species (secondary ranks are available in each area) only after use of an immediately preceding secondary rank (in descending sequence). Between kingdom and family (where secondary ranks do not exist), tertiary ranks immediately follow principal ranks. None of the Code notes or examples pertinent to 4.1, 4.2, or 5.1 (and 33.7 or 33.8, as pointed to by 5.1), however, provides explicit clarification regarding this. In alternative interpretation and in practice, and apparently contrary to the 2000 Code, subfamilies are used in a classification without use of tribes, subgenera without sections, and subspecies without varieties.

This difference in interpretation may exist because of a disparity between Articles 4.1 and 4.2: **tertiary ranks precede the secondary ranks in “relative order” and “descending sequence” but because tertiary ranks are used to increase the number of ranks beyond those provided by secondary ranks, secondary ranks precede tertiary ranks in order of use.** If the Code does not intend to mandate this order of use in ranks, then the separation of 4.1 from 4.2, coupled with the wording of 4.2 (“If a greater number of ranks of taxa is desired”), is stated incorrectly or at least is misleading.

### Alternate formulations for clarification

In clarification of the problem discussed here, modifications of the 2000 (Saint Louis) Code are suggested. Two alternate formulations provide a contrast between what appear to be different interpretations of the Code. Article 3.1 (unmodified from the 2000 code) is included within both alternatives.

If modifications are necessary for the 2012 ICBN in regard to points considered here, a formal proposal in Taxon will be required. Because of the expanse of time between now and the next Code version, because we are not taking a position of advocacy, and because what the Editorial Committee intended in 1993 is not clear to us, we offer this commentary as a beginning point of discussion.

### FORMULATION 1

If the intent of Articles 4 and 5 is to mandate that tertiary ranks be used only in conjunction with secondary ranks between family and genus, between genus and species, and below species, then we suggest that the following better express the intent of the Code.

**Article 3.1** (unmodified from 2000 code). The principal ranks of taxa in descending sequence are: kingdom (regnum), division or phylum (divisio, phylum), class (classis), order (ordo), family (familia), genus (genus), and species (species). Thus, each species is assignable to a genus, each genus to a family, etc.

**Article 4.1.** A plant may be assigned to taxa of the following ranks (in



descending sequence): regnum, subregnum, divisio or phylum, subdivisio or subphylum, classis, subclassis, ordo, subordo, familia, subfamilia, tribus, subtribus, genus, subgenus, sectio, subsectio, series, subseries, species, subspecies, varietas, subvarietas, forma, subforma.

**Article 4.2.** Secondary ranks of taxa are tribe (tribus) between family and genus, section (sectio) and series (series) between genus and species, and variety (varietas) and form (forma) below species. Terms for tertiary ranks of taxa are made by adding the prefix “sub-” to the terms denoting the principal and/or secondary ranks. Tertiary ranks are added if a greater number of ranks of taxa (beyond secondary ranks) is desired.

**Article 4.3.** Further ranks may also be intercalated or added if a greater number of ranks of taxa (beyond tertiary ranks) is desired, provided that confusion or error is not thereby introduced.

**Article 5.1.** The relative order of the ranks specified in Arts. 3 and 4 must not be altered (see Art. 33.7 [*the examples following 33.7 would be better placed here*] and 33.8). The sequence of use of ranks between the principal ranks family and species and below species is secondary (in descending sequence), then tertiary. Tertiary ranks follow the principal and/or secondary ranks from which they are derived. Any of the tertiary ranks may be omitted without altering the relative order; the secondary ranks series and forma may be omitted without altering the relative order.

**Note a.**—Use of the rank of tribe precedes use of subfamily; use of the rank of section precedes use of subgenus or series; use of the rank of variety precedes use of subspecies or form.

**Note b.**—A genus may be included in a family without reference to a tribe or to a subfamily (omission of one or both of the ranks between genus and family does not affect the relative order of ranks).

If Formulation 1 were adopted, a date might be set beyond which the rules would apply—in order to avoid chaotic invalidity of names at tertiary rank. Or, proposal of a name at tertiary rank prior to an appropriate name at secondary rank might be set to automatically establish the secondary rank.

## FORMULATION 2

If the intent of Articles 4 and 5 is that tertiary ranks may be used without reference to secondary ranks, then we suggest that the following better express the intent of the Code. This formulation returns to the less restrictive nature of the 1988 Code, in which no distinction in use was made between secondary and tertiary ranks (as they are termed here). Here, there is no problem with subspecies as sole infraspecific rank within a classification or with subgenus as sole subdivision of a genus.

**Article 3.1** (unmodified from 2000 code). The principal ranks of taxa in descending sequence are: kingdom (regnum), division or phylum (divisio,



phylum), class (classis), order (ordo), family (familia), genus (genus), and species (species). Thus, each species is assignable to a genus, each genus to a family, etc.

**Article 4.1** (same as in FORMULATION 1). A plant may be assigned to taxa of the following ranks (in descending sequence): regnum, subregnum, divisio or phylum, subdivisio or subphylum, classis, subclassis, ordo, subordo, familia, subfamilia, tribus, subtribus, genus, subgenus, sectio, subsectio, series, subseries, species, subspecies, varietas, subvarietas, forma, subforma.

**Article 4.2.** Secondary ranks of taxa are tribe (tribus) between family and genus, section (sectio) and series (series) between genus and species, and variety (varietas) and form (forma) below species. Terms for tertiary ranks of taxa are made by adding the prefix “sub-” to the terms denoting the principal and/or secondary ranks.

**Article 4.3** (same as in FORMULATION 1). Further ranks may also be intercalated or added if a greater number of ranks of taxa (beyond tertiary ranks) is desired, provided that confusion or error is not thereby introduced.

**Article 5.1.** The relative order of the ranks specified in Art. 3 and 4 must not be altered (see Art. 33.7 [*the examples following 33.7 would be better placed here*] and 33.8). Any of the secondary or tertiary ranks may be omitted without altering the relative order, but use of tertiary ranks must follow the principal or secondary ranks from which they are derived.

**Note a.**—A genus may be included in a family without reference to a tribe or to a subfamily (omission of one or both of the ranks between genus and family does not affect the relative order of ranks); then rank of subgenus may be used within a genus without reference to sections; the rank of subspecies may be used within a species without reference to varieties.

### Ranks of Taxa in Relation to Biology

The rank of subspecies sometimes is said to apply to a taxon more “species-like” than a variety and for this reason should precede “variety” in relative order of rank. Intraspecific population systems, however, like species themselves, vary continuously in degree of differentiation and reproductive isolation, and if varieties and subspecies both are treated as morpho-geographic taxa, then a biological distinction between the two ranks is arbitrary. We agree with Fred Barrie (pers. comm.) that the ICBN “legislates the names and relative order of ranks, not the taxonomic concepts attached to a given rank nor the [biological] conditions under which it is appropriate to use one over another.” The discussion here of the ICBN structure and intent are detached from considerations of the importance or biological significance of ranks.

### ACKNOWLEDGMENTS

Preparation of this discussion was precipitated by Ken Chambers, who brought to our attention another Code issue (included in an early version of the manu-

script)—that issue is less complex and apparently will be resolved by the ICBN Editorial Committee before publication of the Vienna Code. We appreciate the comments of Tom Lammers, Gerry Moore, Rich Rabeler, Dick Wunderlin, and especially those of Fred Barrie (early manuscript version) and John Strother, which considerably sharpened the clarity of concepts and presentation.

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Nesom, Guy L and Lipscomb, Barney L. 2005. "ICBN CLARIFICATION NEEDED: USE OF RANKS." *SIDA, contributions to botany* 21, 2185–2191.

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