Minutes

International Committee on Systematics of Prokaryotes

Subcommittee on the taxonomy of phototrophic bacteria

Minutes of the meetings, 27 August 2003, Tokyo, Japan

J. F. Imhoff, *Chairman*
M. T. Madigan, *Secretary*

Session 1. Closed meeting

Minute 1. Call to order. The closed meeting was held on 27 August 2003 at the Funabori Tower in Tokyo, Japan. The meeting was called to order by the chairman, J. F. Imhoff, at 18 : 05.

Minute 2. Record of attendance. The members present were R. W. Castenholz (Eugene, OR, USA), F. Garcia-Pichel (Tempe, AZ, USA), V. M. Gorlenko (Moscow, Russia), A. Hiraishi (Toyohashi, Japan), J. F. Imhoff (Kiel, Germany), M. T. Madigan (Carbondale, IL, USA), A. Oren (Jerusalem, Israel), J. Overmann (München, Germany), V. Yurkov (Manitoba, Canada). Apologies were received from P. Caumette (Pau, France), E. I. Friedmann (Moffett Field, CA, USA), M. Herdman (Paris, France), R. Rippka (Paris, France), S. Ventura (Florence, Italy) and A. Wilmotte (Liège, Belgium).

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

Minute 4. Minutes of previous meeting. The minutes of the previous meeting, held in Barcelona, Spain, on 28 August 2000, were approved.

Minute 5. Chairman's report. The ICSP has opened a web page with information on the taxonomic subcommittees. This page gives a list of the current members of the subcommittee and a list of treated taxa. It also offers a link to the previous minutes of our meetings in the IJSEM. The website URL is http://www.the-icsp.org

The chairman reported on a meeting of members of this subcommittee held last year in Paris on occasion of the International Congress of Microbiological Societies, with the only emphasis to discuss the recommended standards for the description of anoxygenic and of oxygenic phototrophic bacteria, which will be prepared separately. This meeting was attended by P. Caumette, M. Herdman, J. F. Imhoff, A. Oren, R. Rippka and A. Wilmotte. Two drafts of the description of the recommended standards had been prepared by the chairman and formed the basis of the discussion. Standards for the anoxygenic phototrophic bacteria were in an advanced state already and, after some additions and minor changes, are ready for publication. Standards for the cyanobacteria were intensively discussed and circulated after the meeting in Paris to be modified and extended, in particular to meet requirements of the Bacteriological Code. The current version of this draft was intensively discussed in the open session of this meeting (see below).

Minute 6. Changes in membership. No changes were proposed. However, Hans G. Trüper has asked to resign from membership of this subcommittee. The subcommittee thanked him for all his efforts as a member and chair of this subcommittee and accepted his request. Further, it was proposed that the chairman would ask those members that have not attended the meeting several times and that did not respond to mailed requests whether they want to continue to be members of this subcommittee or to resign.

Minute 7. Adjournment. The closed meeting was adjourned at 18 : 25.

Session 2. Open meeting

Minute 8. Call to order. The open meeting was held on 27 August 2003 at the Funabori Tower in Tokyo, Japan. It was called to order by the chairman at 19 : 05.

Minute 9. Record of attendance. All those present at the closed meeting participated in the open meeting. The meeting was also attended by M. Wood (USA), S.-T. Lee (Korea), C. Budinoff (USA), J. Glaeser (Germany), T. Norris (USA), A. Ernst (The Netherlands), I. Iteman (France), R. Duran (France), A. Fourcans (France), P. Wolk (USA) and K. Palinska (Germany).

Minute 10. Update of the three-letter code of abbreviations. Three-letter abbreviations of the genera of anoxygenic phototrophic bacteria were discussed. Suggestions were made for three-letter abbreviations of newly described genera. It was decided to include the list of currently proposed abbreviations in the minutes of the meeting (Table 1). The subcommittee recommended the use of three-letter abbreviations in all cases where more than one genus is treated in a publication or chapter. Alternatively, the genus names may be spelled out completely. However, single-letter abbreviations in many cases

Table 1. Genera of anoxygenic phototrophic bacteria and recommended abbreviations

Chromatiaceae		***Ectothiorhodospiraceae***		**Purple non-sulfur bacteria**		**Aerobic purple bacteria**		**'Green bacteria'**	
γ-Proteobacteria		***γ-Proteobacteria***		***α-Proteobacteria***		***α-Proteobacteria***		***Chlorobiaceae***	
Chromatium	*Chr*	*Ectothiorhodospira*	*Ect*	*Rhodospirillum*	*Rsp*	*Acidiphilium*	*Acp*	*Chlorobium*	*Chl*
Allochromatium	*Alc*	*Halorhodospira*	*Hlr*	*Blastochloris*	*Blc*	*Erythrobacter*	*Erb*	*Prosthecochloris*	*Ptc*
Amoebobacter	*Amb*	*Thiorhodospira*	*Trs*	*Phaeospirillum*	*Phs*	*Erythromicrobium*	*Erm*	*Pelodictyon*	*Pld*
Halochromatium	*Hch*			*Rhodobacter*	*Rba*	*Erythromonas*	*Emn*	*Ancalochloris*	*Anc*
Isochromatium	*Isc*			*Rhodobium*	*Rbi*	*Porphyrobacter*	*Por*	*Chloroherpeton*	*Chp*
Lamprobacter	*Lpb*			*Rhodocista*	*Rcs*	*Roseobacter*	*Rsb*	*Chlorobaculum*	*Cba*
Lamprocystis	*Lpc*			*Rhodomicrobium*	*Rmi*	*Roseococcus*	*Rsc*	***'Chloroflexaceae'***	
Marichromatium	*Mch*			*Rhodopila*	*Rpi*	*Sandaracinobacter*	*San*	*Chloroflexus*	*Cfl*
Rhabdochromatium	*Rbc*			*Rhodoplanes*	*Rpl*	*Roseivivax*	*Rsv*	*Chloronema*	*Cln*
Thermochromatium	*Tch*			*Rhodopseudomonas*	*Rps*	*Roseovarius*	*Rva*	*Heliothrix*	*Htr*
Thiocapsa	*Tca*			*Rhodospira*	*Rsa*	*Roseibium*	*Rib*	*Oscillochloris*	*Osc*
Thiococcus	*Tco*			*Rhodothalassium*	*Rts*	*Roseinatronobacter*	*Rna*	*Roseiflexus*	*Rof*
Thiocystis	*Tcs*			*Rhodovibrio*	*Rhv*	*Rubrimonas*	*Rum*	***'Heliobacteriaceae'***	
Thiodictyon	*Tdc*			*Rhodovulum*	*Rvu*	*Craurococcus*	*Crc*	*Heliobacterium*	*Hbt*
Thiohalocapsa	*Thc*			*Roseospira*	*Ros*	*Paracraurococcus*	*Pcr*	*Heliobacillus*	*Hba*
Thiolamprovum	*Tlp*			*Rhodoblastus*	*Rbl*	*Citromicrobium*	*Cmi*	*Heliophilum*	*Hph*
Thiopedia	*Tpd*			*Rhodobaca*	*Rbc*	*Methylobacterium*	*Mtb*	*Heliorestis*	*Hrs*
Thiorhodococcus	*Trc*			*Roseospirillum*	*Rss*	*Acidisphaera*	*Acs*		
Thiorhodovibrio	*Trv*			***β-Proteobacteria***		*Rubritepida*	*Rut*		
Thiospirillum	*Tsp*			*Rhodocyclus*	*Rcy*	*Staleya*	*Stl*		
Thioalkalicoccus	*Tac*			*Rhodoferax*	*Rfx*	***β-Proteobacteria***			
Thioflavicoccus	*Tfc*			*Rubrivivax*	*Rvi*	*Roseateles*	*Rst*		
Thiobaca	*Tba*								

do not accurately define the genus and should be avoided, unless no doubt is left on the genus name abbreviated.

Minute 11. Current aspects of the taxonomy of phototrophic bacteria. The discussion was focused on major changes proposed in the taxonomy of green sulfur bacteria. The proposed changes give special emphasis to the phylogeny of two independent genes (16S rRNA and *fmoA*, the Fenna–Matthews–Olson protein) and the congruence with G+C values that represent a rough estimate on the total genome composition. It was pointed out that the genus name *Pelodictyon* no longer exists, and that several *Chlorobium* species are now subsumed within the new genus *Chlorobaculum*. These rearrangements have recently been published [Imhoff, *Int J Syst Evol Microbiol* **53** (2003), 941–951]. Also, many strains have been reassigned to other species. In order to define the organism exactly, it is necessary to include strain designations in communications.

Minute 12. Recommended standards for the description of new species of anoxygenic phototrophic bacteria. Discussion on these standards was based on an improved version of the draft version discussed at the meeting in Paris in 2002 (see minute 5), which was circulated among members of the subcommittee during the past year. General agreement was achieved on the recommendations given.

Minute 13. Recommended standards for the description of new species of oxygenic phototrophic bacteria, cyanobacteria. Much of the discussion of this meeting focused on the situation of the taxonomy of cyanobacteria and the standards to describe species of these bacteria. Major aspects of the discussion were the problems caused by the treatment of the cyanobacteria according to two codes, the Botanical Code and the Bacteriological Code. There was no doubt and general agreement that cyanobacteria have to be treated according to the Bacteriological Code, but that this treatment should, in addition, be in accordance to the Botanical Code, whenever possible. The number of names of cyanobacteria currently with valid taxonomic status under the Bacteriological Code is very small (13 species according to A. Oren). The chairman appealed to all cyanobacterial taxonomists to describe new species of cyanobacteria in accordance with the Bacteriological Code and to make any effort to validate the description of species under the Bacteriological Code. R. W. Castenholz pointed out that over 2000 botanical names have been proposed for cyanobacteria. Botanists often still describe new species based only on morphology, and the properties used are not sufficient for species recognition according to bacteriological standards. Further discussion centred around the necessity for pure cultures of cyanobacteria for taxonomic descriptions and included the problem of lack of trustworthy

culture collections of cyanobacteria and the difficulty of finding culture collections that would accept cyanobacteria because of the known difficulties in their culture and maintenance. It was also noted that the problems in handling and maintaining pure cultures of cyanobacteria could be major obstacles in establishing a taxonomic system for cyanobacteria under the rules of the Bacteriological Code.

In view of these basic discussions, the subcommittee concluded on the urgent need for recommended standards for the description of new species of cyanobacteria that will be accepted by taxonomists working according to the Botanical Code as well as by those working according to the Bacteriological Code. It was pointed out by the chairman and generally agreed by the subcommittee that these standards should in no way be regarded as minimal criteria for the descriptions of new species but as a guideline to select properties for describing new species and genera and a recommendation to include those properties listed. An improved version of a draft prepared by the chairman for discussions in Paris (see minute 5) had been circulated among the subcommittee members and was basis of this discussion. A list of criteria prepared according to previous discussions was presented in order to focus the discussion. The improved stage of the recommended standards paper was recognized and it was proposed to circulate this paper to all subcommittee members for further improvement and final approval.

In addition, the preparation of a list of approved names of cyanobacteria under the Bacteriological Code was proposed and a small committee was appointed to prepare such a list. This committee included A. Oren, R. W. Castenholz, F. Garcia-Pichel, K. Palinska and R. Rippka.

Minute 14. Adjournment. The open meeting was adjourned at 21 : 20 on 27 August 2003.