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1 Category: ICSP matters

2

3 **Proposals to emend Rules 8, 15, 22, 25a, 30(3)(b), 30(4), 34a, and Appendix 7 of the**
4 **International Code of Nomenclature of Prokaryotes**

5

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24

25 **Keywords:**

26 International Code of Nomenclature of Prokaryotes; Prokaryotic Code; emendation;
27 International Committee on Systematics of Prokaryotes.

28

29 **Abbreviations:**

30 ICN, International Code of Nomenclature for algae, fungi, and plants; ICNP,
31 International Code of Nomenclature of Prokaryotes; ICSP, International Committee

32 on Systematics of Prokaryotes; IJSEM, International Journal of Systematic and
33 Evolutionary Microbiology; MTA, Material Transfer Agreement.

34

35

36 **Abstract**

37

38 To complete the ongoing revision of the International Code of Nomenclature of
39 Prokaryotes, we here propose emendation of Rules 8, 15, 22, 25a, 30(3)(b), 30(4),
40 34a, and Appendix 7. These proposed emendations deal with the nomenclatural type
41 of taxa above genus; the suitability of names published in supplementary material or
42 in papers published on e-print servers for effective publication; the number of
43 culture collection designations to be included in an effective publication of a name of
44 a species or subspecies to qualify for validation of the name; the kinds of restrictions
45 that may be attached to deposits of type strains; and the question whether elevation
46 of a subspecies to the rank of species or lowering of a species to the rank of
47 subspecies establish new combinations. Some of these emendations change the
48 meaning of the Code while others are mere textual clarifications.

49

50

51 **INTRODUCTION**

52

53 The International Committee on Systematics of Prokaryotes (ICSP) held a ballot to
54 vote on many emendations of the International Code of Nomenclature of
55 Prokaryotes (ICNP) [1]. The ballot included votes on 45 emendations proposed in the
56 IJSEM between 2008 and 2019 [2], complying with Article 13(b) of the statutes of the
57 ICSP [3]. The ballot was preceded by a six-month period of public discussions on all
58 aspects of the ICNP [4]. During these discussions, a number of issues were raised
59 that require emendation of several rules in ways that go beyond the minor changes
60 that the editorial board of the ICNP can make. We therefore present these proposed
61 emendations here. The ICSP will be requested to vote on these emendations
62 separately, in accordance with the procedure outlined in Article 13(b) of its statutes.

63

64

65 **THE NOMENCLATRURAL TYPE OF TAXA ABOVE GENUS**

66

67 In 2019, Tindall [5] published a proposal to unify the way all names at the ranks
68 above genus are formed and typified, i.e., based on names of contained genera,
69 which are also to serve as the nomenclatural type (Rule 15). This would simplify the
70 structure of the ICNP and the links between names and their nomenclatural types.
71 Currently, classes and subclasses have one of the contained orders as nomenclatural
72 type (Table 2 in Rule 15). However, the name of a class or subclass already has to be
73 derived from the name of a genus, i.e., the genus that serves as the nomenclatural
74 type of the type order (Rule 8). Tindall's article was not formatted as a formal
75 proposal to the ICSP to emend the ICNP. Some problematic aspects of the paper
76 have been addressed elsewhere [6]. The retroactivity of changing the category of the
77 nomenclatural type of classes and subclasses needs special attention, as explained
78 below.

79 We consider the proposal to base the names of all higher taxa on names of
80 genera, as nomenclatural types, to be attractive. This approach was also followed for
81 the naming of phyla: the ICSP has voted in favour of a contained genus as the
82 nomenclatural type of a phylum and not one of the contained classes [7], and this
83 was implemented in the naming of 42 phyla [8]. The ICNP recently has been
84 augmented to recognize names of *Cyanobacteria* that are validly published under
85 International Code of Nomenclature for algae, fungi, and plants (ICN) as being also
86 validly published under the ICNP [9]. The ICN [10] regulates nomenclatural types
87 distinctly from the ICNP. However, names of taxa above the rank of family that are
88 automatically typified according to Articles 10.10 and 16.1(a) of the ICN are also
89 derived from the name of a contained genus, and this genus determines the type.
90 The proposed change to the ICNP would thus further increase the compatibility
91 between the two codes.

92 We therefore propose the following emendations of the Rules of the ICNP:

93

94 **Rule 8 – Current version:**

95

96 The name of each taxon above the rank of order is a Latin or latinized word.

97

98 The name of a phylum is in the neuter gender, the plural number, and written
99 with an initial capital letter. The name is formed by the addition of the suffix *-ota*
100 to the stem of the name of the designated type genus. The Judicial Commission
101 can make exceptions regarding the use of the ending *-ota* when forming the
102 name of a phylum.

103

104 The name of a class is in the plural number, and written with an initial capital
105 letter.

106

107 Until 31 December 2011, new names of classes that were considered to have
108 been validly published (see Rule 27) prior to or on that date were to be formed
109 preferably in conformity with Recommendation 6.

110

111 With effect from 1 January 2012, new names of classes that are considered to
112 have been validly published (see Rule 27) on or after that date are in the neuter
113 gender and is formed by the addition of the suffix *-ia* to the stem of the name of
114 the type genus of the type order of the class.

115

116 The name of a subclass is in the feminine gender, plural number, and written
117 with an initial capital letter. The name is formed by the addition of the suffix *-*
118 *idae* to the stem of the name of the type genus of the type order of the subclass.

119

120 Example: Phylum— *Bacteroidota*; Class—*Ktedonobacteria*; Subclass—
121 *Sphaerobacteridae*.

122

123 **Rule 8 – Proposed new version:**

124

125 The name of each taxon above the rank of order is a Latin or latinized word.

126

127 The name of a phylum is in the neuter gender, the plural form, and written with
 128 an initial capital letter. The name is formed by the addition of the suffix *-ota* to
 129 the stem of the name of the designated type genus. The Judicial Commission can
 130 make exceptions regarding the use of the ending *-ota* when forming the name of
 131 a phylum.

132

133 The name of a class is in the plural form and written with an initial capital letter.

134

135 Until 31 December 2011, new names of classes that were considered to have
 136 been validly published (see Rule 27) prior to or on that date were to be formed
 137 preferably in conformity with Recommendation 6.

138

139 With effect from 1 January 2012, new names of classes that are considered to
 140 have been validly published (see Rule 27) on or after that date are in the neuter
 141 gender and is formed by the addition of the suffix *-ia* to the stem of the name of
 142 the designated type genus.

143

144 The name of a subclass is in the feminine gender, plural form, and written with
 145 an initial capital letter. The name is formed by the addition of the suffix *-idae* to
 146 the stem of the name of the designated type genus.

147

148 Example: Phylum—*Bacteroidota*; Class—*Ktedonobacteria*; Subclass—
 149 *Sphaerobacteridae*.

150

151 **Rule 15, Table 2 – Current version**

152

153 **Table 2.** *Taxonomic Categories*

154

Taxonomic category	Type
--------------------	------

Subspecies Species	Designated strain; in special cases the place of the type strain may be taken by a description, preserved specimen, or an illustration (see Rule 18a(1))
Subgenus Genus	Designated species
Tribe Family Suborder Order	Genus on whose name the name of the higher taxon is based
Subclass Class	One of the contained orders
Phylum	One of the contained genera

155

156 **Rule 15, Table 2 – Proposed new version:**

157

158 **Table 2. Taxonomic Categories**

159

Taxonomic category	Type
Subspecies Species	Designated strain; in special cases, the place of the type strain may be taken by a description, preserved specimen, or an illustration (see Rule 18a(1))
	Designated species
Tribe Family Suborder Order Subclass Class Phylum	Genus on whose name the name of the higher taxon is based

160

161

162 **Rule 22 – Current version**

163

164 The type of a phylum is one of the contained genera. If there is only one genus,
165 this becomes the type. If there are two or more genera, the type shall be
166 designated by the author(s) at the time of the proposal of the phylum name,
167 although authors are encouraged to respect priority by considering which genus
168 was described first.

169

170 The type (see Rule 15) of a class or subclass is one of the contained orders. If
171 there is only one order, this becomes the type. If there are two or more orders,
172 the type shall be designated by the author(s) at the time of the proposal of the
173 name.

174

175 If not designated, the type of a taxon higher than order may be later designated
176 by an Opinion of the Judicial Commission.

177

178 **Rule 22 – Proposed new version**

179

180 The type of a phylum is one of the contained genera. If there is only one genus,
181 this becomes the type. If there are two or more genera, the type shall be
182 designated by the author at the time of the proposal of the phylum name,
183 although authors are recommended to respect priority by considering which
184 genus was described first.

185

186 The type of a class or subclass is one of the contained genera. If only one genus
187 name is validly published, this becomes the type. If two or more genera have
188 validly published names, the type shall be designated by the author(s) at the time
189 of the proposal of the name.

190

191 If the author(s) designated as the nomenclatural type of a taxon of a rank above
192 genus, up to and including phylum, another taxon above the rank of genus but
193 below the rank of that taxon and contained within that taxon, and if the

194 nomenclatural type of this designated nomenclatural type is a genus with a
195 validly published and legitimate name, then this genus automatically becomes
196 the nomenclatural type of that taxon in place of the designated nomenclatural
197 type.

198

199 If not designated, the type of a taxon higher than order may be later designated
200 by an Opinion of the Judicial Commission.

201

202 **Appendix 7 (1), within first paragraph – Current version**

203

204 The suffix for class is *-ia*, for subclass *-idae*. These endings are added to the stem
205 of the name of the type genus of the type order of the class or subclass.

206

207 **Appendix 7 (1), within first paragraph – Proposed new version**

208

209 The suffix for class is *-ia*, for subclass *-idae*. These endings are added to the stem
210 of the name of the type genus of the class or subclass.

211

212 **Appendix 7 (6), within second paragraph – Current version**

213

214 The type of a species or a subspecies is a strain, that of a genus is a species, and
215 that of an order, suborder, family, or tribe is the genus on which name the higher
216 taxon name is based (see 1 above). The type of a class or subclass is one of the
217 contained orders. The type of a phylum is one of the contained genera.

218

219 **Appendix 7 (6), within second paragraph – Proposed new version**

220

221 The type of a species or a subspecies is a strain, that of a genus or a subgenus is a
222 species, and that of a phylum, class, subclass, order, suborder, family, or tribe is a
223 genus. With few exceptions (provided for by Rule 8 and Rule 21b) the name of
224 the higher taxon is based on the name of that genus (see 1 above).

225

226 These changes are proposed as being retroactive, which requires a justification. It is
227 indeed often desirable to make changes of the ICNP non-retroactive, particularly if
228 the retroactivity would affect the status of names, i.e., whether or not they are
229 validly published and legitimate. However, the primary purpose of changing the
230 category of the nomenclatural type of classes and subclasses to genus is to simplify
231 the ICNP [5]. This goal would be at odds with an attempt to create a situation in
232 which some classes and subclasses have an order as nomenclatural type while a
233 genus serves as nomenclatural type of others. Such an arrangement would also
234 make the usage of nomenclatural types (e.g., Rule 17, Rule 51b(1)) unnecessarily
235 difficult because the taxonomic positions of taxa of distinct categories would need to
236 be compared to each other to determine whether the taxa for which they serve as
237 nomenclatural types compete for priority (Rule 15, Rule 23a).

238 The structure of the last revision of the ICNP [1] already ensured that names of
239 classes and subclasses indirectly depend on the names of genera. The name of a
240 class or subclass cannot be validly published and legitimate if the name of the order
241 that serves as its nomenclatural type is not validly published and legitimate, and the
242 name of this order cannot be validly published and legitimate if the name of the
243 genus that serves as its nomenclatural type is not validly published and legitimate
244 (Rule 21a). In addition to their status, the regular formation of the name of a class or
245 subclass also already depends on the name of a genus (Rule 8).

246 For these reasons, the retroactivity of the change of the nomenclatural type of
247 classes and subclasses from an order to a genus cannot affect the status of names of
248 classes and subclasses that already have a validly published name, provided their
249 nomenclatural type is actively changed, along with the change of the according
250 requirements in the ICNP. This is accomplished by the third paragraph of the
251 proposed new version of Rule 22. This paragraph also ensures that future proposals
252 of names of classes and subclasses (and, in fact, of all taxa above genus rank), which
253 inadvertently use an inaccurate category of the type [11] can, in most cases, be fixed
254 automatically, without impacting the status of the proposed names.

255

256

257 **THE SUITABILITY OF NAMES PUBLISHED IN SUPPLEMENTARY MATERIAL OR IN**
258 **PAPERS PUBLISHED ON E-PRINT SERVERS FOR EFFECTIVE PUBLICATION**

259

260 In recent years, the List Editors of the IJSEM [12] have encountered cases in which
261 new names were published in supplementary files attached to papers in journals
262 other than the IJSEM or names were proposed in papers published in e-print
263 repositories, and these names were then submitted for validation. Therefore, the
264 editorial board of the ICNP discussed whether such names comply with the *Note* to
265 Rule 25a. In view of the consensus, although not unanimous, opinion that such files
266 should not be considered as effective publications, we propose to emend this *Note*
267 as follows:

268

269 **Rule 25a, *Note* – Current version**

270

271 *Note.* Electronic publication should follow the tradition of publication of printed
272 matter acceptable to this Code.

273

274 **Rule 25a, *Note* – Proposed new version**

275

276 *Note.* Electronic publication must follow the tradition of publication of printed
277 matter acceptable to this Code. Supplementary files attached to papers and
278 papers published in e-print repositories cannot be considered effective
279 publications.

280

281 We regard this modification as an improvement in the clarity of the text. Preprints
282 are already ruled out as effective publications by Rule 25b(6). In the absence of other
283 regulations, the current wording of the Note to Rule 25a already argues against
284 treating supplementary files as effective publications because the “publication of
285 printed matter” does not traditionally contain electronic supplementary material.

286

287 It was noted during the online discussion [4] that permitting supplementary
288 material and preprints as effective publications would amount to lowering the
standards set by the ICNP. If a manuscript available as a preprint is published later by

289 a journal, that journal article can serve as an effective publication. But if a
290 manuscript available as a preprint is not published later by any journal, there may be
291 a reason. Placing information in supplementary material may also cause it to not be
292 thoroughly peer reviewed. Inclusion of taxon descriptions in supplementary material
293 devalues them, compared to placement in the main article. Moreover,
294 supplementary material may be less likely to be permanently available. It is noted
295 that if the ICSP rejects this proposed amendment, it is implicitly accepting the idea
296 that supplementary material can be accepted as effective publication. However,
297 preprints remain excluded by Rule 25b(6).

298

299

300 **THE NEED FOR CULTURE COLLECTION DESIGNATIONS TO BE PUBLISHED AT THE**
301 **TIME OF EFFECTIVE PUBLICATION OF NAMES OF SPECIES AND SUBSPECIES**

302

303 The current version of Rule 30(3)(b) states that, as of 1 January 2001, for the
304 description of a new species, or a new combination, "... a viable culture of the type
305 strain must be deposited in at least two publicly accessible culture collections in
306 different countries ..." and that the designations allotted to the strain by the culture
307 collections should be quoted in the published description. In recent years, the List
308 Editors of the IJSEM have handled numerous validation requests wherein the
309 effective publications designate one culture collection deposit only and a second
310 deposit was obtained later. Validation was routinely approved in such cases and the
311 second deposit was noted in the entry in the Validation Lists. There also were cases
312 wherein the effective publication has only the strain designation given by the author,
313 with the two culture collection documents obtained after the paper was published.
314 In such cases, the List Editors generally requested the publication of a corrigendum.
315 As authors and editors need clear guidelines, we propose emendation of Rule
316 30(3)(b) as follows:

317

318 **Rule 30(3)(b), first paragraph – Current version**

319

320 As of 1 January 2001, the valid publication of the name of a new species, or a
321 new combination previously represented by viable cultures must include the
322 designation of a type strain (see Rule 18a), and a viable culture of that strain
323 must be deposited in at least two publicly accessible culture collection in
324 different countries from which subcultures must be available.

325

326 **Rule 30(3)(b), first paragraph – Proposed new version**

327

328 As of 1 January 2001, the valid publication of the name of a new species, or a
329 new combination previously represented by viable cultures must include the
330 designation of a type strain (see Rule 18a), and a viable culture of that strain
331 must be deposited in at least two culture collections in different countries that
332 are publicly accessible at the time of publication in the IJSEM and are able to
333 provide the strain to the scientific community. At least one designation allotted
334 to the type strain by a culture collection must be cited in effective publications
335 not published in the IJSEM.

336

337 **The kinds of restrictions that may be attached to deposits of type strains**

338

339 Rule 30 is a crucial section of the ICNP, as it defines the requirements for the valid
340 publication of the name of a species. Rule 30 (4) is concerned with situations in
341 which type strains are deposited in a culture collection but these deposits are
342 affected by restrictions:

343

344 **Rule 30 (4) – Current version:**

345

346 Organisms deposited in such a fashion that access is restricted, such as safe
347 deposits or strains deposited solely for current patent purposes, may not serve
348 as type strains.

349

350 Much of the public discussion [4] was devoted to the question of what restrictions
351 are allowed for validation of names, also in view of the implications of the Nagoya

352 protocol and local regulations that may restrict distribution of type material [13]. The
353 mere presence of a Material Transfer Agreement (MTA) does not inherently limit the
354 possibilities for taxonomic investigations, and MTAs are currently applied by most
355 culture collections. To better define what restrictions to access to type strains may
356 be acceptable, we propose the following emendation:

357

358 **Rule 30 (4) – Proposed new version:**

359

360 Deposits to which access is restricted, such as safe deposits, deposits
361 of strains made solely for current patent purposes, and deposits for
362 which access is not possible until a national authority or any other
363 third party grants permission, may not serve as deposits of type
364 strains. Material Transfer Agreements or other contractual agreements
365 may be attached to deposits of type strains only if these agreements do
366 not prohibit the distribution of subcultures of the deposit for, at
367 least, research for taxonomic purposes.

368

369 We propose this emendation to be retroactive. It is not intended to change the
370 requirements for the valid publication of a name. The sole purpose of this
371 modification of Rule 30(4) is to improve the clarity of the text and to cover situations
372 that were as yet not explicitly covered [13]. The dependence of access on permission
373 granted by a third party also contravenes Rule 30(3)(b), as noted during the online
374 debate [4], since accessibility at the time of publication cannot be safely assumed
375 under these circumstances. Type strains deposited with culture collections by
376 authors of new taxa must be made available to the scientific community.

377

378

379 **DOES ELEVATION OF A SUBSPECIES TO THE RANK OF SPECIES OR LOWERING OF A**
380 **SPECIES TO THE RANK OF SUBSPECIES ESTABLISH NEW COMBINATIONS?**

381

382 Rule 34a regulates the use of the term ‘new combination’ (comb. nov., *combinatio*
 383 *nova*) and in special cases ‘nom. nov.’ (*nomen novum*) and the use of the term
 384 ‘basonym’ for the original name.

385

386 **Rule 34a – Current version**

387

388 When authors transfer a species to another genus (Rule 41), or a subspecies to
 389 another species, then the author(s) who make(s) the transfer should indicate the
 390 formation of the **new combination** by the addition to the citation of the
 391 abbreviation “**comb. nov.**” (*combinatio nova*).

392 This form of citation should be used when authors retain the original specific
 393 epithet in the new combination; however, if authors are obliged to substitute a
 394 new specific epithet as a result of homonymy, the abbreviation “**nom. nov.**”
 395 (*nomen novum*) should be used [see Rule 41a(1)]. The original name is referred
 396 to as the **basonym**.

397

398 Example: *Anaerovibrio glycerini* Schauder and Schink 1996; *Anaerosinus glycerini*
 399 (Schauder and Schink 1996) Strömpl *et al.* 1999.

400

401 Rule 34a is not explicit about the use of the terms ‘new combination’ and ‘basonym’
 402 for cases where a subspecies is elevated to the rank of species (Rule 50a) or a species
 403 is lowered to rank of subspecies (Rule 50b), and the original subspecific or specific
 404 epithet is retained. The rule has been interpreted in different ways, as it is not clear
 405 from its wording whether new combination events are also applicable for elevation
 406 or lowering of rank. This also has an effect on whether or not authors of epithets are
 407 to be cited in parentheses.

408 In 2018, a formal proposal was submitted to emend Rules 50a and 50b with
 409 notes to indicate that new combination events are applicable only at the identical
 410 rank [14]; the changes were proposed to be non-retroactive. The ICSP has not yet
 411 voted on these proposals.

412

413 **Proposed Note to Rule 50a [14]**

414

415 *Note.* Based on Rule 34a, elevation of a subspecies to the rank of species does
416 not create a new combination. New combination events are applicable only at
417 the identical rank.

418

419 **Proposed Note to Rule 50b [14]**

420

421 *Note.* Based on Rule 34a, lowering a species to the rank of subspecies does not
422 create a new combination. New combination events are applicable only at the
423 identical rank.

424

425 During the public discussion [4], many participants supported the alternative
426 interpretation of Rule 34a so that a new combination also arises when a subspecies
427 is elevated to the rank of species or a species is lowered in rank to a subspecies. This
428 was based on arguments put forward earlier [15], as well as on additional
429 considerations, including the benefits of honoring the authors of reused epithets by
430 citing them in parentheses (Rule 34b) and of better keeping track of homotypic
431 synonymy. It is important to mention that Rules 34a to 34c are under a common
432 heading: *Proposal and Subsequent Citation of a New Combination*, and in particular,
433 Rule 34c states: When a taxon from subspecies to genus is altered in rank but retains
434 its name or epithet, the original author(s) must be cited, in parentheses, followed by
435 the name of the author(s) who effected the alteration and the year of publication.
436 The example to Rule 34c also indicates that the lowering of a species in rank to a
437 subspecies is considered a new combination. So, indirectly, the elevation or lowering
438 of rank between species and subspecies are considered new combinations, as long
439 as the epithet is retained.

440

441 It was also noted that the *International Code of Nomenclature for algae, fungi,*
442 *and plants (ICN)* [10] treats elevations of subspecies in rank and reductions of
443 species in rank as new combinations, and that compatibility with the ICN regarding
444 terminology and citation of authors is desirable here because of the mutual
recognition between the two codes regarding names of *Cyanobacteria* [9].

445 Therefore, we here present two alternative proposals for emendation of the first
446 paragraph of Rule 34a.

447

448 **Rule 34a – Proposal to clarify that new combination events also occur during**
449 **change in rank**

450

451 When authors transfer a species to another genus (Rule 41), or a subspecies to
452 another species, the author(s) who make(s) the transfer should indicate the
453 formation of the **new combination** by the addition to the citation of the
454 abbreviation “**comb. nov.**” (*combinatio nova*). The term “new combination” also
455 applies when a subspecies is elevated to the rank of a species and the subspecific
456 epithet is retained (Rule 50a) or a species is lowered to the rank of subspecies
457 and the specific epithet is retained (Rule 50b).

458

459 Acceptance of this version necessarily implies rejection of the recently proposed
460 Notes to Rules 50a and 50b [14].

461

462 **Rule 34a – Proposal to apply new combination events only at the identical rank**

463

464 When authors transfer a species to another genus (Rule 41), or a subspecies to
465 another species, the authors who make the transfer should indicate the
466 formation of the **new combination** by the addition to the citation of the
467 abbreviation “**comb. nov.**” (*combinatio nova*). The term “new combination”
468 does not apply when a subspecies is elevated to the rank of a species and the
469 subspecific epithet is retained (Rule 50a) or a species is lowered to the rank of
470 subspecies and the specific epithet is retained (Rule 50b).

471

472 Acceptance of this version implies acceptance of the recently proposed Notes to
473 Rules 50a and 50b [14].

474

475

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479

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481 **Conflicts of interest**

482

483 The authors declare that there are no conflicts of interest.

484

485

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