

Minutes

International Committee on Systematics of Prokaryotes

Subcommittee on the taxonomy of phototrophic bacteria

Johannes F. Imhoff, *Chairman*

Minutes of the closed online meeting, 10–30 June 2014

Minute 1. Call to order. The closed meeting was an online meeting and called to order by the chairman on 10 June 2014 at 08.00 (CET).

Minute 2. Record of attendance. The following members participated in this subcommittee meeting: P. Caumette (Pau, France), V. M. Gorlenko (Moscow, Russia), M. Herdman (Paris, France), A. Hiraishi (Toyohashi, Japan), J. F. Imhoff (Chairman; Kiel, Germany), A. Oren (Jerusalem, Israel), J. Overmann (Braunschweig, Germany), R. Rippka (Paris, France), Ch. Sasikala (Hyderabad, India), S. Ventura (Florence, Italy), B. Whitton (Durham, England), A. Wilmotte (Secretary; Liege, Belgium) and V. Yurkov (Winnipeg, MB, Canada).

Minute 3. Approval of agenda. The agenda was approved.

Minute 4. Change in membership. At our last meeting in Montreal, 2009, Mike Madigan had expressed his wish to resign from the subcommittee and is no longer a member. John Waterbury was dismissed as a member because he did not respond or attend meetings for a prolonged time. At this meeting, suggestions were made to elect Muriel Gugger and Katarzyna Palinska. The members of the subcommittee elected both as new members of this subcommittee. Both accepted this election and are looking forward to an active membership.

Minute 5. Update of the webpage of the ICSP/subcommittee on taxonomy of phototrophic bacteria. The contact details of all members were updated and sent for publication on the ICSP homepage.

Minute 6. Chairman's report.

6.1. Past activities concerning major problems in cyanobacterial systematics since 2000. The Subcommittee on the Taxonomy of Phototrophic Bacteria has been concerned over the past decade with the major problems involved in the establishment of a solid and reliable taxonomic system of the cyanobacteria. Major emphasis was put on the publication of recommended standards for the description of species and the establishment of a list of species to be included in an approved list of names of species of cyanobacteria according to the International Code of

Nomenclature of Prokaryotes (ICNP), but necessarily also on nomenclatural aspects. The activities since the year 2000 were summarized shortly by the chairman as follows.

Recommended standards for the description of species:

In the subcommittee meeting in 2000, a working group was denominated to further develop the recommended standards for the description of oxygenic phototrophic prokaryotes, which included R. Castenholz, F. Garcia-Pichel, M. Herdman, J. F. Imhoff and R. Rippka.

In 2002, a meeting was held in Paris, attended by P. Caumette, M. Herdman, J. F. Imhoff, A. Oren, R. Rippka and A. Wilmotte, in which two drafts of the description of the recommended standards as prepared by the chairman were discussed. Standards for the anoxygenic phototrophic bacteria were in an advanced state already and were published shortly thereafter [Imhoff & Caumette, *Int J Syst Evol Microbiol* **54** (2004), 1415–1421]. Standards for the description of species of cyanobacteria were intensively discussed and circulated after the meeting in Paris to be modified and extended, in particular to meet requirements of the ICNP (referred to in the following as the Prokaryote Code). An improved version of this paper was circulated among the members of the subcommittee and discussed in our subcommittee meeting in 2003 in Tokyo. After this meeting, the document for recommended standards to describe cyanobacterial species was finalized for publication. However, although the majority of the subcommittee concluded the urgent need for recommended standards for the description of novel species of cyanobacteria, the process was stopped because nomenclatural problems were brought up by subcommittee members and used as arguments not to publish the standards at the present time. In consequence, the document is still in the drawer.

Approved list of names of species of cyanobacteria:

The preparation of an approved list of species names of cyanobacteria under the Prokaryote Code was proposed and strongly supported by the members of the subcommittee in its meeting in 2003 in Tokyo. A small committee was appointed to prepare such a list, including A. Oren, R. W. Castenholz, F. Garcia-Pichel, K. Palinska and R. Rippka.

The urgent establishment of an approved list of names of cyanobacteria was again put forward during the subcommittee

meetings in 2006 (in Pau) and 2009 (in Montreal). In the latter, the chairman proposed that all persons involved should meet together the next spring (2010) to discuss and put forward this list. It was also proposed to include the list and suggestions already made by J. Komárek into this discussion.

The approved list of species names was again a point of discussion at the informal meeting of members of the subcommittee in 2012 in Porto, when a formal meeting was not possible because of lack of attendance.

Recent activities/comments of the chairman:

The question has been raised as to why this group of experts failed to put together a list of species or even to start with this work. In view of the actual situation, it appears to be necessary to nominate a new group of experts, able and willing to do this important task within a short time. Therefore, the chairman has taken the initiative to put together a group of experts in the field of cyanobacterial taxonomy and researchers active in the field for years or even decades, to compile a list of species names of cyanobacteria qualifying for approval. A first small list of genera and species has already been put together according to chapters of the latest edition of *Bergey's Manual of Systematic Bacteriology* as a starting point to establish a more comprehensive list.

Nomenclature of cyanobacteria:

Major aspects of the discussion in the subcommittee meeting in 2003 in Tokyo were the problems caused by the treatment of the cyanobacteria according to two Codes, the International Code of Nomenclature for Algae, Fungi and Plants (referred to in the following as the Botanical Code) and the Prokaryote Code. There was a common consensus and no doubt that cyanobacteria have to be treated according to the Prokaryote Code. At this time, the number of names of cyanobacteria with valid status under the Prokaryote Code was, and still is, very small (currently only five genera with validly published names), although more than 2000 botanical names have been proposed for cyanobacteria (according to R. Castenholz).

In the subcommittee meeting in 2006 in Pau, aspects of nomenclature were again discussed. A. Oren pointed out that it was currently almost impossible to validly publish cyanobacterial species names under the Prokaryote Code due to problems of nomenclature. It was also stressed that the next formal meeting of representatives examining the Botanical Code would be in 2011 and no formal discussion and also no decisions could be made prior to this date. Nevertheless, the immediate formation of a special committee or working group to work out and to propose solutions for the problems of nomenclature well before 2011 was established by the subcommittee. A. Oren, L. Hoffmann and A. Wilmotte were nominated as members of this committee and it was proposed that the group started with its work immediately. The chairman of the subcommittee asked to be informed about all future steps and activities.

In the subcommittee meeting in 2009 in Montreal, the issue of cyanobacterial nomenclature and harmonization of the ICNP and the Botanical Code were considered again. The group nominated to propose the first actions for harmonization of the codes reported that up to this meeting date in 2009 no progress had been made and no response was obtained from the botanical nomenclaturists.

Recent activities/comments of the chairman:

One wonders, why no successful attempts have been made to accomplish the treatment of cyanobacteria within the ICNP. According to personal communications of A. Oren and A. Wilmotte to the chairman, the Special Committee on the Harmonization of Nomenclature of Cyanophyta/*Cyanobacteria* indeed was never active after the first invitation was sent in November 2011. Also, recent attempts by the chairman to contact L. Hoffmann failed. If indeed lack of communication and activity were reasons for failure of the special committee to make any progress, it is the time now for a new group of experts to make proper suggestions to the ICSP to enable valid publication of names of cyanobacteria under the ICNP.

6.2. Vote on treatment of cyanobacteria by the Prokaryote Code (also see Minute 8). Members of this subcommittee were irritated by a proposal made by a member of this subcommittee that counteracts the tasks and activities of this subcommittee in an existential manner. Such a proposal was made by Oren & Garrity [*Int J Syst Evol Microbiol* **64** (2014), 309–310] to remove the cyanobacteria from treatment by the ICNP. After this proposal was communicated to the subcommittee members by Rosmarie Rippka, Michael Herdman asked for a vote: 'I propose that the members of the ICSP subcommittee vote on the issue: should the nomenclature of *Cyanobacteria* still be considered under the Prokaryote Code?' The possible answers were: yes, no, no opinion. The result from this vote was quite clear. From the 17 members of the subcommittee, 12 voted yes, two voted no, there was one abstention, one unclear response and one member did not vote.

Minute 7. List of species of cyanobacteria for approval by the ICSP. An outline of considerations for the preparation of a list of species of cyanobacteria and suggestions on how to prepare such a list was sent out by the chairman. Most comments agreed on the preparation of such a list, though one remark was made that the time for such a list would not be suitable. As outlined in the chairman's report (Minute 5) this subcommittee has always considered the preparation of such a list as an important task and has repeatedly brought up this point in past subcommittee meetings. Due to the discussions we had previously and the clear recognition of the urgent need for such a list in the past, the subcommittee considered this task overdue. It agreed with the chairman's initiative to form a new group of experts to start this task, to discuss the initial and further steps in this process, and to prepare a first draft for discussion at the next subcommittee meeting.

Minute 8. Nomenclature of cyanobacteria according to the ICNP. As the result of the vote clearly indicated the opinion of the majority of the subcommittee members to continue the treatment of cyanobacteria under the ICNP, it is first of all necessary to propose the changes that are required to the ICNP to enable the appropriate treatment of cyanobacteria according to this code and the valid publication of names of species. According to General Consideration 5, 'The Code of Nomenclature of Prokaryotes applies to all Prokaryotes'. All problems currently associated with the treatment of cyanobacteria by this code should be eliminated to make their treatment under this code possible and allow valid publication of names of cyanobacteria according to the ICNP.

It was Rosmarie Rippka who first suggested in some detail the changes to Principle 2, General Consideration 5 and Rule 11 required for this purpose. It was agreed on further elaborating these suggestions and preparing a formal proposal of these changes. It was strongly recommended and agreed to consult the chairman of the Judicial Commission of the ICSP prior to submission of this proposal. It was also suggested to inform the chairman of the ICSP and of its Judicial Commission of the opinion of this subcommittee in regard to the proposal by Oren & Garrity [*Int J Syst Evol Microbiol* **64** (2014), 309–310] and its activities to modify the ICNP in order to smoothly integrate cyanobacteria into this code and remove all obstacles to valid publication of names of species and genera of cyanobacteria according to this code.

Minute 9. Varia.

Old literature on *Cyanobacteria*. As A. Oren pointed out, the National Library of Israel, located at the Hebrew University of Jerusalem, has a nearly complete collection of the original 19th (and even some 18th) century books on cyanobacteria (and many old books on eukaryotic algae as well). This treasure was collected by the late Imre Friedmann, whose collection was donated to the library after his death in 2007. These books include works by Bornet and Flahault, Gomont, Nägeli, Kützing, Agardh,

Hansgirg, Ehrenberg, Lyngbye, Cohn, and others, and are available for everybody interested.

Concluding remarks of the chairman. Major aspects of the discussions of this subcommittee meeting were the establishment of a list of species names of cyanobacteria for approval under the ICNP and the proposal of changes to the ICNP to enable proper treatment and valid publication of names of cyanobacteria under this code. The subcommittee clearly voted against the proposal of Oren & Garrity [*Int J Syst Evol Microbiol* **64** (2014), 309–310] to exclude part of the prokaryotes, the cyanobacteria, from treatment by the ICNP. As prokaryotes, they should be treated with the ICNP and the necessary points of this code should be adopted (General Considerations, Principles and Rules) to enable this smoothly. The subcommittee supports the initiatives to compile a list of cyanobacterial species names for approval by the ICSP and to formulate a proposal to change the ICNP in those parts essential to allow valid publication of names of cyanobacteria under this code.

Minute 10. Present membership. J. F. Imhoff (Chairman; Kiel, Germany), A. Wilmotte (Secretary; Liege, Belgium), R.W. Castenholz (Eugene, OR, USA), P. Caumette (Pau, France), F. Garcia-Pichel (Tempe, AZ, USA), L. Giovannetti (Florence, Italy), V. M. Gorlenko (Moscow, Russia), M. Herdman (Paris, France), A. Hiraishi (Toyohashi, Japan), J. Komárek (Trebón, Czech Republic), A. Oren (Jerusalem, Israel), J. Overmann (Braunschweig, Germany), R. Rippka (Paris, France), Ch. Sasikala (Hyderabad, India), S. Ventura (Florence, Italy), B. Whitton (Durham, England), V. Yurkov (Winnipeg, MB, Canada).

Minute 11. Next meeting of the subcommittee. The next meeting of this subcommittee will be held in association with the 15th International Symposium on Phototrophic Prokaryotes in Tübingen (Germany) in August 2015.

Minute 12. Adjournment. The closed meeting was adjourned on 30 June 2014 at 17.39 (CET).