

Current text	Proposed new text	Comments	References
CHAPTER 3. RULES OF NOMENCLATURE WITH RECOMMENDATIONS	CHAPTER 3. RULES OF NOMENCLATURE WITH RECOMMENDATIONS		
Section 1. General	Section 1. General		
<p>Rule 1a This revision of the <i>International Code of Nomenclature of Bacteria</i> supersedes all previous revisions of the Bacteriological Code and shall be known as the <i>International Code of Nomenclature of Prokaryotes</i> (see Appendix 1). It shall be cited as the <i>Prokaryotic Code</i> (2008 Revision) and will apply from the date of publication online (2015).</p>	<p>Rule 1a This revision of the <i>International Code of Nomenclature of Prokaryotes</i> supersedes all previous revisions of the Bacteriological Code and the <i>International Code of Nomenclature of Prokaryotes</i> (see Appendix 1). It shall be cited as the <i>Prokaryotic Code</i> (2022? Revision) and will apply from the date of publication online (2022?).</p>		Text clarifications proposed by the Editorial Board
<p>Rule 1b Alterations to this Code can only be made by the ICSP at one of its plenary sessions. Proposals for modifications should be made in sufficient time to allow publication in the <i>IJSEM</i> before the next International Congress of Bacteriology and Applied Microbiology. For this and other Provisions, see the Statutes of the ICSP.</p>	<p>Rule 1b Alterations to this Code can be made only by the ICSP. Proposals for modifications should be made as specified in the Statutes of the ICSP.</p>	Now changes can be approved changes by electronic voting, “plenary sessions” can simply be deleted or replaced with ‘as specified in the Statutes of the ICSP’	
<p>Rule 2 The Rules of this Code are retroactive, except where exceptions are specified. Examples: Rule 18a, Rule 30.</p>	<p>Rule 2 The Rules of this Code are retroactive, except where specified. Examples: Rule 18a, Rule 30.</p>		
Rule 3	Rule 3		

<p>Names contrary to a Rule cannot be maintained, except that the International Committee on Systematics of Prokaryotes, on the recommendation of the Judicial Commission, may make exceptions to the Rules (see Rule 23a and the Statutes of the ICSP).</p>	<p>Names contrary to a Rule cannot be maintained, except that the ICSP, on the recommendation of the Judicial Commission, may make exceptions to the Rules (see Rule 23a).</p>	<p>“And the statutes of the ICSP” could be deleted as in Principle 8, it is not clear what this has to do with the Rule.</p>	
<p>Rule 4 In the absence of a relevant Rule or where the consequences of a Rule are uncertain, a summary in which all pertinent facts are outlined should be submitted to the Judicial Commission for consideration (see Appendix 8 for preparation of a Request for an Opinion).</p>	<p>Rule 4 In the absence of a relevant Rule or where the consequences of a Rule are uncertain, a summary in which all pertinent facts are outlined should be submitted to the Judicial Commission for consideration (see Appendix 8 for preparation of a Request for an Opinion).</p>		
<p>Section 2. Ranks of Taxa</p>	<p>Section 2. Ranks of Taxa</p>		
<p>Rule 5a Definitions of the taxonomic categories will inevitably vary with individual opinion, but the relative order of these categories may not be altered in any classification.</p>	<p>Rule 5a Definitions of the taxonomic categories may vary with individual opinion, but the relative order of these categories may not be altered in any classification.</p>		
<p>Rule 5b The taxonomic categories above and including species which are covered by these Rules are given below in ascending taxonomic rank. Those in the left hand column should be recognized where pertinent; those in the right hand column are optional.</p>	<p>Rule 5b The taxonomic categories above and including subspecies, which are covered by these Rules, are given below in ascending taxonomic rank. Those in the left column should be recognized; those in the right column should be considered optional. The Latin equivalents are given in parentheses.</p>	<p>Proposed changes include deleting the taxonomic categories Subfamily, Subtribe and Kingdom that are not used, and addition of the rank of phylum (as approved by the ICSP). The Editorial Board added the category subspecies here; it is not clear why it was not given earlier, as subspecies are dealt with by the rules of the Code and were mentioned in Rule 5c,</p>	<p>Oren A. Proposal to modify the Rules of the <i>International Code of Nomenclature of Prokaryotes</i> to abolish the taxonomic categories Subfamily, Subtribe and Kingdom. <i>Int J Syst Evol</i></p>

<p>The Latin equivalents are given in parentheses.</p> <p>Species (Species)</p> <p>Subgenus (Subgenus)</p> <p>Genus (Genus)</p> <p>Subtribe (Subtribus)</p> <p>Tribe (Tribus)</p> <p>Subfamily (Subfamilia)</p> <p>Family (Familia)</p> <p>Suborder (Subordo)</p> <p>Order (Ordo)</p> <p>Subclass (Subclassis)</p> <p>Class (Classis)</p>	<p>Subspecies (Subspecies)</p> <p>Species (<i>Species</i>)</p> <p>Subgenus (<i>Subgenus</i>)</p> <p>Genus (<i>Genus</i>)</p> <p>Tribe (<i>Tribus</i>)</p> <p>Family (<i>Familia</i>)</p> <p>Suborder (<i>Subordo</i>)</p> <p>Order (<i>Ordo</i>)</p> <p>Subclass (<i>Subclassis</i>)</p> <p>Class (<i>Classis</i>)</p> <p>Phylum (Phylum)</p>	<p>13a, in the table of taxonomic categories given below Rule 15, and elsewhere. The first sentence of Rule 5c can then be deleted, and even the entire Rule 5c is probably no longer needed.</p> <p>The question was asked (for this Rule and others) why not deleting also Subgenus. It had little use in the past. There are no subgenera in the Approved Lists. Since then, the only case is <i>Gluconacetobacter</i> (VL 17), but it is no longer needed as it was elevated to the rank of genus (VL 64). In List 4 of Appendix 4 you can find some subgenus names rejected by the JC (e.g. <i>Branhamella</i>). Deleting it will also simplify other parts of the Code. There also are only few cases of tribe, suborder and subclass. However, a validly published name can only be rejected by the Judicial Commission. Therefore the above mentioned ranks were kept in the current draft revision. The Editorial Board hopes to receive further comments in the discussion forum.</p> <p>Some members of the Editorial Board proposed to reverse the order of the taxonomic categories in the list, starting with phylum and ending with subspecies. Comments are welcome.</p>	<p><i>Microbiol</i> 2019;69:1524-1525.</p> <p>Oren A, Arahal DR, Rosselló-Móra R, Sutcliffe IC, Moore ERB.</p> <p>Emendation of Rules 5b, 8, 15, and 22 of the International Code of Nomenclature of Prokaryotes to include the rank of phylum. <i>Int J Syst Evol Microbiol</i> 2021;71:004851.</p>
<p>Rule 5c</p>	<p>Rule 5c</p>	<p>In the opinion of majority of the Editorial Board, Rule 5c can be deleted: subspecies</p>	<p>Tindall BJ. An analysis of the term 'standing in</p>

<p>A species may be divided into subspecies, which are dealt with by the Rules of this Code (see Rules 13a–d). Variety is a synonym of subspecies; its use is not encouraged as it leads to confusion, and after publication of this Code the use of the term variety for new names will have no standing in nomenclature.</p>		<p>now is in Rule 5b; the category ‘variety’ has apparently never been used, so there is no possibility of confusion. If Rule 5c is to be kept, the last sentence may be replaced with the following as suggested by Tindall (2019): “After 1st January 1980 new names published as varieties will not be considered to be validly published.”</p>	<p>nomenclature’, as used in the International Code of Nomenclature of Prokaryotes <i>Int J Syst Evol Microbiol</i> 2019;69:2166–2168</p>
<p>Rule 5d Taxa below the rank of subspecies (infrasubspecific subdivisions) are not covered by the Rules of this Code, but see Rule 14a and Appendix 10.</p>	<p>Rule 5c Taxa below the rank of subspecies (infrasubspecific subdivisions) are not covered by the Rules of this Code, but see Rule 14a and Appendix 10.</p>	<p>To be renumbered 5c if the current Rule 5c is deleted.</p>	
<p>Section 3. Naming of Taxa</p>	<p>Section 3. Naming of Taxa</p>		
<p>General</p>	<p>General</p>		
<p>Rule 6 The scientific names of all taxa must be treated as Latin; names of taxa above the rank of species are single words.</p>	<p>Rule 6 The scientific names of all taxa must be treated as Latin; names of taxa above the rank of species are single words. When proposing new names, the etymology must be provided. Words from languages other than Latin or Greek should be avoided as long as equivalents exist in Latin or Greek or can be constructed by combining word elements from these two languages. Exceptions: names derived from typical local items such as food, drinks or geographical localities for which no Latin or Greek names exist.</p>	<p>See comments on proposed changes to Rules 10a and 12c. This is ‘duplicated’ into Rules 10a and 12c. If accepted this will no longer be a recommendation but a rule and so should be deleted here</p>	<p>Oren A, Garrity GM, Schink B. Proposal to modify Rule 6, Rule 10a, and Rule 12c of the International Code of Nomenclature of Prokaryotes <i>Int J Syst Evol Microbiol</i> 2014;64:1452-1453.</p>

	<p>Names that end on <i>-myces</i>, <i>-phyces</i>, <i>-phyta</i>, or <i>-virus</i> should not be used to avoid confusion with the names of eukaryotic or virus taxa. This rule is not retroactive.</p>	<p>A question discussed by the Editorial Board without a consensus being reached: should it be specified that names of taxa of all ranks be printed in italic type? This is not specified anywhere in the Code. Somehow, it is implicit in Note 2 of Rule 33a, but it may be better to make it explicit here. Advisory Notes Chapter 4 states “For scientific names of taxa, conventions shall be used which are appropriate to the language of the country and to the relevant journal and publishing house concerned. These should preferably indicate scientific names by a different type face, e.g., italic, or by some other device to distinguish them from the rest of the text.” It seems rare now but in the past underlining was used as an alternative to italics.</p>	
<p>Recommendation 6 To form new prokaryotic names and epithets, authors are advised as follows. (1) Avoid names or epithets that are very long or difficult to pronounce.</p>	<p>Recommendation 6 To form new prokaryotic names and epithets, authors are advised as follows: (1) Avoid names or epithets that are long or difficult to pronounce. (2) Make names or epithets that have an agreeable form that is</p>		

<p>(2) Make names or epithets that have an agreeable form that is easy to pronounce when latinized.</p> <p>(3) Words from languages other than Latin or Greek should be avoided as long as equivalents exist in Latin or Greek or can be constructed by combining word elements from these two languages. Exceptions: names derived from typical local items such as foods, drinks or geographical localities for which no Latin or Greek names exist.</p> <p>(4) Do not adopt unpublished names or epithets found in authors' notes, attributing them to the authors of such notes, unless these authors have approved publication.</p> <p>(5) Give the etymology of new generic names and of new epithets.</p> <p>(6) Determine that the name or epithet which they propose is in accordance with the Rules.</p>	<p>easy to pronounce when generating latinized or Greek derivatives.</p> <p>(3) Words from languages other than Latin or Greek should be avoided if equivalents exist in Latin or Greek or can be constructed by combining word elements from these two languages. Exceptions: names derived from typical local items such as foods, drink or geographical localities for which no Latin or Greek names exist.</p> <p>(4) Do not adopt unpublished names or epithets found in authors' notes, without the authors' approval.</p>	<p>General comment, relevant to many places in the Code: The Word spelling check suggests capitalization of 'latinized'. Why?</p> <p>The Editorial Board propose deleting Recommendations 6(5) and 6(6). Recommendation 6(5) is no longer a recommendation but it is part of Rule 27. If old Recommendation 6(6) were indeed a recommendation, authors are free to propose names that are not in accordance with the Rules!</p> <p>The Editorial Board proposes changing 'should' to 'may' – so that authors have the</p>	<p>Oren A, Vandamme P, Schink B. Notes on the use of Greek word roots in genus and species names of prokaryotes. <i>Int J Syst Evol Microbiol</i> 2016;66:2129–2140.</p> <p>Oren A, Garrity GM, Schink B. Proposal to modify Rule 6, Rule 10a, and Rule 12c of the International Code of Nomenclature of Prokaryotes. <i>Int J Syst Evol Microbiol</i> 2014;64:1452-1453.</p> <p>(adopted with minor changes)</p>
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<p>(7) The Greek K and Z and the Medieval Latin J (for consonantic I) should be maintained to avoid confusion.</p> <p>Examples: Akinetobacter instead of Acinetobacter, Acidijanus instead of Acidianus.</p> <p>(8) The abbreviation M.L. stands for “Medieval Latin” not “Modern Latin”. For the latter, N.L. (“Neo Latin”) is to be used.</p> <p>(9) When arbitrary names (see Rules 10a and 12c) are formed, this has to be indicated and such names have to be easy in spelling and pronunciation.</p> <p>(10) Authors should not name organisms after themselves or after co-authors. If genus names or specific epithets are formed from personal names they should contain only the untruncated family (rarely the first) name of one person.</p>	<p>(5) The Greek K and Z and the Medieval Latin J (for consonantic I) may be maintained to avoid confusion.</p> <p>Examples: Actinokineospora instead of Actinocineospora; Flectobacillus major instead of Flectobacillus maior.</p> <p>(6) The abbreviation M.L. stands for “Medieval Latin” not “Modern Latin”. For the latter, N.L. (“Neo Latin”) is to be used.</p> <p>(7) If genus names or specific epithets are formed from personal names, they should contain only the untruncated family (rarely given) name of a person. Authors should not name organisms after themselves or co-authors.</p>	<p>choice whether to use k or c. See also the section ‘Comments on the transliteration of the Greek k in genus and species names’ in Oren et al. 2015.</p> <p>The Editorial Board has changed the examples; <i>Akinetobacter</i> and <i>Acidijanus</i> were poor examples as <i>Acinetobacter</i> and <i>Acidianus</i> are the validly published names.</p> <p>The Editorial Board recommends adding a list with all abbreviations used in describing taxonomic names. Such a list is now added in Appendix 7.</p> <p>In the opinion of the Editorial Board, this should be discarded. It adds nothing of value since Rules 10 and Rules 12 are explained in detail. For example, what does ‘easy’ mean?</p>	
<p>Names of Taxa above the Rank of Genus up to and including Order</p>	<p>Names of Taxa above the Rank of Genus up to and including Order</p>		

<p>Rule 7 The name of a taxon above the rank of genus up to and including order is a substantive or an adjective used as a substantive of Latin or Greek origin, or a latinized word. It is in the feminine gender, the plural number, and written with an initial capital letter. Example: Family <i>Pseudomonadaceae</i>.</p> <p>Historically, all these names were feminine plural adjectives qualifying the word "<i>plantae</i>," plants; in modern prokaryotic nomenclature they qualify the word "<i>procaryotae</i>." Example: <i>Plantae pseudomonadaceae</i>; <i>Procaryotae pseudomonadaceae</i>. In practice, such names are used alone and as substantives. Example: A member of the <i>Pseudomonadaceae</i>.</p>	<p>Rule 7 The name of a taxon above the rank of genus up to and including order is a substantive or an adjective used as a substantive of Latin or Greek origin, or a latinized word. It is in the feminine gender, the plural number, and written with an initial capital letter. Example: Family <i>Pseudomonadaceae</i>.</p>	<p>The Editorial Board considers deleting this, as it is no longer relevant today.</p>	
<p>Names of Taxa above the Rank of Order</p>	<p>Names of Taxa above the Rank of Order</p>	<p>Comments raised by members of the Editorial Board: Maybe better: Names of Taxa above the Rank of Order (Phylum, Class, Subclass), to mimic the heading before Rule 9. There also is a proposal to change the order of the Rules, starting with the highest taxa – Phylum, so: Rule 7 - Names of taxa of Phylum; Rule 8 - Names of taxa of Class and Subclass or: Names of taxa between Phylum and Order; Rule 9 -</p>	

		Names of taxa of Order and Suborder; Rule 10 - Names of taxa of Family etc. However, this will cause lots of confusion as all other Rules need to be renumbered. Rule 10 is now for genera.	
<p>Rule 8 The name of each taxon (covered by the Code) above the rank of order is a Latin or latinized word.</p> <p>The name of a class is in the neuter gender, the plural number and written with an initial capital letter. The name is formed by the addition of the suffix <i>-ia</i> to the stem of the name of the type genus of the type order of the class. The name of a subclass is in the feminine gender, the plural number and written with an initial capital letter. The name is formed by the addition of the suffix <i>-idae</i> to the stem of the name of the type genus of the type order of the subclass</p>	<p>Rule 8 The name of each taxon above the rank of order is a Latin or latinized word. Until 31 December 2011, new names that were considered to have been validly published (see Rule 27) prior to or on that date were to be formed preferably in conformity with Recommendation 6. With effect from 1 January 2012, for new names of classes and subclasses that are considered to have been validly published (see Rule 27) on or after that date, the name of a class is in the neuter gender, the plural number and written with an initial capital letter. The name is formed by the addition of the suffix <i>-ia</i> to the stem of the name of the type genus of the type order of the class. The name of a subclass is in the feminine gender, plural number and written with an initial capital letter. The name is formed by the addition of the suffix <i>-idae</i> to the stem of the name of the type genus of the type order of the subclass. The name of a phylum is in the neuter gender, the plural number and written with an initial capital letter. The name is formed by the</p>	<p>The green highlighted text was proposed by Tindall 2016. Is it necessary?</p> <p>An open issue is still whether the naming of classes with the suffix <i>-ia</i> must be retroactive. Advantage: uniformity; disadvantage: it destabilizes nomenclature, as many names that were validly published must be changed. Oren et al. (2016) submitted a Request for an Opinion. They did not formally propose the retroactive implementation of the new version of Rule 8, including the valid publication of the 39 new names of classes presented in Table 1, in spite of the fact that the current text of the Rule requires this. Instead, they proposed that the issue of retroactivity of the modification of Rule 8, as approved in Istanbul in 2008, be discussed again by the ICSP and its Judicial Commission. If necessary, a note can be added to clarify</p>	<p>Tindall BJ. The undesirable retroactive changes to Rule 8 of the International Code of Nomenclature of Prokaryotes. <i>Int J Syst Evol Microbiol</i> 2016;66:4895–4896.</p> <p>Oren A, Garrity GM, Parte A. Implementation of Rule 8 of the International Code of Nomenclature of Prokaryotes for the renaming of classes; Request for an Opinion. <i>Int J Syst Evol Microbiol</i> 2016;66:4296–4298.</p> <p>Tindall BJ. Names above the rank of genus; the radical approach. <i>Int J Syst Evol Microbiol</i> 2018;69:1833–1834.</p>

<p>Example: Domain—<i>Procarvotae</i>; Class—<i>Clostridia</i></p>	<p>addition of the suffix <i>-ota</i> to the stem of the name of one of the contained genera.</p> <p>Example: Class—<i>Ktedonobacteria</i>; Subclass—<i>Sphaerobacteridae</i>.</p>	<p>that Rule 8 is not retroactive, as required according to Rule 2</p> <p>The proposal by Tindall (2019) to unify Rules 7, 8, and 9 as well as Rules 21 and 22 looks problematic because of a misunderstanding of Latin grammar; an alternative text can be considered as suggested by Oren <i>et al.</i> 2019:</p> <p>The name of a taxon covered by this Code (Rule 5b) above the rank of genus is a substantive or an adjective used as a substantive of Latin or Greek origin, or a latinized word. It is generally in the feminine gender, the plural number, the nominative case, and written with an initial capital letter. Names of classes that end in <i>-ia</i> are in the neuter gender, the plural number, in the nominative case, and written with an initial capital letter.</p> <p>Unification of Rules 7, 8 and 9 will require the numbering of all subsequent rules in the Code. Therefore, it may be better retaining the rules. Still, the content and arrangement of Rules 7, 8 and 9 is not entirely satisfactory. If Rule 6 already sets that scientific names of all taxa must be treated as Latin, it is probably not necessary to repeat this.</p>	<p>Oren A, Chuvochina M, Schink B, Ventura S. Naming classes of prokaryotes based on the rules of Latin grammar. <i>Int J Syst Evol Microbiol</i> 2019;69:1526–1527</p> <p>Oren A. Proposal to modify the Rules of the <i>International Code of Nomenclature of Prokaryotes</i> to abolish the taxonomic categories Subfamily, Subtribe and Kingdom. <i>Int J Syst Evol Microbiol</i> 2019;69:1524-1525.</p> <p>Oren A, Arahal DR, Rosselló-Móra R, Sutcliffe IC, Moore ERB. Emendation of Rules 5b, 8, 15, and 22 of the <i>International Code of Nomenclature of Prokaryotes</i> to include the rank of phylum. <i>Int J Syst Evol Microbiol</i> 2021;71:004851.</p>
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<p>Names of Taxa between Subclass and Genus (Order, Suborder, Family, Subfamily, Tribe, Subtribe)</p>	<p>Names of Taxa between Subclass and Genus (Order, Suborder, Family, Tribe)</p>	<p>The ranks of subfamily and subtribe to be deleted if the proposed change in Rule 5b is accepted.</p>	<p>Oren A. Proposal to modify the Rules of the <i>International Code of Nomenclature of Prokaryotes</i> to abolish the taxonomic categories Subfamily, Subtribe and Kingdom. <i>Int J Syst Evol Microbiol</i> 2019;69:1524-1525.</p>
<p>Rule 9 The name of a taxon between subclass and genus is formed by the addition of the appropriate suffix to the stem of the name of the type genus (see Rule 15). These suffixes are presented in Table 1.</p>	<p>Rule 9 The name of a taxon between subclass and genus is formed by the addition of the appropriate suffix to the stem of the name of the type genus (see Rule 15). These suffixes are presented in Table 1.</p>	<p>See the proposed updated version of the table given below. There currently are 7 subclasses with validly published names (not including a few subclasses of cyanobacteria named under the ICN). All except one have the – <i>idae</i> ending, except for <i>Anoxyphotobacteriae</i> Gibbons and Murray 1978 (Approved Lists 1980).</p>	<p>Oren A. Proposal to modify the Rules of the <i>International Code of Nomenclature of Prokaryotes</i> to abolish the taxonomic categories Subfamily, Subtribe and Kingdom. <i>Int J Syst Evol Microbiol</i> 2019;69:1524-1525;</p> <p>Another relevant publication – not published in the IJSEM: Tindall BJ. Standardised suffixes in the nomenclature of the higher taxa of prokaryotes as aid to data mining, database administration</p>

and automatic assignment of names to taxonomic ranks. *Curr Microbiol* 2020;77:1135-1138.

Table 1. Suffixes for Categories

Rank	Suffix	Example
Order	-ales	<i>Pseudomonadales</i>
Suborder	-ineae	<i>Pseudomonadineae</i>
Family	-aceae	<i>Pseudomonadaceae</i>
Subfamily	-oideae	<i>Pseudomonadoideae</i>
Tribe	-eae	<i>Pseudomonadeae</i>
Subtribe	-inae	<i>Pseudomonadinae</i>

Table 1. Suffixes for Categories between Subclass and Tribe

Rank	Suffix	Example
Subclass	idae	<i>Actinobacteridae</i>
Order	-ales	<i>Pseudomonadales</i>
Suborder	-ineae	<i>Pseudomonadineae</i>
Family	-aceae	<i>Pseudomonadaceae</i>
Subfamily	-oideae	<i>Pseudomonadoideae</i>
Tribe	-eae	<i>Pseudomonadeae</i>
Subtribe	-inae	<i>Pseudomonadinae</i>

The names *Pseudomonadoidae* and *Pseudomonadinae* were not validly published..