

20210228: Compilation (final) of ALL comments for the ICSP discussion on the proposed inclusion of the rank of phylum in the ICNP (comments from 20201101 – 20210227)

Sent: Thursday, 2020-10-29; 13:14

From: Iain Sutcliffe iain.sutcliffe@northumbria.ac.uk

ICSP discussion on the proposed inclusion of the rank of phylum in the International Code of Nomenclature of Prokaryotes - contributions invited

Dear members of the International Committee on Systematics of Prokaryotes, Judicial Commission, Chairs of Taxonomic Subcommittees and others interested in ICSP matters,

As announced earlier today by Aharon Oren, Executive Secretary of ICSP, in keeping with Article 4 of the ICSP Statutes, the ICSP Executive Board and the Editorial Board of the International Code of Nomenclature of Prokaryotes (ICNP) are conducting an open electronic meeting concerning proposals for changes to the ICNP. The issue for the current discussion is the **proposal to include the rank of phylum** in the International Code of Nomenclature of Prokaryotes.

The first phase of the meeting will take place from **Sunday 1st November 2020 until Sunday 31st January 2021**. It is intended to allow open discussion of the proposals as an email chain among the members of the ICSP, JC and other interested parties. Comments should be posted by using the 'reply-all' option on your email server. Please feel free to add interested parties to the email recipient list or inform us of suggested additions. *Comments must be less than 500 words in length* and should identify the author's name(s) and affiliation(s). Comments should be respectful and focussed on the scientific debate; *ad hominem* comments will be deleted from the record.

Please reply to this email thread and this one only.

As comments accumulate, Edward Moore (erbmoores@ccug.se) and David Arahal (David.Ruiz@uv.es) will collate them and the edited comments will serve as the minutes of the meeting.

Please feel free to add interested parties to the email recipient list and solicit comments from interested parties outside the ICSP.

Voting will be opened in the second phase of the meeting between **01st to 28th February 2021**.
Only Full and Co-opted members of the ICSP may vote.

For further information about the proposal, see

Oren A. et al. (2015) IJSEM 65:4284-4287. <https://doi.org/10.1099/ijsem.0.000664>

and the subsequent addendum:

Whitman W.B. et al. (2018) IJSEM 68: 967-979. <https://doi.org/10.1099/ijsem.0.002593>

Please give your full attention to these two inter-related proposals and contribute comments as described above. Additional notes to accompany these two articles are given in the attached document.

Sincerely yours,

Iain

Professor Iain Sutcliffe,
Northumbria University,
Newcastle upon Tyne NE1 8ST,
U.K.

Attachment: Code emendment to introduce the rank of phylum (29.10.20).docx (27 KB)

To the members of the International Committee on Systematics of Prokaryotes & Judicial Commission.

In keeping with Article 4 of the ICSP Statutes, the ICSP Executive Board and the Editorial Board of the International Code of Nomenclature of Prokaryotes (ICNP) are conducting an open electronic meeting concerning

proposals for changes to the ICNP. The issue for the current discussion is the proposal to include the rank of phylum in the International Code of Nomenclature of Prokaryotes.

The first phase of the meeting will take place from **Sunday 1st November 2020 until Sunday 31st January 2021**. It is intended to allow open discussion of the proposals as an email chain among the members of the ICSP, JC and other interested parties. Comments should be posted by using the 'reply-all' option on your email server. Please feel free to add interested parties to the email recipient list or inform us of suggested additions. *Comments must be less than 500 words in length* and should identify the author's name(s) and affiliation(s). Comments should be respectful and focussed on the scientific debate; *ad hominem* comments will be deleted from the record.

As comments accumulate, Edward Moore (erbmoore@ccug.se) and David Arahal (David.Ruiz@uv.es) will collate them and the edited comments will serve as the minutes of the meeting.

Please feel free to add interested parties to the email recipient list and solicit comments from interested parties outside the ICSP.

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Oren A. et al. (2015) IJSEM 65:4284-4287. <https://doi.org/10.1099/ijsem.0.000664>

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Whitman W.B. et al. (2018) IJSEM 68: 967-979. <https://doi.org/10.1099/ijsem.0.002593>

Please give your full attention to these two inter-related proposals and contribute comments as described above. Additional notes to accompany these two articles are given in the attached document.

Sincerely yours,

Aharon Oren
Executive Secretary ICSP

Comments from 20201101 – 20201231. Compilation of comments for the ICSP discussion on the proposed inclusion of the rank of phylum in the ICNP

Sent: Thursday, 2020-11-26; 11:27

From: Markus Göker markus.goeker@dsmz.de

Re: FW: ICSP discussion on the proposed inclusion of the rank of phylum in the International Code of Nomenclature of Prokaryotes - contributions invited

Dear all,

At first I did not dare to start this discussion but since as yet there were few, if any, contributions, I am sending some comments here in the hope that they are useful.

I would like to dissect the proposal into four separate aspects:

- (1) whether it makes sense to include the rank of phylum into the ICNP;
- (2) the choice of the standardized ending for phylum names;
- (3) how to deal with exceptions from the standardized ending;
- (4) the choice of the nomenclatural type for names of phyla.

I suppose (1) is uncontroversial but maybe someone wants to comment on that for the sake of completeness. As for (2), just to be safe I would like to ask the authors of the proposal and the addendum to clarify whether the intended ending to be voted about is -ota as opposed to -aeota, which was suggested earlier on.

I think the main issue here is to be able to unambiguously infer the rank from the name.

As stated by others, if -ota is sufficient for this purpose, -ota is preferable compared to the longer -aeota.

The ending for classes, -ia, sometimes leads to names that could be confused with genus names.

This does not seem to be the case with -ota. I found few validly published genus names with a slightly similar ending (Andreprevotia, Grimontia, Lelliottia, Soortia). According to Appendix 9, Table 2 of the INCP, if a genus is named after a person whose name ends in -ot, the genus name formed should end in -otia instead of -ota.

I conclude that there is little chance for a collision.

I admit that these comments are a bit boring.

I will try to say something more interesting about (3) and (4) in other contributions.

Sincerely yours

Markus Göker

Sent: Friday, 2020-11-27; 16:04

From: Maria Chuvochina m.chuvochina@gmail.com

Re: FW: ICSP discussion on the proposed inclusion of the rank of phylum in the International Code of Nomenclature of Prokaryotes - contributions invited

Dear Markus and all

Thank you for the start, and for dissecting the proposal into several important aspects!

I agree with your conclusions regarding the **1st aspects ("whether it makes sense to include the rank of phylum into the ICNP")**.

The rank of phylum must become a category covered by the rules of ICNP in order to bring stability and order in nomenclature.

The current practice of naming phyla has shown us that freedom of naming leads to unnecessary debates and problematic nomenclature consequences as a result of new taxonomic opinions. In the absence of rules that

would regulate nomenclature of phylum names, many seem to believe that names of phyla have some 'meaning' other than that just being a name (i.e. a label for a taxon) and should be permanently attached to the collection of organisms they are defining. We already discussed earlier that the majority of phyla names have been proposed in violation of general nomenclature rules such as designation of nomenclature types (Chuvochina et al., 2018), creating a dilemma to those who disagree with the initial proposals. Recognition of phylum as the highest taxonomic category in the hierarchy (at least recognised as such by many after the domain excluding intermediate ranks) does not imply its name being manageable in a manner different to other ranks above the genus.

I wanted to cite also an extract from paragraph by Glöckner et al., 2017:

"The numbers of bacterial and archaeal phyla are currently under a dramatic expansion ([Hug et al., 2016](#), [Rinke et al., 2013](#), [Seitz et al., 2016](#), [Zaremba-Niedzwiedzka et al., 2017](#)). While most studies employ a reasonable phylogenetic reconstruction strategy to propose new phyla, some maybe a result of the enormous pressure on scientists to create the deepest [taxonomic rank](#) possible, rendering their work more dramatic."...

Re: (2) "the choice of the standardized ending for phylum names":

The initially proposed suffix *-aeota* was not a good choice for the reasons discussed in the addendum (Whitman et al., 2018).

The choice of the suffix *-aeota* was not explained in the original proposal, and the etymology of the suffix *-ota* was also not given in the addendum.

It is mentioned only that suffix *-ota* brings the nomenclature of the rank of phylum in agreement with the suffix used for the same category under the provision of ICN for fungi. It should be noted that the usage of *-phygota* for algae has been amended in the ICN and no longer in use (da Silva, 2015). The [current text](#) of ICN states: "**16.3.** Automatically typified names end as follows: the name of a division or phylum ends in *-phyta*, unless it is referable to the fungi in which case it ends in *-mycota*..."

The suffix *-ota* comes from Greek, it is a neuter plural suffix of the singular form *-otos/otes* (it is an adjectival suffix; where *-o-* seems to be actually part of the stem of the word and suffix itself is *-tos/tes*). We have many Greek-derived words ending with this suffix and its singular or plural forms such microbiota, prokaryote, symbiote, zygote...

I agree with Markus that we need to take into consideration the ability of the suffix to distinguish the names at different ranks.

This has been recently discussed by Tindall (2020) and I support this idea of uniformity and ability to distinguish ranks by the ending of taxa names.

However, I found a precedent where a genus name has an ending *-ota*...

Candidatus Halestosymbiota - <https://www.namesforlife.com/10.1601/nm.33720>, DOI 10.1099/ijsem.0.003789

We may consider adding to the proposal that formation of generic names ending in *-ota* are forbidden as consequences of the Oren et al.2015/Whitman et al. 2018 proposal.

Re: (3) "how to deal with exceptions from the standardized ending"

I suggest adopting the same rule as in ICN which states: "Automatically typified names with a termination not in accordance with this rule or [Art. 17.1](#) are to be corrected, without change of authorship or date of publication (see [Art. 32.2](#))."

Re (4) the choice of the nomenclatural type for names of phyla.

The current proposal suggests to typify names of phyla by the name of one of their contained classes.

However, there are a number (about 40 or so) class names that are formed in violation of the Rule 8 of the ICNP.

Therefore, while those names are validly published, they are indeed illegitimate and cannot be used for nomenclature proposals.

If one proposes a phylum name based on illegitimate class name, that will make this phylum name illegitimate by default.

To avoid this, we have to unify the way classes are named. This is a separate discussion and two proposals have been made in the past regarding the retroactivity of the Rule 8 (issue of stability of names vs correctly-formed names). Nevertheless, in order to proceed with this discussion and correct formation of phyla names, I suggest that names of the phyla have to be typified by the genus name. To be more specific by the type genus name of the type order of one of the contained classes. Perhaps we should also consider to autotypify all higher rank names by the type genus name as this will have further implications in consideration of naming of taxa affected by changes...

References:

Chuvochina, M., Rinke, C., Parks, D.H., Rappé, M.S., Tyson, G.W., Yilmaz, P., Whitman, W.B. and Hugenholtz, P., 2019. The importance of designating type material for uncultured taxa. *Systematic and applied microbiology*, 42(1), pp.15-21.

Glöckner, F.O., Yilmaz, P., Quast, C., Gerken, J., Beccati, A., Ciuprina, A., Bruns, G., Yarza, P., Peplies, J., Westram, R. and Ludwig, W., 2017. 25 years of serving the community with ribosomal RNA gene reference databases and tools. *Journal of biotechnology*, 261, pp.169-176.

da Silva, W.J. and Menezes, M., 2015. (049) Proposal to modify Article 16.3. *Taxon*, 64(3), pp.652-652.

Tindall, B.J., 2020. Standardised Suffixes in the Nomenclature of the Higher Taxa of Prokaryotes an Aid to Data Mining, Database Administration and Automatic Assignment of Names to Taxonomic Ranks. *Current Microbiology*, pp.1-4.

Oren, A., Garrity, G.M., Parker, C.T., Chuvochina, M. and Trujillo, M.E., 2020. Lists of names of prokaryotic Candidatus taxa. *International Journal of Systematic and Evolutionary Microbiology*, 70(7), pp.3956-4042.

Thank you!

Masha

--

Dr Maria Chuvochina

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St Lucia QLD 4072 Australia

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m.chuvochina@uq.edu.au

Sent: Sunday, 2020-11-29; 22:06

From: B.J.Tindall b.j.tindall@judicialcommission.org

Re: FW: ICSP discussion on the proposed inclusion of the rank of phylum in the International Code of Nomenclature of Prokaryotes - contributions invited

My comments interleaved below.

Dr. Brian J. Tindall

This e-mail is sent as a private individual, no affiliation to an employer is either intended or should be inferred.

Editor's note: Original comments received 2020-11-27 from Maria Chuvochina are in Calibri font in blue colour; Brian's interleaved comments are in Times font in black colour.

On November 27, 2020 at 4:04:23 pm +01:00, Maria Chuvochina <m.chuvochina@gmail.com> wrote:

Dear Markus and all

Thank you for the start, and for dissecting the proposal into several important aspects!

I agree with your conclusions regarding the **1st aspects ("whether it makes sense to include the rank of phylum into the ICNP")**.

The rank of phylum must become a category covered by the rules of ICNP in order to bring stability and order in nomenclature.

The current practice of naming phyla has shown us that freedom of naming leads to unnecessary debates and problematic nomenclature consequences as a result of new taxonomic opinions. In the absence of rules that would regulate nomenclature of phylum names, many seem to believe that names of phyla have some 'meaning' other than that just being a name (i.e. a label for a taxon) and should be permanently attached to the collection of organisms they are defining. We already discussed earlier that the majority of phyla names have been proposed in violation of general nomenclature rules such as designation of nomenclature types (Chuvochina et al., 2018), creating a dilemma to those who disagree with the initial proposals. Recognition of phylum as the highest taxonomic category in the hierarchy (at least recognised as such by many after the domain excluding intermediate ranks) does not imply its name being manageable in a manner different to other ranks above the genus.

If the names in question are not validly published the only "dilemma" is their continued use as names that lie outside the current jurisdiction of the Code and what happens should names at this rank be covered by the Code. Simply changing the Code to include names of phyla and adding the names is not necessarily the solution when the names as originally published in the absence of both a description or designation of a nomenclatural type do not conform with the Code anyway (nomen nudum) - it is the fine detail that is important.

I wanted to cite also an extract from paragraph by Glöckner et al., 2017:

"The numbers of bacterial and archaeal phyla are currently under a dramatic expansion ([Hug et al., 2016](#), [Rinke et al., 2013](#), [Seitz et al., 2016](#), [Zaremba-Niedzwiedzka et al., 2017](#)). While most studies employ a reasonable phylogenetic reconstruction strategy to propose new phyla, some maybe a result of the enormous pressure on scientists to create the deepest taxonomic rank possible, rendering their work more dramatic."...

Can we conclude that creating lots of new names of phyla is done simply to make the paper more attractive for Nature/Springer/Science papers?

Re: (2) "the choice of the standardized ending for phylum names":

The initially proposed suffix *-aeota* was not a good choice for the reasons discussed in the addendum (Whitman et al., 2018).

The choice of the suffix *-aeota* was not explained in the original proposal, and the etymology of the suffix *-ota* was also not given in the addendum.

It is mentioned only that suffix *-ota* brings the nomenclature of the rank of phylum in agreement with the suffix used for the same category under the provision of ICN for fungi. It should be noted that the usage of *-phycota* for algae has been amended in the ICN and no longer in use (da Silva, 2015). The current text of ICN states: "**16.3**. Automatically typified names end as follows: the name of a division or phylum ends in *-phyta*, unless it is referable to the fungi in which case it ends in *-mycota*..."

The suffix *-ota* comes from Greek, it is a neuter plural suffix of the singular form *-otos/otes* (it is an adjectival suffix; where *-o-* seems to be actually part of the stem of the word and suffix itself is *-tos/tes*). We have many Greek-derived words ending with this suffix and its singular or plural forms such microbiota, prokaryote, symbiote, zygote...

I agree with Markus that we need to take into consideration the ability of the suffix to distinguish the names at different ranks.

This has been recently discussed by Tindall (2020) and I support this idea of uniformity and ability to distinguish ranks by the ending of taxa names.

Rather than being cryptic: and adding it to the reference list
Standardised Suffixes in the Nomenclature of the Higher Taxa of Prokaryotes an Aid to Data Mining, Database Administration and Automatic Assignment of Names to Taxonomic Ranks

<https://doi.org/10.1007/s00284-020-01890-y>

this should be open access.

See also:

Names above the rank of genus; the radical approach:

<https://doi.org/10.1099/ijsem.0.003169>

This also deals with nomenclatural types and also the gender of names, but has been misunderstood/ incorrectly interpreted elsewhere. Although submitted and accepted under the old statutes, it was finally published in June 2019 after approval of the new statutes, but is not being dealt with according to the new statutes.

However, I found a precedent where a genus name has an ending *-ota*...

Candidatus Halestosymbiota - <https://www.namesforlife.com/10.1601/nm.33720>,
DOI 10.1099/ijsem.0.003789

Name not validly published. Another alternative would be to derive the name from the Greek sunbion which gives us the term symbiont, ie., the organism is a symbiont rather than living symbiotically.

We may consider adding to the proposal that formation of generic names ending in *-ota* are forbidden as consequences of the Oren et al.2015/Whitman et al. 2018 proposal.

Re: (3) "how to deal with exceptions from the standardized ending"

I suggest adopting the same rule as in ICN which states: "Automatically typified names with a termination not in accordance with this rule or [Art. 17.1](#) are to be corrected, without change of authorship or date of publication (see [Art. 32.2](#))."

As long as that does not collide with other parts of the ICNP, meaning that one Rule permits it, the other forbids it. However, the statutes would also suggest that this type of change to the Code needs to be published as a formal proposal in the IJSEM.

Re (4) the choice of the nomenclatural type for names of phyla.

The current proposal suggests to typify names of phyla by the name of one of their contained classes. However, there are a number (about 40 or so) class names that are formed in violation of the Rule 8 of the ICNP.

Therefore, while those names are validly published, they are indeed illegitimate and cannot be used for nomenclature proposals.

If one proposes a phylum name based on illegitimate class name, that will make this phylum name illegitimate by default.

To avoid this, we have to unify the way classes are named. This is a separate discussion and two proposals have been made in the past regarding the retroactivity of the Rule 8 (issue of stability of names vs correctly-

formed names). Nevertheless, in order to proceed with this discussion and correct formation of phyla names, I suggest that names of the phyla have to be typified by the genus name. To be more specific by the type genus name of the type order of one of the contained classes. Perhaps we should also consider to autotypify all higher rank names by the type genus name as this will have further implications in consideration of naming of taxa affected by changes...

In essence one can't leave out this type of change if it has consequences for the current discussion. The other issue is that as currently worded the texts appear to be talking about the type of a phylum being one of the contained classes, whereas here we have a shift in your wording to nomenclatural type of the name of a phylum and the nomenclatural type being the name of the genus rather than the genus itself - very subtle differences, but two very different issues. While one often encounters "validly published species" or "validly published description" instead of validly published name, the incorrect use of terms does not make the system easier to understand or interpret when errors or lack of clarity are in the original terminology.

Brian

Sent: Sunday, 2020-12-13; 21:38

From: Markus Göker markus.goeker@dsmz.de

Re: FW: ICSP discussion on the proposed inclusion of the rank of phylum in the International Code of Nomenclature of Prokaryotes - contributions invited

Dear Masha, dear all,

On 27.11.20 16:04, Maria Chuvochina wrote:

> Thank you for the start, and for dissecting the proposal into several important aspects!

Thank you for your comments. I have no further questions regarding

- (1) whether it makes sense to include the rank of phylum into the ICNP and
- (2) the choice of the standardized ending for phylum names.

As for (3), I think the ballot should be augmented to let the ICSP should explicitly vote on the possible alternatives regarding exceptions from the standardized ending -ota.

The authors of the proposal (<https://dx.doi.org/10.1099/ijsem.0.002593>)

have expressed their concern that some well-known and frequently used names of phyla that do not end in ota would be replaced by new names.

It was suggested that the JC considers conserving the better known names.

It is my understanding that conservation (Rule 56b) is applicable if two names compete for priority and it is desirable to treat the name that has no priority as the correct name. I further assume that the JC can only conserve a validly published and legitimate name.

Rule 8 stipulates that names of taxa of a rank higher than genus are formed from the stem of the name of the nomenclatural type (ST) plus a standardized ending (SE), and the phylum rank would behave in the same way. This would render validly published names that violate the ST+SE scheme illegitimate, unless the INCP granted an exception. Fixing such a deviation would not be within the scope of an orthographical correction unless it was minor.

Since, as indicated by the authors of the proposal, some microbiologists may prefer some names of phyla that deviate from the ST+ota scheme, the ICSP may better explicitly vote on that matter. If it was already obvious that everybody wanted all names of phyla to conform to the new scheme and that no one cared about the replacement of well-known names, no such addition would be needed.

There are four options:

- (1) no deviation from the ST+ota scheme;

- (2) the JC can permit a deviation but ST+ending is mandatory;
- (3) the JC can permit a deviation but the scheme prefix+ota is mandatory;
- (4) the JC can permit a deviation and even another prefix and another ending.

I do not even have strong opinions regarding these options. I just believe that things would run more smoothly in the future if there was an explicit vote on that matter, regardless of its outcome. For instance, if the ICSP explicitly decided to not permit exceptions from the ST+ota scheme for phyla, one could refer to this decision in the case of complaints; if otherwise, someone might conclude that the ICSP had simply overlooked that matter.

This is not intended as a criticism of the proposal to include the phylum rank in the ICNP, I just feel that there should be some flexibility to augment the ballot when it makes sense.

Sincerely yours
Markus Göker

Sent: Sunday, 2020-12-13; 21:42
From: Markus Göker markus.goeker@dsmz.de
Re: FW: ICSP discussion on the proposed inclusion of the rank of phylum in the International Code of Nomenclature of Prokaryotes - contributions invited

On 13.12.20 21:37, Markus Göker wrote:

> Rule 8 stipulates that names of taxa of a rank higher than genus are
> formed from the stem of the name of the nomenclatural type (ST) plus a
> standardized ending (SE), and the phylum rank would behave in the same
> way. This would render validly published names that violate the ST+SE
> scheme illegitimate, unless the INCP granted an exception. Fixing such
> a deviation would not be within the scope of an orthographical
> correction unless it was minor.

An addition (because of the 500-words limit):

Rule 21b states 'If the name of a family was not made in conformity with Rule 21a but its name has been conserved, then the type genus may be fixed by an Opinion of the JC.' I think this allowed the JC to retain the name Enterobacteriaceae with the type genus Escherichia. Note that the name Enterobacteriaceae does not comply with ST+SE but does comply with prefix+SE.

I did not find an equivalent to Rule 21b for other categories. I fear that the options the JC has in dealing with this matter are currently restricted because of the lack of a clause in the ICNP that would grant exceptions from the scheme. The same held if the rank of phylum was included in the ICNP. At present many validly published names of classes already fail to conform to the ST+SE scheme (<https://lpsn.dsmz.de/text/names-of-classes>).

The examples given in Rule 22 do not seem to conform to (current) Rule 8, nor does the claim, 'If not designated, the type of a taxon higher than order may be later designated by an Opinion of the JC.'

For this reason, a request to reconsider the retroactivity of Rule 8 (<https://dx.doi.org/10.1099/ijsem.0.001319>) is currently under consideration.

The same issues arise regarding names of phyla, hence it seems preferable to clarify these question within the ballot.

Sent: Monday, 2020-12-14; 05:44

From: B.J.Tindall b.j.tindall@judicialcommission.org

Re: FW: ICSP discussion on the proposed inclusion of the rank of phylum in the International Code of Nomenclature of Prokaryotes - contributions invited

Editor's note: Original comments received 2020-12-13 from Markus Göker are in Calibri font in blue colour; Brian's interleaved comments are in Times font in black colour.

Markus brief comments in your text.

Dr. Brian J. Tindall

This e-mail is sent as a private individual, no affiliation to an employer is either intended or should be inferred.

Am 13. Dezember 2020 um 21:37:32 +01:00, hat Markus Göker <markus.goeker@dsmz.de> geschrieben:

Dear Masha, dear all,

On 27.11.20 16:04, Maria Chuvochina wrote:

It is my understanding that conservation (Rule 56b) is applicable if two names compete for priority and it is desirable to treat the name that has no priority as the correct name. I further assume that the JC can only conserve a validly published and legitimate name.

Rule 8 stipulates that names of taxa of a rank higher than genus are formed from the stem of the name of the nomenclatural type (ST) plus a standardized ending (SE), and the phylum rank would behave in the same way. This would render validly published names that violate the ST+SE scheme illegitimate, unless the INCP granted an exception. Fixing such a deviation would not be within the scope of an orthographical correction unless it was minor.

Except for the rank of class and subclass, but see my proposal for the "radical approach". However, the issue remains that the publication of a name without designation of a nomenclatural type and without a description would not qualify the name for valid publication. In many instances there are no nomenclatural types designated nor is there any recognisable description of the properties. The other issue is whether the rule would be retroactive, essentially back dating names or limited to "as of 1st January 2022".

Since, as indicated by the authors of the proposal, some microbiologists may prefer some names of phyla that deviate from the ST+ota scheme, the ICSP may better explicitly vote on that matter. If it was already obvious that everybody wanted all names of phyla to conform to the new scheme and that no one cared about the replacement of well-known names, no such addition would be needed. There are four options:

- (1) no deviation from the ST+ota scheme;
- (2) the JC can permit a deviation but ST+ending is mandatory;
- (3) the JC can permit a deviation but the scheme prefix+ota is mandatory;
- (4) the JC can permit a deviation and even another prefix and another ending.

All exceptions cause inherent problems.

Sent: Monday, 2020-12-14; 06:25
From: B.J.Tindall <b.j.tindall@judicialcommission.org>
Re: FW: ICSP discussion on the proposed inclusion of the rank of phylum in the International Code of Nomenclature of Prokaryotes - contributions invited

Markus,

The problem with the family name Enterobacteriaceae is two-fold.

1) the name is not derived from a genus name, but the trivial use of the term "enterobacteria".

While there is a genus Enterobacter, this would give us Enterobacteraceae.

The issue surfaced when Gupta and colleagues started to carve up the higher taxa of the "enterobacteria".

2) Opinion 15 of the Judicial Commission dates from 1958, with the twist being as to whether the name Enterobacteriaceae was included on the Approved Lists of Bacterial Names, to which I would add in the same format as other names of families.

The Approved Lists states:

Editor's note: The family name Enterobacteriaceae 1937 (type genus *Escherichia* Castellani and Chalmers 1919) has been challenged and is presently subjudice (see S.P.Lapage. *Int. J. Syst. Bacteriol.* 29:265-266, 1979; Judicial Commission Minute 29, *Int. J. Syst. Bacteriol.* 1979).

We had a similar issue with "*Sinorhizobium adhaerens*" Willems et al. 2003

[Description of new *Ensifer* strains from nodules and proposal to transfer *Ensifer adhaerens* Casida 1982 to *Sinorhizobium* as *Sinorhizobium adhaerens* comb. nov. Request for an Opinion | Microbiology Society \(doi.org\)](#)

where the issue arises whether names subject to Requests for an Opinion fall under

Rule 28a (2):

It was merely proposed in anticipation of the future acceptance of the taxon concerned or the acceptance of a particular circumscription, position, or rank for the taxon which is being named or in anticipation of the future discovery of some hypothetical taxon.

The JC issued Opinion 84:

[The genus name *Sinorhizobium* Chen et al. 1988 is a later synonym of *Ensifer* Casida 1982 and is not conserved over the latter genus name, and the species name '*Sinorhizobium adhaerens*' is not validly published. Opinion 84 | Microbiology Society \(doi.org\)](#)

The minutes to the JC meeting in San Francisco also document this interpretation under minute 7 (2 xiv), Rule 28b.

[Judicial Commission of the International Committee on Systematics of Prokaryotes; XIth International \(IUMS\) Congress of Bacteriology and Applied Microbiology | Microbiology Society \(doi.org\)](#)

where the proposed wording that was not accepted was also published with a clarifying note:

"(xiv) A change to Rule 28b (2) was proposed to clarify whether new names or new combinations that were the subject of a Request for an Opinion were validly published. The following wording was proposed:

'It was merely proposed in anticipation of the future acceptance of the taxon concerned or the acceptance of a particular circumscription, position, or rank for the taxon which is being named or in anticipation of the future discovery of some hypothetical taxon. This includes new names or new combinations which are the subject of Requests for an Opinion.'

This was rejected, with 8 votes against, 2 votes for and one abstention.

It was generally felt that the wording was sufficiently clear and that the proposed addition was implicit and need not be added. However, it was agreed that this be formally documented in the Minutes, in order to prevent any confusion in the future."

If the name Enterobacteriaceae was subject to a Request for an Opinion can one by extension of this principle conclude that the name is validly published via the Approved Lists? There are other issues with names of classes and subclasses.

[Names at the rank of class, subclass and order, their typification and current status: Supplementary information to Opinion 79. Judicial Commission of the International Committee on Systematics of Prokaryotes | Microbiology Society \(doi.org\)](#)

All exceptions cause problems, as does not reading the Code or other documents in detail.

Dr. Brian J. Tindall

This e-mail is sent as a private individual, no affiliation to an employer is either intended or should be inferred.

Sent: Wednesday, 2020-12-23; 21:49
From: Markus Göker <markus.goeker@dsmz.de>
Re: FW: ICSP discussion on the proposed inclusion of the rank of phylum in the International Code of Nomenclature of Prokaryotes - contributions invited

Dear Maria, dear all,

On 27.11.20 16:04, Maria Chuvochina wrote:

> Nevertheless, in order to proceed with this discussion and correct
> formation of phyla names, I suggest that names of the phyla have to be
> typified by the genus name. To be more specific by the type genus name
> of the type order of one of the contained classes. Perhaps we should
> also consider to autotypify all higher rank names by the type genus
> name as this will have further implications in consideration of naming
> of taxa affected by changes...

Thanks for considering genera as nomenclatural types of phyla, which seems advantageous in several respects.

It is somehow logical to use classes as nomenclatural types of phyla.

The class is the next lower major category covered by the ICNP (major means not having a prefix like sub-).

The next lower major category, order, is also used for the nomenclatural types of classes and subclasses.

However, considering the entire hierarchy covered by the ICNP, there are three concerns regarding classes as types of phyla. The issues considered below do not really arise because of the proposal to include phyla into the ICNP but because of its current structure.

(A) We already have a jump in the ICNP regarding the relationship between the rank of a taxon name and the rank of its nomenclatural type: from subtribe to order genera are used while for classes and subclasses orders are used. Using the class as the category for types of phyla yielded another jump. I think the whole system would only be consistent if either (i) there were no jumps, i.e. all nomenclatural types of taxa higher than the rank of genus had the same rank, which means they had genus rank; or (ii) there were regularly distributed jumps, i.e. all nomenclatural types had the next lower major rank. I think even (i) cannot be made fully consistent because the number of categories covered by the ICNP is larger than the number of categories currently in use. Concern C explained below also speaks for (i) rather than (ii).

(B) The ICNP is currently also somehow inconsistent regarding the way names of rank higher than genus are formed from the name of their nomenclatural type. Apart from the category-specific suffix, for classes and subclasses it is 'stem of the name of the type genus of the type order' (indirect) but for the ranks subtribe to order it is 'stem of the name of the type genus' (direct). The phrasing suggest in the proposal is 'stem of the name of one of the contained classes'. (Here I would have expected 'stem of the name of the type class', in analogy to the other categories treated in the same rule. I also wonder whether the ordering of the sentences in Rule 8 could not reflect the ordering of the ranks). But even apart from this deviation from the principle to derive the name from the name of the type, this addition to the ICNP would cause it to use three distinct ways to form a name above the rank of genus.

(C) Using the genus as rank of the type of taxa of rank higher than genus rank gave taxonomists the freedom to omit intermediary categories such as order (for classes) or order and classes (for phyla). One could, e.g., argue that one does not (yet) taxonomically need a class or order if one just has a single genus in a phylum. In contrast, the genus rank itself could hardly be dispensed with.

Yours
Markus

Sent: Tuesday, 2020-12-27; 07:44
From: B.J.Tindall <b.j.tindall@judicialcommission.org>
Re: FW: ICSP discussion on the proposed inclusion of the rank of phylum in the International Code of Nomenclature of Prokaryotes - contributions invited

Markus,

This takes us off into other proposals to change the wording of the Code that also means one cannot discuss the phylum issue in isolation.

1) if the name of a phylum is linked to the name of a class, then we have to look at the way names of classes are dealt with at present, including names that are not formed in conformity the proposed new wording:
The undesirable retroactive changes to Rule 8 of the International Code of Nomenclature of Prokaryotes
<https://doi.org/10.1099/ijsem.0.001368>

Implementation of Rule 8 of the International Code of Nomenclature of Prokaryotes for the renaming of classes.
Request for an Opinion.
<https://doi.org/10.1099/ijsem.0.001319>

2) there are clearly issues relating to how one forms a name and the nomenclatural type. If the nomenclatural type of an order were to be the family and the name of the order is formed by the stem of the family name, that in turn is formed from the stem of the genus name, then at the rank of class it gets more complicated. If the name of a class is formed from the stem of the order name, that in turn is formed from the stem of the family name, which in turn is based on the stem of the genus name, then it all ultimately links back to the genus name, so why not do this directly in the first place? This has already been proposed. but is apparently not up for discussion.

Names above the rank of genus; the radical approach.
<https://doi.org/10.1099/ijsem.0.003169>

3) one of the issues with order names is that after 1975 there was no link between the name at the rank of order and the use of a name at lower rank, ie it was possible for it to be a purely descriptive name eg for methanotrophs it would have been possible to create the name Methanotrophia. This is similar to the way the family name Enterobacteriaceae is formed as a descriptive name rather than formed from a genus name. In the past we also had the family names, Athiorhodaceae and Thiorhodaceae, that were descriptive and not based on a genus name. See also:

Nomenclatural type of orders: corrections necessary according to Rules 15 and 21a of the Bacteriological Code (1990 Revision), and designation of appropriate nomenclatural types of classes and subclasses. Request for an opinion.
<https://doi.org/10.1099/00207713-51-2-725>

Names at the rank of class, subclass and order, their typification and current status: Supplementary information to Opinion 79.
<https://doi.org/10.1099/ijsem.0.069310-0>

This also affects:

Proposal to designate the order Actinomycetales Buchanan 1917, 162 (Approved Lists 1980) as the nomenclatural type of the class Actinobacteria. Request for an Opinion.
<https://doi.org/10.1099/ijsem.0.002287>

4) if you really want to simplify parts of the Code then you follow the proposals here:

Names above the rank of genus; the radical approach.
<https://doi.org/10.1099/ijsem.0.003169>

where you have an all inclusive text that covers all names above the rank of genus and either

- make them all Latin feminine plural
- do not mention the gender or whether they are singular or plural
- put all the relevant ranks and the appropriate endings in a single table, which also reduces the length of wording in the main text of the Code. This automatically supplements either a) or b).
- you combine a number of rules under one all inclusive text.

Dr. Brian J. Tindall

This e-mail is sent as a private individual, no affiliation to an employer is either intended or should be inferred.

Sent: Tuesday, 2020-12-29; 09:30
From: Aharon Oren <aharon.oren@mail.huji.ac.il>
Re: FW: ICSP discussion on the proposed inclusion of the rank of phylum in the International Code of Nomenclature of Prokaryotes - contributions invited

About the gender of the names of higher taxa: names of higher taxa are nouns that are treated as Latin (Principle 3 and Rule 6 of the ICNP), and Latin nouns have a gender. For some ranks above genus the names are feminine, for others they have the neuter gender (Rule 8). The same is true in botany and zoology. Therefore, we have in the prokaryotic nomenclature names such as *Pseudomonas brassicacearum*, *Lysobacter solanacearum*, *Renibacter salmoniarum* - all based on feminine higher taxa, but *Vibrio echinoideorum*, *Marinobacter bryozoorum* and *Elstera cyanobacteriorum* - based on names of higher taxa of the neuter gender.

See further: Oren, A., Chuvochina, M., Schink, B., and Ventura, S. 2019. Naming classes of Prokaryotes based on the rules of Latin grammar. *Int. J. Syst. Evol. Microbiol.* 69: 1526-1527.

The authors who in the last century named *Mycobacterium poriferae*, *Mesoplasma syrphidae* and *Mesoplasma tabanidae* obviously did not understand the grammatical context of the zoological names, and apparently there was no proper quality control then of newly proposed names of prokaryotes.

A happy 2021 to all,
Aharon

Prof. Aharon Oren
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Sent: Wednesday, 2020-12-30; 11:11
From: Vicki Chalker <Vicki.Chalker@phe.gov.uk>
RE: FW: ICSP discussion on the proposed inclusion of the rank of phylum in the International Code of Nomenclature of Prokaryotes - contributions invited

My thoughts on this area as follows
As I am new to this group feel free to shoot me down!

Vicki

Editor's note: Original comments received 2020-11-26 from Markus Göker are in Calibri font in blue colour; Vicki Chalker's comments are in Times font in black colour.

These suffixes are presented in Table 1.

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>

This table can be extended to class, subclass and phylum and phylum added to Rule 5b.

By fixing the endings this also fixes plural and feminine gender without stating it.

As in the ICN one could also propose different endings at the same rank, such as Planctomycetes / Actinomycetes (derived from a genus name originally treated as a fungus) and Clostridiia (etc.) for names at the rank of class.

I also suspect that the table with its suffixes is more useful to most end users than the accompanying texts and multiple rules. It also takes us back to a point raised earlier about standardized endings.

<https://doi.org/10.1007/s00284-020-01890-y>

Article 16 of the ICN appears to define names above the rank of family as plural, but not the gender.

The ICZN seems not to formally regulate names above "family-group nominal taxa".

Dr. Brian J. Tindall

This e-mail is sent as a private individual, no affiliation to an employer is either intended or should be inferred.

From: B.J.Tindall [mailto:b.j.tindall@judicialcommission.org]

Sent: den 4 januari 2021 11:51

To: Aharon Oren <aharon.oren@mail.huji.ac.il>

Subject: Re: FW: ICSP discussion on the proposed inclusion of the rank of phylum in the International Code of Nomenclature of Prokaryotes - contributions invited

The examples are interesting:

Pseudomonas brassicacearum: derived from *Brassicaceae* Burnett 1835 for which the alternative family name is *Cruciferae* de Jussieu 1789.

Marinobacter bryozorum: derived from *Bryozoa* Ehrenberg 1831

Vibrio echinoideorum: derived from *Echinoidea* Leske, 1778

All three names were created before formal Codes of Nomenclature were active and illustrate issues that the modern ICZN and ICN have in dealing with nomenclature that long pre-dates any attempt to formally regulate nomenclature.

This is a major difference to the ICNP where it would be possible to simplify the Code as outlined in my other e-mail and one can easily also make all names above the rank of genus feminine plural, with standardized endings defined.

There is nothing in the Code or statutes that prevents one changing the wording of Rule 8.

I keep hearing comments that the Code is too complicated and difficult to read (as an English text).

Rather than simplifying the wording and combining several rules and in addition to being fluent in English (an international language in modern science), one also now adding fluency in Latin and ancient Greek.

Elstera cyanobacteriorum - derived from cyanobacteria where the original publication

(<https://doi.org/10.1099/ijsem.0.002308>)

states "cy.a.no.bac.te.ri.o'rum. N.L. gen. pl. n. cyanobacteriorum of cyanobacteria" rather than *Cyanobacteria* or perhaps more correctly *Cyanobacteriia*, but neither are validly published, so the interpretation is that cyanobacteria (cyanobacterium) would have been used as a trivial name and not the name of a taxon at any rank.

True that cyanobacteria would be the plural of cyanobacterium in the neuter gender, but not linked to the name of a higher taxon.

Dr. Brian J. Tindall

This e-mail is sent as a private individual, no affiliation to an employer is either intended or should be inferred.

From: William B Whitman [mailto:whitman@uga.edu]

Sent: den 15 januari 2021 23:24

Subject: Re: FW: ICSP discussion on the proposed inclusion of the rank of phylum in the International Code of Nomenclature of Prokaryotes - contributions invited

Dear Ed et al.

So far, I've enjoyed the discussion on phylum names and the thoughtful comments by our colleagues. I would like to add my opinions. To my mind, all the important points have been raised and elegantly discussed. My opinions regarding the questions as posed by Markus are as follows:

(1) whether it makes sense to include the rank of phylum into the ICNP.

I agree that the rank of phylum should be in the Code.

(2) the choice of the standardized ending for phylum names.

Two endings have been proposed, 'aeota' and 'ota'. I prefer 'ota' because it avoids awkward names when the root ends in '-ae'.

It does not bother me that one genus also has the ending 'ota'.

I don't believe that will be a major problem.

Similarly, some genera names end in 'ia', and that has not led to much confusion.

(3) how to deal with exceptions from the standardized ending.

If we accept Rule 8 as written for class names, there will be no exceptions.

Class names such as 'Alphaproteobacteria' are currently illegitimate and have been for 12 years.

As pointed out by Masha and Markus [and Oren et al. 2016], most of the class names retain the same root under Rule 8.

These can be easily corrected by changing the suffix by means of a corrigendum, which retains the priority and defining publication (Rule 61).

If the legitimate class names are used, there will be no exceptions for the phylum names.

I don't see the value in revisiting the issue of class names.

A decision was made 12 years ago for Rule 8 to be retroactive. We should follow the rule.

In any case, the proposal of Oren et al. (2016) to retain the older class names is also not on this ballot.

When this issue comes up for a vote, we can consider its effects on phylum names

(4) the choice of the nomenclatural type for names of phyla.

Personally, I like the idea of using the genus name for all the reasons stated by Markus, Masha and Brian. However, that is not the question before us and should be decided by a separate ballot.

The current proposal is to use the class as type for phyla.

If the type is changed to a genus at some later date, the name will not change, so the issue is not urgent and can be properly discussed on its own.

Best,

Barny Whitman

William B. Whitman

Department of Microbiology

527 Biological Sciences Building

University of Georgia
Athens, GA 30602-2605
1-706-542-4219

From: Markus Göker [mailto:markus.goeker@dsmz.de]
Sent: den 16 januari 2021 15:52
Subject: Re: FW: ICSP discussion on the proposed inclusion of the rank of phylum in the International Code of Nomenclature of Prokaryotes - contributions invited

Editor's note: Original comments received 2021-01-21 from Barny Whitman are in Calibri font in blue colour; Markus Göker's comments are in Times font in black colour

Dear all,

On 15.01.21 23:23, William B Whitman wrote:

> (3) how to deal with exceptions from the standardized ending. If we
> accept Rule 8 as written for class names, there will be no exceptions.
> Class names such as 'Alphaproteobacteria' are currently illegitimate
> and have been for 12 years. As pointed out by Masha and Markus [and
> Oren et al. 2016], most of the class names retain the same root under
> Rule 8. These can be easily corrected by changing the suffix by means
> of a corrigendum, which retains the priority and defining publication
> (Rule 61). If the legitimate class names are used, there will be no
> exceptions for the phylum names. I don't see the value in revisiting
> the issue of class names. A decision was made
> 12 years ago for Rule 8 to be retroactive. We should follow the rule.
> In any case, the proposal of Oren et al. (2016) to retain the older
> class names is also not on this ballot. When this issue comes up for a
> vote, we can consider its effects on phylum names

Rule 8 states: "The name of a class [...] is formed by the addition of the suffix -ia to the stem of the name of the type genus of the type order of the class."

Accordingly, some validly published names of classes that currently contravene Rule 8 can, unfortunately, not be corrected by "changing the suffix by means of a corrigendum".

For instance, Alphaproteobacteria has the suffix -ia but is not derived from a validly published and legitimate genus name (which would be Alphaproteobacter).

Rule 61 states "An unintentional typographical or orthographic error later corrected [...] is to be accepted in its corrected form without affecting the status and date of valid publication."

I am not sure whether names like Alphaproteobacteria Garrity et al. 2006 (not derived from the stem of the name of a genus) or Thermotogae Reysenbach 2002 (derived from the stem of the name of a genus but having the wrong ending can be regarded as "unintentional typographical or orthographic error".

Because of such issues, a request for an opinion is currently pending that targets the retroactivity of Rule 8.

Rule 61 also places restrictions on the liberty to conduct corrections by stating "Except for changes of gender in specific epithets [...] no grammatical or orthographic corrections will be accepted for names on the Approved Lists of Bacterial Names, the Validation Lists and the Notification Lists."

It may be possible for the Judicial Commission to correct Thermotogae to Thermotogia but other names of classes would need to be replaced completely, unless Rule 8 is not treated as retroactive any more.

> (4) the choice of the nomenclatural type for names of phyla.
> Personally, I like the idea of using the genus name for all the
> reasons stated by Markus, Masha and Brian. However, that is not the
> question before us and should be decided by a separate ballot. The
> current proposal is to use the class as type for phyla. If the type
> is changed to a genus at some later date, the name will not change, so

> the issue is not urgent and can be properly discussed on its own.

If (a) the ICSP later on decided to treat Rule 8 not as retroactive, then names like Alphaproteobacteria could be legitimate. If so, a validly published name and legitimate phylum name Alphaproteobacterota would be possible as suggested by Whitman et al. (2018).

However, because such a name is not derived from genus name, a change of the name of the phylum would be needed if "the type is changed to a genus at some later date".

If (b) Rule 8 remained as-is, then a class name such as Alphaproteobacteria would still be illegitimate and a phylum name Alphaproteobacterota could not be legitimate if based on a class as nomenclatural type that has that name.

Using genera as nomenclatural types of phyla would circumvent such problems with classes from the beginning and avoid later changes of phylum names. (See, e.g., <https://lpsn.dsmz.de/text/names-of-classes> for the full extent of the problem with class names).

Thus I think that the decision on the nomenclatural type of phyla should better be made by the ICSP right now, attached to the decision on the inclusion of the rank of phylum in the ICNP.

Particularly because a diverse set of contributors has expressed sympathy with the usage of genera as nomenclatural types of phyla as such.

Of course the illegitimate names of classes would still need to be targeted by another, later ballot.

But because they need to be addressed anyway, a later decision on names of classes could also establish genera as nomenclatural types of classes (and subclasses).

Then the entire hierarchy above the genus rank would be consistently use genera as nomenclatural types.

Yours
Markus

From: William B Whitman [mailto:whitman@uga.edu]

Sent: den 16 januari 2021 17:31

Subject: Re: FW: ICSP discussion on the proposed inclusion of the rank of phylum in the International Code of Nomenclature of Prokaryotes - contributions invited

Dear All,

The point is that Alphaproteobacteria has been illegitimate for 12 years, so we are not discussing saving a name but reinstating a name. We could make it legitimate, but for what purpose? Are we planning on changing the name ever other decade? Why not just agree that we have one consistent and logical system for naming classes and hence phyla? Of course, a corrigendum would not allow a simple change for Alphaproteobacteria, but it would for most of the other classes if we allowed it.

Best,

William B. Whitman
Department of Microbiology
527 Biological Sciences Building
University of Georgia
Athens, GA 30602-2605
1-706-542-4219

From: B.J.Tindall [mailto:b.j.tindall@judicialcommission.org]

Sent: den 17 januari 2021 11:47

To: William B Whitman <whitman@uga.edu>

Subject: Re: FW: ICSP discussion on the proposed inclusion of the rank of phylum in the International Code of Nomenclature of Prokaryotes - contributions invited

In reply to:

1) the question is perhaps not so much whether to include the names of phyla, but a topic that is not covered in either of the proposals is whether this is to be retroactive. There are potential negative effects if this is retroactive. However, since the issue of retroactivity is not mentioned perhaps this is not on the ballot paper.

2) the genus name in question is not validly published, which seems to be a central role of the current ICNP, not just "appeared in print" or even "is in circulation" (ie in databases).

3)

a) this is where problems start. There are two alternative proposals for the wording of Rule 8 in the publications submitted

b) whether rules are retroactive can be changed and this is something that plagued the botanists, when unexpected side effects surfaced. The original proposal by Jean Euzéby was that the wording should not be retroactive and there are two additional proposals dealing with Rule 8 and this problem in particular, with a third dealing with a more "radical solution"

c) Rule 61 contains a note that says you can't "correct" names in the way you propose. However, this also centres on the role of notes, for which there are at least two interpretations and two solutions. Needs to be discussed.

d) I would respectfully disagree that the matter is "not urgent" because if you base Acidobacteriaeota/Acidobacteriota on the illegitimate class name Acidobacteria you have snookered yourself, but if the genus name Acidobacterium is used then you have avoided the problem.

We also have Actinobacterota/Actinobacteraeota where there is no genus name Actinobacter and you have problems with the class name Actinobacteria, that get worse if you make Actinomyces the nomenclatural type. We do, of course have a class name Actinomycetes where the proposal to "replace" it with Actinobacteria is contrary to the rules of the Code on two counts.....

e) I agree, follow the rules, but when the rules are problematic one should consider whether they should be changed and if necessary, how. Delaying issues to a later date potentially adds to the problem.

4) discussions - what discussions? Based on what I have seen in print it would appear that the intention is to circumvent Article 13b of the current statutes. This adds to the list of times that the statutes have not been implemented correctly.

I had a discussion recently with regards "parliamentary procedure" in the UK and the USA. In both cases attempts to circumvent the statutes/constitution could be brought before an impartial body who upheld the statutes/constitution. This seems to be missing here.

Dr. Brian J. Tindall

This e-mail is sent as a private individual, no affiliation to an employer is either intended or should be inferred.

From: Markus Göker [mailto:markus.goeker@dsmz.de]

Sent: den 19 januari 2021 08:45

Subject: Re: FW: ICSP discussion on the proposed inclusion of the rank of phylum in the International Code of Nomenclature of Prokaryotes - contributions invited

Editor's note: Original comments received 2021-01-16 from Barny Whitman are in Calibri font in blue colour; Markus Göker's comments are in Times font in black colour

Dear all,

On 16.01.21 17:31, William B Whitman wrote:

> The point is that Alphaproteobacteria has been illegitimate for 12
> years, so we are not discussing saving a name but reinstating a
> name. We could make it legitimate, but for what purpose? Are we
> planning on changing the name ever other decade? Why not just agree

- > that we have one consistent and logical system for naming classes and
- > hence phyla? Of course, a corrigendum would not allow a simple change
- > for Alphaproteobacteria, but it would for most of the other classes if
- > we allowed it.

I neither argued for nor against replacing Alphaproteobacteria. But I noticed that the unresolved problems with class names have an effect on the naming of phyla.

For instance, the phylum name Alphaproteobacteriota that was proposed in Whitman et al. 2018 (10.1099/ijsem.0.002593) as a replacement for Proteobacteria Garrity et al. 2005 could not be legitimate if based on the nomenclatural type Alphaproteobacteria if the name of this class remained illegitimate. (See also the example given by Brian, who has made a similar point.)

If we instead used genera as nomenclatural type of phyla, a replacement name for Proteobacteria Garrity et al. 2005 could, once validly published, immediately be legitimate, provided it is based on a genus name that is legitimate. Caulobacterota would be the logical choice (see also Oren et al. 2016, 10.1099/ijsem.0.001319, Table 1).

If Rule 8 remained retroactive and the class name Alphaproteobacteria was replaced by a legitimate class name, the phylum based on this nomenclatural type could not be named Alphaproteobacteriota (and neither be named Alphaproteobacterota, see below).

If, in contrast, Alphaproteobacteria would be made a legitimate name by a modification of the ICNP related to Rule 8, the phylum name could be Alphaproteobacteriota (or Alphaproteobacterota, see below).

But in that case switching to genera as nomenclatural types of phyla at a later time point would imply a change of some phylum names (e.g., Alphaproteobacteriota to Caulobacterota), which may better be avoided. Thus one should not hope for a completely smooth later transition to another rank for the types of phyla.

I think these considerations argue for voting on genera vs. classes as nomenclatural types of phyla right now and against delaying this decision.

As an aside, it should be noticed that Whitman et al. (2018, 10.1099/ijsem.0.002593) suggested Alphaproteobacteriota (Table 1) instead of Alphaproteobacterota.

In Oren et al. (2015,

10.1099/ijsem.0.000664) Alphaproteobacteraeota had been suggested with the ending -aeota, thus implying the stem Alphaproteobacter-, in line with the name of the class if we assume a stem+ia formation of the class name. Through replacing -aeota by -ota we would obtain Alphaproteobacterota from Alphaproteobacteraeota, not Alphaproteobacteriota. This example may further illustrate the problems currently associated with using classes as nomenclatural types of phyla.

If the class names are not based on genus names it is more difficult to determine their stem.

Yours
Markus

From: Phil Hugenholtz [mailto:p.hugenholtz@uq.edu.au]
Sent: den 19 januari 2021 10:37
To: Markus Göker <markus.goeker@dsmz.de>
Subject: Re: ICSP discussion on the proposed inclusion of the rank of phylum in the International Code of Nomenclature of Prokaryotes - contributions invited

Dear All

I'll just add that there are only a few cases like the Proteobacteria which will cause problems. Most phylum names are already based on genus names so I also favour the simplification of basing all higher rank names on genus names.

Bw, Phil

From: B.J.Tindall [mailto:b.j.tindall@judicialcommission.org]
Sent: den 19 januari 2021 11:30
To: Markus Göker <markus.goeker@dsmz.de>
Subject: Re: FW: ICSP discussion on the proposed inclusion of the rank of phylum in the International Code of Nomenclature of Prokaryotes - contributions invited

One should, of course look at the detail:

In the case of the class name Proteobacteria Stackebrandt et al. 1988 "bacteria" is taken as being derived from "Gr. dim. n. bakterion". Since at the time the names of classes were not regulated it is not clear whether it was intended to mean "bacteri" add "a" -> "bacteria" or "bacter", add "ia" -> "bacteria"

In the case of the phylum name Proteobacteria Garrity et al. 2005 the derivation is N.L. masc. n. bacter,

In the case of the class name Alphaproteobacteria Garrity et al. 2006 the derivation is N.L. masc. n. bacter

Now those of us who have been active for 40+ years will recall that this all started with the alpha-subclass of the purple sulphur bacteria etc., that eventually mutated to α -Proteobacteria and then on to alphaproteobacteria, which in essence means that we are basing the names on trivial names and where the original use of the word "bacteria" was essentially plural, with the singular being "bacterium" and would support the derivation from "bakterion" - all rather academic.

However, since we are talking about "replacing names" that are under the jurisdiction of the Code this is covered by:

Replacement of Names

Rule 54

A name or epithet illegitimate according to Rules 51b, 53 or 56a is replaced by the oldest legitimate name or epithet in a **binary** or **ternary combination** which in the new position will be in accordance with the Rules.

and I can't see anything in Rules 51b, 53, or 56a that says you can replace names that are not correctly formed.

In the case of names of phyla this can easily be solved by making the appropriate section not retroactive and defining a date -"as of 01.01.2022"

Dr. Brian J. Tindall

This e-mail is sent as a private individual, no affiliation to an employer is either intended or should be inferred.

From: B.J.Tindall [mailto:b.j.tindall@judicialcommission.org]
Sent: den 19 januari 2021 11:40
To: Phil Hugenholtz p.hugenholtz@uq.edu.au
Subject: Re: ICSP discussion on the proposed inclusion of the rank of phylum in the International Code of Nomenclature of Prokaryotes - contributions invited

Thanks Phil, but in essence this comes from another publication:

Names above the rank of genus; the radical approach
B. J. Tindall <https://doi.org/10.1099/ijsem.0.003169>

This is apparently not up for discussion and if you stick with the current proposals you have to either vote for names of phyla being:

- a) based on the name of the class
- b) being based on the name of the genus that is the nomenclatural type of the name of the order that is itself the nomenclatural type of the name of the class.

With a yes/no option you have to vote no if you don't agree.

If you want to go directly to the genus name then you have to acknowledge that we are discussing the proposal that I submitted and discuss that separately.

Dr. Brian J. Tindall

This e-mail is sent as a private individual, no affiliation to an employer is either intended or should be inferred.

From: On, Stephen [mailto:Stephen.On@lincoln.ac.nz]
Sent: den 21 januari 2021 03:25
To: b.j.tindall@judicialcommission.org; Markus Göker <markus.goeker@dsmz.de>.res.in>; 'J.P. Hays'
Subject: RE: FW: ICSP discussion on the proposed inclusion of the rank of phylum in the International Code of Nomenclature of Prokaryotes - contributions invited

Dear all

In contributing to this discussion I choose to respond to the structured questions raised by Markus Göker, that I found helpful in framing this challenge.

- (1) **whether it makes sense to include the rank of phylum into the ICNP.** I believe this makes sense – in principle. My biggest reservation lies in the absence (as far as I can tell) of minimal standards and recommendations as to HOW a phylum is defined. How much phylogenetic distinction is required, and how should this be measured (16S rRNA or other housekeeping genes? MLSA? WGS? All of the aforementioned?)? How do we consider phenotypic and/or ecological aspects?

I have some genuine concerns that approval to formally include the phylum rank into ICNP in the absence of a standardised framework has potential to result in a degree of chaos. I can envisage proposals and counter-proposals and requests for opinions stemming from individuals/labs/teams with different opinions challenging each other because they didn't consider THIS or use THAT, and in the meanwhile the wider scientific community whom our work informs and serves become all the more confused. I would venture that every single contributor so far is aware of some example in their field where the status of (supposedly) novel species, genera or possibly other taxon has been questioned. At least with species definitions, the distinction is reasonably well defined and clear cut and thus easier to challenge.

My alternative suggestion then is to POSTPONE this vote until such minimal standards are in place. If this is unacceptable, then I urge the ICSP to develop/facilitate guidelines apace, such that implementation of phyla descriptions can be done in a robust and structured framework.

- (2) **the choice of the standardized ending for phylum names.** I concur with Marcus' viewpoint. "-ota" would be my preference.
 - (3) **how to deal with exceptions from the standardized ending.** If there are any, then I can only see this as being handled on a case by case basis, possibly as Requests for the Opinion of the Judicial Commission.
 - (4) **the choice of the nomenclatural type for names of phyla.** Others in this forum have provided some quite clear views in this area. I must admit, at this level of taxonomic demarcation, I am perplexed predominantly since to me, "type" equates to "typical" and the further away one gets from an individual species, the more challenging this becomes... I Rooting the phylum name to the genus for standardisation is at least logical going forward but for extant proposals that have general acceptance and usage, but do not conform to this, for clarity of communication I would prefer these to be preserved.
-

From: B.J.Tindall [mailto:b.j.tindall@judicialcommission.org]
Sent: den 21 januari 2021 09:19
To: On, Stephen <Stephen.On@lincoln.ac.nz>
Subject: RE: FW: ICSP discussion on the proposed inclusion of the rank of phylum in the International Code of Nomenclature of Prokaryotes - contributions invited

Stephen,

Thanks for raising these important points. Two major issues: and 3 minor ones that I think need further qualification to put this in perspective and may help to clarify a few points

1) "I have some genuine concerns that approval to formally include the phylum rank into ICNP in the absence of a standardised framework has potential to result in a degree of chaos. I can envisage proposals and counter-proposals and requests for opinions stemming from individuals/labs/teams with different opinions challenging each other because they didn't consider THIS or use THAT, and in the meanwhile the wider scientific community whom our work informs and serves become all the more confused. I would venture that every single contributor so far is aware of some example in their field where the status of (supposedly) novel species, genera or possibly other taxon has been questioned. At least with species definitions, the distinction is reasonably well defined and clear cut and thus easier to challenge."

The purpose of the International Code of NOMEMCLATURE of Prokaryotes is to regulate nomenclature and not classification/taxonomy. "Requests for an Opinion" that deal with the acceptance of Taxon A vs Taxon B are de facto dealing with issues of taxonomy and not of names alone. The Judicial Commission has in the past not ruled on matters of taxonomy/classification. This is about scientific debate as to whether a particular hypothesis that may result in different (new) names or different classifications involving two or more competing (existing) names (whether they are considered to be homotypic or heterotypic synonyms, or even a mixture of both). I am aware of the fact that there are interpretations that consider whether taxa are synonymous, but that is not covered by the Code that only takes names into consideration ie, only names can be synonyms within the context of the Code.

2) ".....then I urge the ICSP to develop/facilitate guidelines apace, such that implementation of phyla descriptions can be done in a robust and structured framework."

There are nominally no guidelines for descriptions of any taxon. Descriptions are ultimately based on the biological entity one is studying, normally individual cells or populations of cells ("strains"). Everything else at all other taxonomic ranks builds on that data. What is useful at one rank may not be useful at another, but you can only collect all the data by studying the biological entity.

3) I would also question the term used by Markus in "How much phylogenetic distinction is required?" Where the real question is "how much distinction is required?" We are talking about taxonomies, that may or may not be based on "phylogenetic reconstruction", but a "phylogeny" is not per se a taxonomy, unless you are working under the PhyloCode. I also note the differences between the original use of the term phylogeny by Haeckel, its use by Hennig in "phylogenetic systematics" (aka cladistics) and what appears to be a modern usage. Remember genes encode for something and that something is generally a protein or RNA, both of which may have structural and/or functional relevance, that brings us to the phenotype. The reason for using 16S rRNA gene sequences was because the primary sequence reflects its preserved phenotype in the ribosome (Nobel Prize winners confirmed that). That preserved phenotype is based on the function of the ribosome and the interaction with up to 60 component parts (the "complexity hypothesis"). Genes that do not encode for anything generally degrade and are eventually lost or their function recovered ("flickering genes").

4) "type" = "nomenclatural type" .

Rule 15:

The nomenclatural type, referred to in this Code as "**type**", is that element of the taxon with which the name is permanently associated, whether as a correct name or as a later heterotypic synonym. The nomenclatural type is not necessarily the most typical or representative element of the taxon.

(the wording needs further refinement: <https://doi.org/10.1099/ijs.0.000310>)

i.e., type ≠ typical, and "nomenclatural type" is also not the "typical name", which is why one should not shorten the term, but that is another topic.

5) names formed from the name of the genus, where names at the ranks of order, suborder, family, subfamily, tribe and subtribe (latter two little used) are already covered. There are other issues with names of classes, not just the stem of the name:

<https://doi.org/10.1099/ijs.0.069310-0>

Dr. Brian J. Tindall

This e-mail is sent as a private individual, no affiliation to an employer is either intended or should be inferred.

From: Peter Young [mailto:peter.young@york.ac.uk]

Sent: den 21 januari 2021 23:16

Subject: Re: FW: ICSP discussion on the proposed inclusion of the rank of phylum in the International Code of Nomenclature of Prokaryotes - contributions invited

Dear All

- (1) I support the inclusion of the rank of phylum in the ICNP.
- (2) The standard suffix should be -ota not -aeota.
- (3) The names of all higher taxa should be derived, using standard suffixes, from the appropriate genus name. No exceptions. This includes classes, and it would make sense to rename these first, before dealing with phyla, to avoid wasting effort trying to construct phylum names from class names that were not created systematically in the first place (cf. recent discussion of Alphaproteobacterota v. Alphaproteobacteriota). Yes, this means that some old names that we are comfortable with will be replaced by outlandish new ones, but the discomfort will only last for a generation and future generations of microbiologists will thank us for instituting a logical system that is easy to understand, learn and extend.
- (4) My last point is much wider than the remit of this consultation, but others have raised related issues and this mailing list includes many of the most relevant people. The ICNP is concerned only with the names of prokaryotes, as Brian Tindall reminds us, and not with the actual microbes themselves. However, as Markus Göker has pointed out, real microbiologists need guidance on applying the names to real microbes. How similar do microbes need to be in order to be assigned to the same phylum or class or, indeed, genus? In the past, it was possible to avoid the question by arguing, with some justice, that our methods for describing microbes were so rudimentary that there was no 'right answer' and taxonomists should be free to propose as they saw fit. Now that we have genome sequences as a 'common currency', it is time to address the question and come up with some standards. Most microbiologists I speak to are surprised that there is no official guidance. A paper from the Hugenholtz group suggested that, with an appropriate genome-based metric, taxonomic ranks could be roughly equivalent across all prokaryotes (Parks et al. 2018 doi:10.1038/nbt.42290). This is very encouraging, but defining genome-based standards for the ranks in bacterial taxonomy is not for a single paper or a single group. It needs discussion and agreement by the community. Is ICSP going to take this forward? If not, who is?

All the best

Peter Young

--

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Chair, [ICSP Subcommittee on taxonomy of rhizobia and agrobacteria](#)

From: Markus Göker [mailto:markus.goeker@dsmz.de]
Sent: den 26 januari 2021 18:12
To: b.j.tindall@judicialcommission.org; On, Stephen <Stephen.On@lincoln.ac.nz>
Subject: Re: FW: ICSP discussion on the proposed inclusion of the rank of phylum in the International Code of Nomenclature of Prokaryotes - contributions invited

Editor's note: Original comments received 2021-01-21 from Brian Tindall are in Calibri font in blue colour; Markus Göker's comments are in Times font in black colour

On 21.01.21 09:18, B.J.Tindall wrote:

> 3) I would also question the term used by Markus in "How much
> phylogenetic distinction is required?"

Just to be safe, let me first mention that I had not used the term "phylogenetic distinction", nor could I wholeheartedly recommend its usage. More important comments below.

> 4) "type" = "nomenclatural type" . Rule 15: The nomenclatural type,
> referred to in this Code as "type", is that element of the taxon with
> which the name is permanently associated, whether as a correct name or
> as a later heterotypic synonym. The nomenclatural type is not
> necessarily the most typical or representative element of the taxon.
> (the wording needs further refinement:
> <<https://doi.org/10.1099/ij.s.0.000310>>) ie type≠typical, and
> "nomenclatural type" is also not the "typical name", which is why one
> should not shorten the term, but that is another topic.

The situation that nomenclatural types are not intended to be typical seems to regularly trouble microbiologists, see, e.g.,

<https://dx.doi.org/10.1099/00207713-50-4-1687> and

<https://dx.doi.org/10.1016/j.syapm.2008.09.005> (section "Type strains are not typical of their taxon").

I am not sure whether taxonomists had any specific reason in the past for attempting to determine a "typical" representative of a taxon, apart from what may well be a misinterpretation of the term "nomenclatural type". The general taxonomic merit of "typical" representatives is not clear to me; they seem to be of use only in special situations.

Be that as it may, it has already been pointed out (correctly, I think) that we are dealing in this debate with issues of nomenclature rather than issues of taxonomy and that the ICNP does not regulate the latter. Not regulating taxonomy is rather deeply embedded in the ICNP, including General Consideration 4 and Principle 1(4). Matters of taxonomy are indeed important, but it does not follow from this observation that it is the ICNP that should regulate them. According to the "Do One Thing and Do It Well" approach the ICNP should better stick to nomenclature.

I agree with Stephen that there are Requests for an Opinion, potentially including pending ones, that actually deal with matters of taxonomy rather than nomenclature. However, I think such Requests for an Opinion should better not have been filed in the first place. The concerns of the respective authors should, of course, be expressed, just not as a Request for an Opinion.

As for taxonomy, I presume that there are participants in this debate who believe they have already solved the question of how to delineate phyla. As pointed out in the published proposals to augment the ICNP and by others earlier in this discussion, many names of phyla were already suggested in the literature. It seems that quite a few taxonomists already opine that they can and should distinguish bacteria at the phylum level. Augmenting the ICNP would enable one to consolidate the resulting names under official rules of nomenclature without restricting the taxonomic freedom of the authors of these names.

From: B.J.Tindall [mailto:b.j.tindall@judicialcommission.org]
Sent: den 26 januari 2021 19:43
To: Markus Göker <markus.goeker@dsmz.de>
Subject: Re: FW: ICSP discussion on the proposed inclusion of the rank of phylum in the International Code of Nomenclature of Prokaryotes - contributions invited

Brief apology, I misread Stephen On's comments and I assumed he had quoted Markus, I agree that this is not the case, the wording stems from Stephen, therefore in the official record this should be corrected to now read:

3) *I would also question the term used by Stephen in "How much phylogenetic distinction is required?"*

Sorry Markus.

Yes, this is all about names and seems to be something that causes a lot of confusion. The real battles are about classification, which is always problematic because the system is man-made and organisms generally do not answer to the Latinized names we give them. The current proposals centre on the main divisions. Skipping sub- and also tribe and subtribe. While not widely used one wonders what would happen if we put in all the subdivisions that are currently not widely used.

Would need to check, but in essence the issue of (nomenclatural) type = typical goes back to at least the 1930s and the Botanical Code (from which the ICNP developed) and started with a problematic translation of the original French text into both English and German.

Are we classifying and naming organisms or only (parts of) their genomes?

If you read the small print in the Code you will see that you might be able to reject certain names, but this does not affect the underlying classification, i.e., you reject a name that applies to a species, you cannot deny that the species exists, but you can't name it as such. Also does not apply to names of genera.....

Dr. Brian J. Tindall

This e-mail is sent as a private individual, no affiliation to an employer is either intended or should be inferred.

From: Markus Göker [mailto:markus.goeker@dsmz.de]
Sent: den 26 januari 2021 20:43
To: Vicki Chalker <Vicki.Chalker@phe.gov.uk>
Subject: Re: FW: ICSP discussion on the proposed inclusion of the rank of phylum in the International Code of Nomenclature of Prokaryotes - contributions invited

Editor's note: Original comments received 2020-12-20 from Vicki Chalker are in Calibri font in blue colour; Markus Göker's comments are in Times font in black colour

On 30.12.20 11:10, Vicki Chalker wrote:

- > (2) the choice of the standardized ending for phylum names;
- > consistency is helpful to all (3) how to deal with exceptions from the
- > standardized ending; have statement going forward along the lines
- > of... all future names will be consistent. Add a request for the
- > community to adopt new system longer term, assist by updating online
- > definitive list with details of formal nomenclature including prior
- > name, request journals adopt consistent approach

It seems that there are objective reasons for favouring consistency and there are objective reasons for granting exceptions in order to retain well-known names.

I think the ICSP has three major options here:

(i) The ICSP explicitly votes on granting exceptions from stem+ota and decides against exceptions, favouring consistency over retaining well-known names of phyla.

(ii) The ICSP explicitly votes on granting exceptions from stem+ota and decides to permit exceptions under certain circumstances, favouring the possibility of retaining (some) well-known names of phyla over consistency.

(iii) The ICSP does not explicitly vote on granting exceptions from stem+ota.

There is not much difference between options (i) and (ii).

One could argue that (i) is better in the long term while (ii) causes less disruption.

However, in both cases the ICSP had seriously considered the pros and cons of exceptions and did not take the matter lightly.

In contrast, if option (iii) is chosen (which implied that exceptions are not possible right now) the ICSP could be criticized for not taking the matter seriously enough, particularly because the published proposals which we are discussing here did mention a potential interest in retaining well-known names.

From: B.J.Tindall [mailto:b.j.tindall@judicialcommission.org]

Sent: den 27 januari 2021 11:13

To: Peter Young <peter.young@york.ac.uk>

Subject: Re: FW: ICSP discussion on the proposed inclusion of the rank of phylum in the International Code of Nomenclature of Prokaryotes - contributions invited

To point 2)

The issue of linking all names of higher taxa directly to names of a genus (as mentioned here) and matters relating to names at the rank of class and are not part of the two documents circulated. Both come from other submitted proposals that have yet to be discussed as is happening here for the names of phyla.

".....will only last for a generation and future generations of microbiologists will thank us for instituting a logical system that is easy to understand, learn and extend."

This is what the ICNP is about, but because there is confusion and mystery about how it works, most end users get confused. A central factor being the classification of a group (that lies outside the jurisdiction of the Code) and the Code determined selection of the (validly published, legitimate) name to use. There are a variety of examples listed below where I have included the name in bold that the current scientific evidence indicates should be used, based on the Rules of the Code - others may interpret the scientific evidence differently and you will find the "alternative names" in the current literature/databases.

Agrobacterium tumefaciens (Smith and Townsend 1907) Conn 1942 (Approved Lists 1980)

Agrobacterium radiobacter (Beijerinck and van Delden 1902) Conn 1942 (Approved Lists 1980)

Rhizobium radiobacter (Beijerinck and van Delden 1902) Young et al. 2001

***Ensifer Casida* 1982**

Sinorhizobium Chen et al. 1988

Caryophanaceae Peshkoff 1939 (Approved Lists 1980)

Planococcaceae Krassilnikov 1949 (Approved Lists 1980)

Some problems arise when the scientific evidence indicates that a particular name should be used, but this is missed or the Code is incorrectly interpreted. and new names or new combinations should not have been created (underlined). This does not refer to disputed taxonomic treatments.

Homotypic synonyms

***Arachnia Pine and Georg* 1969 (Approved Lists 1980)**

Pseudopropionibacterium Scholz and Kilian 2016

***Arachnia propionica* (Buchanan and Pine 1962) Pine and Georg 1969 (Approved Lists 1980)**

Propionibacterium propionicum (Buchanan and Pine 1962) Charfreitag et al. 1988

Pseudopropionibacterium propionicum (Buchanan and Pine 1962) Scholz and Kilian 2016

Sarcina ventriculi Goodsir 1842 (Approved Lists 1980)

Clostridium ventriculi (Goodsir 1842) Lawson and Rainey 2016

Heterotypic synonyms

Nitrobacteraceae Buchanan 1917 (Approved Lists 1980)

Bradyrhizobiaceae Garrity et al. 2006

Mycobacteriales Janke 1924 (Approved Lists 1980)

Corynebacteriales Goodfellow and Jones 2015

A rather peculiar one is (note they are all homotypic synonyms):

Enterobacter aerogenes Hormaeche and Edwards 1960 (Approved Lists 1980)

Klebsiella mobilis Bascomb et al. 1971 (Approved Lists 1980)

Klebsiella aerogenes (Hormaeche and Edwards 1960) Tindall et al. 2017

Changing taxonomic opinions may also alter the names we are using:

Agrobacterium Conn 1942 (Approved Lists 1980)

Rhizobium Frank 1889 (Approved Lists 1980)

then (as heterotypic synonyms, but challenged)

Agrobacterium Conn 1942 (Approved Lists 1980)

Rhizobium Frank 1889 (Approved Lists 1980)

now

Agrobacterium Conn 1942 (Approved Lists 1980)

Rhizobium Frank 1889 (Approved Lists 1980)

Alternatively, without being challenged

Oerskovia Prauser et al. 1970 (Approved Lists 1980)

Cellulomonas Bergey et al. 1923 (Approved Lists 1980)

Then (as heterotypic synonyms)

Oerskovia Prauser et al. 1970 (Approved Lists 1980)

Cellulomonas Bergey et al. 1923 (Approved Lists 1980)

Now

Oerskovia Prauser et al. 1970 (Approved Lists 1980)

Cellulomonas Bergey et al. 1923 (Approved Lists 1980)

A key aspect is that the date of valid publication of the name of the taxon determines priority when dealing with (competing) heterotypic synonyms. While the view has been expressed that it is the date of valid publication of the name of the nomenclatural type that determines priority there is no evidence that the ICNP operates in that fashion.

Names of phyla are not currently covered by the ICNP and how they are incorporated will determine which names are in fact validly published at this rank. Classifications have a horrible habit of moving on and affecting the names we use.

In the modern age we rely on databases and as we all know they are not always 100% accurate or may present the same information in a different fashion. How these differences affect our interpretation with regards nomenclature is usually related to how experienced one is with the names associated with the taxa in question and the classification(s) that are currently in circulation. End users rarely have time to go into the topic in depth

Dr. Brian J. Tindall

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Comments from 20210130 – 20210212. Compilation of comments for the ICSP discussion on the proposed inclusion of the rank of phylum in the ICNP

From: B.J.Tindall [mailto:b.j.tindall@judicialcommission.org]

Sent: den 31 januari 2021 17:25

To: ERBMoore <erbmoore@ccug.se>

Subject: RE: ICSP discussion on the proposed inclusion of the rank of phylum in the International Code of Nomenclature of Prokaryotes - contributions invited

Attachment: Rule 15.pdf (280 kb)

Going back through the proposals I was also reminded of the issue with Rule 15, where the most significant proposal was to add phyla to Table 2. However, the text of Rule 15 as cited by the authors of the first proposal (ie -aeota) is not identical to the text agreed on in Istanbul and is cited as from Parker et al. in press. A draft version of the text of the 2008 revision of the Code had been distributed to a number of the authors of the present proposal, but also has a slightly different wording to that cited in the paper.

The text cited is identical to that cited in a proposal from 2008 (not implemented as proposed in the 2008 revision of the Code) and a proposal was again published in 2015 - a second attempt to get the wording accepted because of potential misunderstandings. This proposal pre-dates the wording of Rule 15 given in the proposal to include phyla in the ICNP. Again we seem to have overlapping proposals where one or two are being picked out for discussion and others being left out.

I have attached an overview of the relevant text from 2015 that also references the text from 2008 and compared it to the Code as currently written and the text of Oren et al., 2015. If one is going to group proposals together then it seems only reasonable to include all of those that are relevant and not some.

I also note that:

Preparing a revision of the International Code of Nomenclature of Prokaryotes

<https://doi.org/10.1099/ijsem.0.004598>

Includes proposals that were dealt with (one included in the 2008 revision of the Code) and one that was published in January 2020 has been left out

Clarification of access regulations to genetic resources that are subject to the sovereign rights of sovereign states and the deposit of nomenclatural types under the International Code of Nomenclature of Prokaryotes

Jan 2020 <https://doi.org/10.1099/ijsem.0.003754>

Could we please make sure that all relevant issues are dealt with in a proper fashion.

Dr. Brian J. Tindall

This e-mail is sent as a private individual, no affiliation to an employer is either intended or should be inferred.

On 30 January 2021 at 12:07:56 +01:00, B.J.Tindall <b.j.tindall@judicialcommission.org> wrote:

It would appear that there may be some misunderstanding with regards what is being discussed and where certain proposals are coming from. Attached is a summary of the various points.

Proposal to include the rank of phylum in the International Code of Nomenclature of Prokaryotes 2015

<https://doi.org/10.1099/ijsem.0.000664>

Proposal of the suffix –ota to denote phyla. Addendum to ‘Proposal to include the rank of phylum in the International Code of Nomenclature of Prokaryotes 2018

<https://doi.org/10.1099/ijsem.0.002593>

Both reference "class" when discussing the stem of the name and the nomenclatural type of names of phyla

There is no reference to genus. This principle comes from another proposal that deals with the names and nomenclatural types of all higher taxa covered by the Code;

Names above the rank of genus; the radical approach 2018 (Tindall)

<https://doi.org/10.1099/ijsem.0.003169>

Unfortunately, if one reads the full text of this proposal it would actually make a lot of the wording proposed in the previous two proposals superfluous (see attached document). Since this proposal was not up for discussion then it seems rather unfair to take one part of it, without giving the ICSP the chance to formally address the whole of the proposal and to vote on it. The texts are worded in such a fashion to simplify interpretation and implementation of both the texts and the Code itself.

While it is flattering that there seems to be wide support for this proposal, it is not part of the two proposals being discussed and should be dealt with, together with the rest of the proposal and voted on by the ICSP as a separate issue following the procedure laid down in Article 13b of the statutes.

Dr. Brian J. Tindall

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From: ERBMoore [mailto:erbmoore@ccug.se]

Sent: den 31 januari 2021 14:28

To: b.j.tindall@judicialcommission.org

Subject: RE: ICSP discussion on the proposed inclusion of the rank of phylum in the International Code of Nomenclature of Prokaryotes - contributions invited

Dear Brian and Colleagues,

As you point out, the reference, **Names above the rank of genus; the radical approach 2018 (Tindall)** <https://doi.org/10.1099/ijsem.0.003169>, was not included in the initial October 29 announcement to the members of the ICSP and JC for conducting an open electronic meeting concerning proposals for changes to the ICNP for inclusion of the rank of phylum in the International Code of Nomenclature of Prokaryotes’.

In fact, the proposals for the exact Rules emendations that would be necessary were not defined in the announcement for this discussion, as was done in the case of Whitman’s proposals for changing The Code last year. The announcement referred only to the two references of Oren et al., (2015) and Whitman et al., (2018).

However, during the last 3 months, there has been discussion, which has included issues of advantages for adopting your proposal.

Thus, it appears likely that some aspect of the proposal that the nomenclatural type of a phylum be derived from one of the contained genera may appear on the Ballot for voting.

Is the concern that the proposal will not be understood properly, because the reference was not included in the announcement?

With kind regards,

Edward Moore, PhD
ICSP, SFM (Sweden)
ICSP-EB, Vice-Chair

From: B.J.Tindall [mailto:b.j.tindall@judicialcommission.org]
Sent: den 31 januari 2021 18:09
To: ERBMoore <erbmoore@ccug.se>
Subject: RE: ICSP discussion on the proposed inclusion of the rank of phylum in the International Code of Nomenclature of Prokaryotes - contributions invited

Dear Ed,

We seem to have a potential dilemma. As written, the texts that were submitted did not cover anything other than the names and nomenclatural types being linked to the class.

There are those who have been looking at other issues who spotted the possibility to use the genus right the way through the system for the higher taxa. The source of this concept has been clearly identified.

Problem:

- 1) the proposal was not included in the documents submitted for discussion, so one could only vote yes/no for class;
- 2) If you want to vote yes/no for genus, then in essence you also have to add all ranks - phylum, class, subclass etc.;
- 3) wording in the proposal also dramatically simplifies the wording of the Code and brings several rules together, a point mentioned previously;
- 4) the JC/ICSP and other interested parties have not had the opportunity to discuss these issues that could also have an effect on whether other parts of the wording in the other two proposals are accepted;
- 5) we also have the issue of the suffixes and their gender, where I note that there also seems to be some doubt about bio-ta, myco-ta or phyco-ta vs bi-ota, myc-ota or phyc-ota.

What I would like to know is whether all interested parties will have the same chance to discuss all proposals relevant to rules addressed by the two proposals (that primarily deal with the names of phyla, that by necessity have to include changes to several rules) and vote on the alternative proposals in the same fashion?

I am sure that it is possible to find a solution, but one has to make sure that one also knows the consequences of one's actions. Let's look for a reasonable solution.

Dr. Brian J. Tindall

This e-mail is sent as a private individual, no affiliation to an employer is either intended or should be inferred.

From: Maria Chuvochina [mailto:m.chuvochina@gmail.com]
Sent: den 31 januari 2021 21:03
To: b.j.tindall@judicialcommission.org
Subject: Re: ICSP discussion on the proposed inclusion of the rank of phylum in the International Code of Nomenclature of Prokaryotes - contributions invited

Dear all

I also support the inclusion of other proposals into consideration specifically one addressing the possibility of genus being a nomenclature type for all taxa above the genus.

It is true that such consideration will require to consider emendation of other relevant rules, for example, those dealing with changes in names as consequences of taxonomic changes. For example, it will make application of rule 47a in the same manner for all higher rank taxa from family to phylum (if genus is a type).

Note that in case of family, it would be always one of the genera as obviously there are no type genera in newly created family...

Kindest regards.
Maria

From: B.J.Tindall [mailto:b.j.tindall@judicialcommission.org]
Sent: den 31 januari 2021 21:35
To: Maria Chuvochina <m.chuvochina@gmail.com>
Subject: Re: ICSP discussion on the proposed inclusion of the rank of phylum in the International Code of Nomenclature of Prokaryotes - contributions invited

Are you referring to the existing text or are you referring to the proposal that has been made to change Rule 47a as well?

<https://doi.org/10.1099/ijsem.0.001441>

One option is to remove it altogether, because this is essentially a what to do when text that essentially follows from earlier rules.

Dr. Brian J. Tindall

This e-mail is sent as a private individual, no affiliation to an employer is either intended or should be inferred.

From: On, Stephen [mailto:Stephen.On@lincoln.ac.nz]
Sent: den 1 februari 2021 00:01
To: b.j.tindall@judicialcommission.org; ERBMoore <erbmoore@ccug.se>
Subject: RE: ICSP discussion on the proposed inclusion of the rank of phylum in the International Code of Nomenclature of Prokaryotes - contributions invited

Dear all

There have been many excellent comments to date. Mine below predominately relate to the core question: "Should the rank of phylum be included under the rules of the ICNP?"

It is clear this question relates to nomenclature only. Markus (27/1) makes the excellent point: "**According to the "Do One Thing and Do It Well" approach the INCP should better stick to nomenclature.**" Several others (including Brian and Peter) affirm this.

My problem is this. Names should *mean* something. If the foundation for a named taxon is spurious or flawed, there is potential for confusion and chaos. We should never forget that our work serves a wider community than our own, where that potential for confusion and chaos is worryingly real.

Markus again on 27/1 states: "**I presume that there are participants in this debate who believe they have already solved the question of how to delineate phyla**". At one point I would have presumed that too. *Until* I saw a proposal to subdivide an existing genus into 6-7 others that did not include all relevant comparators, made spurious claims regarding phenotypic coherence and published their OGRI metrics as supplementary data that had evidently been misinterpreted from the original guidelines. Bluntly, the proposers own data did not support their proposal. However, this proposal has been published and validated. Not without challenge I may add.

I have been given to believe there are other examples out there.

I genuinely fear for more far-reaching implications if we are to adopt proposals, no matter how inherently logical they may seem, in the absence of guidelines and standards. Peter Young's response to point 4 (22/1) encapsulates my views here. Two key remarks: **"real microbiologists need guidance on applying the names to real microbes"**, and **"Most microbiologists I speak to are surprised that there is no official guidance"** hearken back to my point about our work serving the wider community. To further quote Peter, **"it is time to address the question and come up with some standards."** I could not agree more.

My perception is that the code has not really changed all that much since its first publication in 1958. Yet the environment in which it operates is substantively different, and not only from the technical advances in taxonomic characterisation. There are a plethora of journals in which to publish, with differing funding models and standards and perhaps more than ever before, scientists are compelled to "publish or perish". It is impossible to say if, or how much, these issues influence publications in our field but I would suggest it is impossible to say that such factors *do not* have an impact. Therefore, I feel that *any* proposal to include new taxonomic ranks to the ICNP should be postponed until we actually have guidelines and standards as to *how* such proposals are formulated.

If this proposal *is* approved, then I urge the ICSP to formulate such standards at haste. Such efforts would surely only help to serve the core principles of the Code.

Kind regards, Stephen On

From: B.J.Tindall [mailto:b.j.tindall@judicialcommission.org]

Sent: den 1 februari 2021 07:35

To: On, Stephen <Stephen.On@lincoln.ac.nz>

Subject: RE: ICSP discussion on the proposed inclusion of the rank of phylum in the International Code of Nomenclature of Prokaryotes - contributions invited

Dear Stephen,

Your comments are appreciated. A couple of points need clarification.

1) Names should *mean* something.

General Consideration 8

The International Code of Nomenclature of Prokaryotes is an instrument of scientific communication. Names have meaning only in the context in which they were formed and used. (Thanks to George Garrity for that wording, that while meant to deal with a particular misuse of names, the Code and the publisher, is also more widely applicable too).

Principle 4

The primary purpose of giving a name to a taxon is to supply a means of referring to it rather than to indicate the characters or the history of the taxon (when written, this did not mean "phylogeny").

Rhodococcus has a Greek and Latin meaning and yes it is confusing when one of the species would be a blue pigmented rod, but it is "only a name". Linnaeus started using the genus name and an epithet, the latter termed (*nomen triviale*), in a comprehensive fashion instead of the common practice of "species epithets" being diagnostic phrases that changed if the properties were changed. He also did not invent the use of binomials that were in use before him.

2) My perception is that the code has not really changed all that much since its first publication in 1958. Yet the environment in which it operates is substantively different, and not only from the technical advances in taxonomic characterisation.

The Code has not changed much since it diverged from the 1935, Cambridge edition of the Botanical Code, because it is about names and types, not how they are characterised, not what data sets are used, not

whether the philosophy of classification is phenetic (overall similarity), cladistic (phylogenetic?), eclectic, polyphasic, phylogenomic or whatever. Your freedom of movement is how names are formed, which ones have priority when and how one determines how names are used with regards the nomenclatural type. Some of the wording of the Code Including the current ICN can be traced back to original texts in French from the 1850s and our use of Latin names is strongly influenced by Linnaeus, who in turn was relying on Greek philosophy - genus - genos, something that can be further divided into a sort or kind - species - a sort or kind. Bottom line is yes the information available has become more comprehensive, but is still far from complete. Classifications also move on.

3) Recommendation 30

Note 2. It is the aim of minimal standards to provide guidance on the description of taxa for taxonomists seeking such advice. However, these standards are not to be applied in such a way as to contradict Principle 1 (4).

All your points about the data collected and how that is interpreted in terms of a classification are sound, but this lies outside of the Code. If you want to challenge a particular classification and the interpretation of data you may do so, that again lies outside of the Code until you change which names are to be used in **your opinion** - here you must reference the Code.

Dr. Brian J. Tindall

This e-mail is sent as a private individual, no affiliation to an employer is either intended or should be inferred.

From: Maria Chuvochina [mailto:m.chuvochina@gmail.com]

Sent: den 1 februari 2021 11:05

To: B.J.Tindall <b.j.tindall@judicialcommission.org>

Subject: Re: ICSP discussion on the proposed inclusion of the rank of phylum in the International Code of Nomenclature of Prokaryotes - contributions invited

Dear Stephen and all

I agree with the latest comments from Brian and that is exactly what has been pointed out by Markus when he wrote about doing one thing well...

Names are labels for which we should not aim to assign any meaning except what rank they communicate about and that dictate how they need to be formed.

(example: you want to name a phylum. You go to the naming rules and read: 'the name is formed by addition of the suffix -ota'. Done. You designate the nomenclature type for this phylum (class or genus, TBD). Done. You write in your ms that you created a new name for the rank of phylum. You label it. You provide etymology of this name which is not about "meaning of the taxon" but simply about how you come up with that name).

There is a practical reason for this exemplified by an example from Brian (see Rhodococcus) that basically tells you about the meaningless of trying to assign a meaning for a taxon name. I understand the confusion and many still believe that names of taxa communicate to us about their features or place of isolation. This is not true. The only reason people use some features or locations when forming a name is simply because of convenience. Not everyone has a wide imagination when it comes to naming. It is much easier to propose a name based on direct observations expressed by the taxon. Here see the point "by the taxon". We all know that taxa are expanding and 'reshaping' with time, i.e. with future discoveries. What is seen today as being 'all blue', tomorrow can be a rainbow. Shall we change the name based on this? Of course not...as otherwise it will lead to total instability of nomenclature and we all will be lost in our attempt to communicate. Think of taxon names as labels on the tube. You only need to ensure that what is in the tube is labelled correctly, no matter what is written on it. A rose would smell as sweet by any other name...

Here is another point: "to ensure that what is in the tube is labelled correctly". That refers to how one describes the taxa and its boundaries.

It is clear that there is no agreement on this and it is still a topic of research. This is why the ICNP allows freedom in expression of taxonomic opinions.

However not everyone appreciates the freedom, and **for many users having well defined criteria for taxa delineation are highly desirable.**

They are also **highly desirable for those who make decisions on whether or not to accept the newly proposed taxa names.**

This point advocates for the approval of **official taxonomy** (please note that this is not a topic of current conversation but a consequence).

However this should not stop the field in expanding the knowledge and re-defining the taxa, it would simply be an agreement point that would facilitate research communication and data organisation. Aren't those the purposes of taxonomy? We all know its artificial nature but it serves us, so it is in our goals to improve the service. This discussion should occur **as a separate topic outside of ICSP matters.**

Best wishes,
Maria

P.S. If we will come up with a totally new approach on how to classify the prokaryotes and define prokaryotic taxa in the future, it would be simply a matter of reorganisation of existing names/types movement. Nomenclature should not be concerned here. It serves taxonomy. We already lived a change in paradigm from phenotype, 16S rRNA and now to genome-based classification. We just need to ensure that nomenclature rules are followed in order to adapt to taxonomic changes because it helps us to communicate about what is happening there...and the essential points will not change: you need to form your name accordingly to the rank and designate the type. Basta...

From: B.J.Tindall [mailto:b.j.tindall@judicialcommission.org]

Sent: den 1 februari 2021 17:35

To: Maria Chuvochina <m.chuvochina@gmail.com>

Subject: Re: ICSP discussion on the proposed inclusion of the rank of phylum in the International Code of Nomenclature of Prokaryotes - contributions invited

Please forgive me if I correct some of the comments made here. My Ph.D. started in 1976 working on both halobacteria (Pseudomonadaceae at the time) and anoxygenic phototrophic bacteria (primarily Ectothiorhodospira). I remember vividly how the 16S rRNA data helped us to put other data into context, but at the same time other data allowed us to put the 16S rRNA data in context

In essence the "paradigm shift" has been about ADDING the 16S rRNA gene sequencing and now ADDING the genomic data, not replacing. You can replace one with another and start again, but then you can also create two systems, one based on only the genome and one that integrates the genomic data into the rest. It is refreshing to me to see how the delta- and epsilon-subclasses became classes and now phyla. I no longer have to explain away why two evolutionary groups that do not produce ubiquinones group with the alpha-, beta- and gamma-subclass/class/phyla? That are the only evolutionary groups in the Bacteria to produce ubiquinones.

I also note that many of the groupings present in the GTBD correspond fairly well with the distribution of chemical markers in both the Bacteria and Archaea. While often neglected we are talking about compounds such as respiratory lipoquinones (essential in the respiratory chain) and polar lipids that are essential components of the cell membrane. None of the genes involved in the biosynthesis of these compounds appear in the "selected set of 120 genes", Cell membranes define the cell and are an amazing step in the origin and evolution of cellular life - no lipids - no membrane - no life. Incidentally, if you get vaccinated with the BioNTec mRNA vaccine, it is encapsulated in a lipid based "protocell" that fuses with our cell membrane and allows the mRNA to cross an otherwise impermeable barrier.

Quoting Dobzhansky, "nothing in biology makes sense except in the light of evolution" and evolution is a wonderfully complex process that affects all levels of the cell, not just parts of it

I think Peter Young raised the issue of a "common currency", but that common currency is used differently in different evolutionary groups and is biased by a number of other effects. Going from a "common currency" to

how an economy works is a long, long way. Life is too short to argue about issues that I think many outside of taxonomy consider to be clearly going in the direction of integrating data, rather than just relying on one data set. Others in this group may feel the same way, but not express their opinion openly.

Dr. Brian J. Tindall

PS Thanks to the group in Brisbane for interpreting all that data that confirms the importance of "chemotaxonomy", without even including that data or the corresponding biochemical pathways/genes in their analysis.

This e-mail is sent as a private individual, no affiliation to an employer is either intended or should be inferred.

From: On, Stephen [mailto:Stephen.On@lincoln.ac.nz]
Sent: den 1 februari 2021 20:33
To: Maria Chuvochina <m.chuvochina@gmail.com>; B.J.Tindall <b.j.tindall@judicialcommission.org>
Subject: RE: ICSP discussion on the proposed inclusion of the rank of phylum in the International Code of Nomenclature of Prokaryotes - contributions invited

Hi all

Just a postscript – I didn't mean to infer that I felt assigned names should have a meaning in the literal sense in terms of, e.g., Properties expressed – just that taxa were coherent and recognisable so that they could be recognised by others, by whatever name was assigned to them.

I also do not wish in any way to allow for repression of taxonomic opinions – I do however fundamentally believe that standards / guidelines are critical to allow for proper perspective to be given. Simple example – how much easier it is to describe a "new" taxon if another extant one that is indistinguishable from it is not included in the analysis....

Kind regards, Stephen

From: Svetla Danova [mailto:stdanova@yahoo.com]
Sent: den 1 februari 2021 22:50
To: Maria Chuvochina <m.chuvochina@gmail.com>; B. J. Tindall <b.j.tindall@judicialcommission.org>; On, Stephen <Stephen.On@lincoln.ac.nz>
Subject: Re: ICSP discussion on the proposed inclusion of the rank of phylum in the International Code of Nomenclature of Prokaryotes - contributions invited

Dear Colleagues,

I fully agree with the postscript of Stephen.

Svetla Danova

From: Maria Chuvochina [mailto:m.chuvochina@gmail.com]
Sent: den 2 februari 2021 10:33
To: Svetla Danova <stdanova@yahoo.com>
Subject: Re: ICSP discussion on the proposed inclusion of the rank of phylum in the International Code of Nomenclature of Prokaryotes - contributions invited

Dear all

I believe that nomenclature does provide the guidelines for taxa being recognisable by means of its name (how a name should be formed depending on its rank).

There are inconsistencies such as names of classes, of course, that end in *-ia* as many generic names, but otherwise one is able to distinguish between species, genus names and above. The point of this discussion is exactly about this. How should we form a phylum name (proposal to use suffix *-ota*), what should be its

nomenclature type (type class or genus) and as consequences how do we deal with its name when it is no longer viewed as a phylum by alternative taxonomic opinion. It is irrelevant for nomenclature how one delineates a phylum. If the name is formed according to the rules, one can easily apply any taxonomic opinion in the frame of hierarchical taxonomy. The history of events/opinions can be then followed by the placement of its type. Currently we deal with the situation where the majority of phyla names are formed in a way that is impossible to be managed, i.e. they are formed against the orthography rules with inconsistent endings, they have no types and they have rarely named intermediate ranks. This way one actually restricts the freedom of taxonomic opinions that could be expressed over a taxon name at the rank of phylum. Let's deal with this here please...

Since nomenclature is not concerned with taxa delineation, we cannot include such guidelines in the text of the Code. IMHO.

I believe that the scientific community should address this question separately.

Let's talk about names and how we should manage them in a way that helps to easily implement any taxonomic opinion...

kindest regards,
Maria

Comments from 20210212 – 20210227. Compilation of comments for the ICSP discussion on the proposed inclusion of the rank of phylum in the ICNP

From: B.J.Tindall [mailto:b.j.tindall@judicialcommission.org]

Sent: den 19 februari 2021 08:06

To: ERBMoore <erbmoore@ccug.se>

Subject: RE: FW: ICSP discussion on the proposed inclusion of the rank of phylum in the International Code of Nomenclature of Prokaryotes - contributions invited

I went back to the interesting point raised by Maria Chuvochina

"The suffix -ota comes from Greek, it is a neuter plural suffix of the singular form -otos/otes (it is an adjectival suffix; where -o- seems to be actually part of the stem of the word and suffix itself is -tos/tes). We have many Greek-derived words ending with this suffix and its singular or plural forms such microbiota, prokaryote, symbiote, zygote."

In the case of zygote most dictionaries state something like:

A zygote (from Greek ζυγωτός *zygōtos* "joined" or "yoked", from ζυγοῦν *zygoun* "to join" or "to yoke") This would mean that a Greek word already exists that has been used in a different context in biology.

Prokaryote is generally taken to include the Ancient Greek κάρυον (*káruon*, "nut, kernel"), but at the same time it may be that the ending "-ote" comes from the French - Chatton coined the term prokaryote, but he was using the terms protocaryon and homocaryote (in French) previously. Homocaryote seems to have been used sometime earlier, but also appears not to have been formally defined. German uses the term Prokaryont as a variant of Prokaryote.

I also found for caryote Ancient Greek καρυίτης, *karuitēs*

Some dictionaries point to "-ote" as in zygote and one would have to find a definition of the use of that biological term when it was first used, which is often difficult of Chatton who seems to have used terms, defined what they referred to, but did not indicate how they were formed.

If we look at "biota" this is linked to the Greek "bios" life and the Collins online dictionary links it to "biotē" (way of life), whereas my Shorter Oxford English Dictionary simply links biota to "life". Again one would have to find the original use of the term and see how it is defined. However, evidence is that it could simply be an English word without a formal (Neo) Latin definition, but via "bios".

Microbiota is of course from the Greek mikros with the English stem being defined as micro- ie micro-biota

In the case of mycota, this is derived from the Greek múkēs, and in English the stem is defined as myco-. In the case of phycota this is derived from the Geek phukos / phycos, with in English the stem being phyco-. While these appear to parallel the use of an ending used in biota I did find:

Suffix -mycota : New Latin -mycetes, from Greek mykes, myket-, fungus

we also have

-myces: N.L. masc. n. from Gr. masc. n. mukês –etis

In essence we certainly have the stems

micro-

bio-

myco-

phyco-

Consequently if one parallels the use of the ending -phycota and -mycota under the Melbourne version of the ICN then the stems do appear to end in -o-. You can of course get away with endings such as -mycota and -phycota (now dropped), neither of which rely on knowing the nature of the ending -ota vs -ta. The introduction of Acocmycota and Basidomycota in fungal nomenclature does not give a derivation of the names or of -mycota.

"Classical" endings used in taxonomy are:

-aceae fem. pl = -sing. -acea (fem.) -aceus (masc.), -aceum (neut.)

-ales fem. pl.= sing. -alis (masc./fem.) -ale (neut.)

etc. all of which have a meaning.

If -ota is neuter plural and there is a singular what does it mean? Note the gender of the singular endings that also have plurals in the different gender. At present the endings "-ota" or "aeota" have not been further qualified.

We also have Cypriot (older form Cypriote) - an inhabitant of Cyprus - from the Greek Kupriōtes / Kypriōtēs (Κύπρος Κύπρος / Kupros = Cyprus).

Note also that transliteration may vary with all these terms and that some do not come directly via the Greek but via modern languages with roots in Latin/Greek.

There are similar issues with biology etc, where the component parts are "bios" and "logos", which gives us bio-logy and not bi-ology. However, we do talk about bi-ology and bi-ologist, rather than bio-logy and bio-logist.

Dr. Brian J. Tindall

This e-mail is sent as a private individual, no affiliation to an employer is either intended or should be inferred.

From: B.J.Tindall [mailto:b.j.tindall@judicialcommission.org]

Sent: den 28 februari 2021 22:06

To: ERB Moore <erbmoore@ccug.se>

Subject: RE: FW: ICSP discussion on the proposed inclusion of the rank of phylum in the International Code of Nomenclature of Prokaryotes

Some comments on the present discussion.

- 1) discussions on the Code include interpretations that are not supported by the wording of the Code. If the Code is not being interpreted or portrayed correctly then those who do so may well be misleading themselves. Once this gets out in a wider group who accept that (incorrect) interpretation then the community is also being misled. Publishing in journals does not make the interpretation correct.

- 2) some of the problems appear in, but are not limited to social media and the same problems are in scientific journals and major reference works - the latter is not new.
- 3) incorrect interpretation of the Code has major effects on the information in databases.
Taking 5 systems that communicate taxonomic and nomenclatural information into consideration those with a sound footing in the Code can spot the problems. The majority of end users do not have the same knowledge and can easily be misled. The problems appear to be increasing, not decreasing.
- 4) another issue are authoritative lists that may not be as correct as claimed, especially when issues currently in discussion are portrayed as accepted fact or where the interpretation disconnects from a careful reading of the Code. In some cases the same misinterpretation outlined in 1) is creeping into 3).
- 5) given the “importance” of certain issues it is interesting the way preference is being given to some topics that seems to connect with personal interest or participation (i.e., authorship) to the exclusion of other (evidently) relevant topics. One wonders whether this is conflict with Article 16 of the current statutes. One would certainly hope that all issues currently up for discussion are dealt with in the same fashion and not parts of one proposal (not up for discussion) taken to smooth out another proposal that has been discussed in depth, especially when there appears to be a link between personal interest or participation.
- 6) is this an extension of other problems that include taking a text from an unpublished manuscripts and “recommending” use by others? Despite informing the journal and editor-in-chief concerned this text and the concept behind it continues to be used, sometimes source credited (acceptable), in other cases not (not acceptable). Texts have been copied word for word from current proposals (apparently not up for discussion) and used without reference to their source. One wonders why a request (or was it a demand, editor-in-chief cc’d) to withdraw a paper was followed up by an editorial that a subsequent paper refuted in detail. It is also rather odd that papers have been rejected on the basis of point 1) coupled with what looks like a statement of – “not a pressing issue, this will be done when we update the Code”. Contained in confidential, unpublished manuscripts, without discussing them under Article 13 b how this will ever reach the ICNP in conformity with the statutes? “Not pressing” seems to be a poor reason for rejection. There are other “interesting” cases.

Dr. Brian J. Tindall

This e-mail is sent as a private individual, no affiliation to an employer is either intended or should be inferred.

From: Aharon Oren [mailto:aharon.oren@mail.huji.ac.il]
Sent: den 1 februari 2021 12:15
To: Members of the International Committee on Systematics of Prokaryotes,
CC: members of the JC and the Editorial Board of the ICNP
Subject: Ballot on the proposed inclusion of the rank of phylum in the ICNP

Attachment: ICSP – Ballot form on including the rank of phylum in the ICNP.docx (50 KB)

Dear Members of the International Committee on Systematics of Prokaryotes, February 1, 2021

(copied also to members of the JC and the Editorial Board of the ICNP)

Our email of 29th October 2020 opened the discussion period on proposals published by Oren et al. (2015) and Whitman et al. (2018) which would emend the International Code of Nomenclature of Prokaryotes to **include the rank of phylum**.

In keeping with the timeline outlined, the voting will take place from 01st to 28th February 2021.
Only Full and Co-opted members of the ICSP may vote.

The open discussion addressed the specific proposals in Oren et al. (2015) and Whitman et al. (2018) and also raised the issue of whether the nomenclatural type of a phylum should be one of the contained classes or one of the contained genera (Tindall 2019), which may have consequences with regard to the established names of some named phyla.

Please vote by adding an X into the appropriate box in each of the four voting tables below. Please return your votes to Aharon Oren (ICSP Executive Secretary; aharon.oren@mail.huji.ac.il) and David R. Arahal (JC Chair; david.ruiz@uv.es) by 28th February 2021.

NB depending on which of these proposals are passed at the voting stage, other parts of the ICNP may need to be changed for clarity and consistency. These will be assessed by the Editorial Board of the ICNP in due course.

Please give this matter your full attention.

Sincerely yours,
Iain Sutcliffe, Chair
Aharon Oren, Executive Secretary

Vote 1

Should the rank of phylum be included under the rules of the ICNP?

As detailed in Oren et al. (2015), this requires modification of Rules 5b, 8, 15 and 22 of the ICNP.

The Editorial Board of the ICNP will incorporate appropriate amendments to the ICNP.

VOTE:

I accept the proposal that the rank of phylum be included under the rules of the ICNP	
I reject the proposal that the rank of phylum be included under the rules of the ICNP	
I abstain	

Vote 2

If Vote 1 is in favour of including the rank of phylum under the rules of the ICNP, should the nomenclatural type of a phylum be one of the contained classes or one of the contained genera?

Examples: *Alphaproteobacteriota* or *Alphaproteobacteriaeota* instead of *Proteobacteria*
Caulobacterota or *Caulobacteraeota* instead of *Proteobacteria*

As detailed in Tindall (2019), this requires modification of the Rules listed above, worded differently to those proposed in Oren et al. (2015).

The Editorial Board of the ICNP will incorporate appropriate amendments to the ICNP.

VOTE:

I vote that the nomenclatural type of a phylum should be a contained class	
I vote that the nomenclatural type of a phylum should be a contained genus	
I abstain	

Vote 3

If Vote 1 is in favour of including the rank of phylum under the rules of the ICNP, should the suffix –aeota or –ota be adopted for phyla?

As detailed in Whitman et al. (2018), this requires a modification of Rule 8 of the ICNP worded differently to that proposed in Oren et al. (2015).

The Editorial Board of the ICNP will incorporate appropriate amendments to the ICNP.

VOTE:

I vote for the proposal that the name of a phylum is formed by addition of the suffix –aeota to the stem of the name of the nomenclatural type	
I vote for the proposal that the name of a phylum is formed by addition of the suffix –ota to the stem of the name of the nomenclatural type	
I abstain	

Vote 4

If Vote 1 is in favour of including the rank of phylum under the rules of the ICNP, should the ending (-aeota or -ota) be applied consistently or should the Judicial Commission be allowed to make exceptions for the nomenclature of some phyla?

Example: *Proteobacteria*

The Editorial Board of the ICNP will incorporate appropriate amendments to the ICNP.

VOTE:

I vote that the ending (-aeota or -ota) must be applied consistently	
I vote that the Judicial Commission be allowed to make exceptions	
I abstain	

References

Oren et al., 2015. Proposal to include the rank of phylum in the International Code of Nomenclature of Prokaryotes. <https://doi.org/10.1099/ijsem.0.000664>

Whitman et al., 2018. Proposal of the suffix –ota to denote phyla. Addendum to ‘Proposal to include the rank of phylum in the International Code of Nomenclature of Prokaryotes. <https://doi.org/10.1099/ijsem.0.002593>

Tindall. 2019. Names above the rank of genus; the radical approach. <https://doi.org/10.1099/ijsem.0.003169>

Prof. Aharon Oren
Department of Plant and Environmental Sciences
The Alexander Silberman Institute of Life Sciences
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