

International Committee on Systematic Bacteriology

Subcommittee on the taxonomy of *Halobacteriaceae*

Minutes of the meetings, 16 August 1999, Sydney, Australia

Session 1. Closed meeting

Minute 1. Call to order. The closed meeting was held on 16 August 1999 at the Sydney Convention and Exhibition Centre, Sydney, Australia. The Chairman, A. Ventosa, opened the meeting at 16:00.

Minute 2. Record of attendance. The members present were A. Ventosa (Seville, Spain) (Chairman), A. Oren (Jerusalem, Israel) (Secretary), R. R. Colwell (Arlington, VA, USA), M. Kamekura (Noda, Japan), C. D. Litchfield (Fairfax, VA, USA), H. G. Trüper (Bonn, Germany) and R. H. Vreeland (West Chester, PA, USA).

Apologies were received from W. D. Grant (Leicester, UK), L. I. Hochstein (Las Vegas, NV, USA), D. J. Kushner (Toronto, Canada), A. Ramos-Cormenzana (Granada, Spain), F. Rodríguez-Valera (Alicante, Spain), B. J. Tindall (Braunschweig, Germany) and I. S. Zvyagintseva (Moscow, Russia).

The subcommittee congratulated its member Rita Colwell on the occasion of her appointment as director of the United States National Science Foundation.

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

Minute 4. Minutes of previous meeting. The minutes of the meetings held in Jerusalem, 19 and 20 August 1996 [*Int J Syst Bacteriol* **47** (1997), 595–596], were approved.

Minute 5. Election of officials. A. Ventosa and A. Oren were unanimously re-elected for another 6-year term as Chairman and Secretary of the subcommittee, respectively.

Minute 6. Minimal standards. The proposed minimal standards for description of new taxa in the order *Halobacteriales*, as approved during the meeting of the subcommittee in Jerusalem, have now been published [Oren, A., Ventosa, A. & Grant, W. D. (1997). *Int J Syst Bacteriol* **47**, 233–238].

Minute 7. Present membership. A. Ventosa (Seville, Spain) (Chairman), A. Oren (Jerusalem, Israel) (Secretary), R. R. Colwell (Arlington, VA, USA), W. D. Grant (Leicester, UK), L. I. Hochstein (Las Vegas, NV, USA), M. Kamekura (Noda, Japan), D. J. Kushner (Toronto, Canada), C. D. Litchfield (Fairfax, VA, USA), A. Ramos-Cormenzana (Granada, Spain), F. Rodríguez-Valera (Alicante, Spain), B. J. Tindall (Braunschweig, Germany), H. G. Trüper (Bonn, Germany), R. H. Vreeland (West Chester, PA, USA) and I. S. Zvyagintseva (Moscow, Russia).

Minute 8. Adjournment. The meeting was adjourned at 16:40.

Session 2. Open meeting

Minute 9. Call to order. The open meeting was held on 16 August 1999 at the Sydney Convention and Exhibition

Centre, Sydney, Australia. The Chairman, A. Ventosa, opened the meeting at 16:45.

Minute 10. Record of attendance. The members who were present at the closed meeting also attended the open meeting.

Minute 11. In memoriam Benjamin Elazari Volcani. A. Oren and A. Ventosa reported on the death of Dr Benjamin Elazari Volcani who passed away in La Jolla, CA, USA, on 6 February 1999, at the age of 84. It was noted that the genus *Halobacterium*, type genus of the *Halobacteriaceae*, was named by Dr Volcani, and first formally described by him in the 7th edition of *Bergey's Manual* (1957).

Minute 12. New taxa. Reports on the following new taxa and reclassification of existing taxa were presented by different members of the subcommittee (in chronological order of publication in *Int J Syst Bacteriol* or *Int J Syst Evol Microbiol*):

Haloarcula argentinensis sp. nov. [Ihara, K., Watanabe, S. & Tamura, T. (1997). *Int J Syst Bacteriol* **47**, 73–77], with type strain JCM 9737^T.

Haloarcula mukohataei sp. nov. [Ihara, K., Watanabe, S. & Tamura, T. (1997). *Int J Syst Bacteriol* **47**, 73–77], with type strain JCM 9738^T. *Haloarcula mukohataei* has a polar lipid composition different from that of all other *Haloarcula* species. In addition its phylogenetic distance from other *Haloarcula* species is rather large, so that reclassification in another, yet-to-be-created genus may be warranted. The Secretary will approach the authors who described the strain, recommending the preparation of a full description in accordance with the Minimal Standards document toward its reclassification.

Confirmation of strain VKM B-1733^T as the type strain of *Halorubrum distributum* [Oren, A., Kamekura, M. & Ventosa, A. (1997). *Int J Syst Bacteriol* **47**, 231–232]. Such a confirmation was necessary in view of a proposal to designate strain VKM B-1739 as the new type strain of the species [Zvyagintseva, I. S., Kudryashova, E. B. & Bulygina, E. S. (1996). *Microbiology* (English translation of *Mikrobiologiya*) **64**, 209–214], which is in conflict with Rule 18c of the International Code of Nomenclature of Bacteria.

Transfer of *Natronobacterium vacuolatum* to the genus *Halorubrum* as *Halorubrum vacuolatum* comb. nov. [Kamekura, M., Dyll-Smith, M. L., Upasani, V., Ventosa, A. & Kates, M. (1997). *Int J Syst Bacteriol* **47**, 853–857].

Transfer of *Natronobacterium magadii* to the genus *Natrialba* as *Natrialba magadii* comb. nov. [Kamekura, M., Dyll-Smith, M. L., Upasani, V., Ventosa, A. & Kates, M. (1997). *Int J Syst Bacteriol* **47**, 853–857].

Transfer of *Natronobacterium pharaonis* to the newly created genus *Natronomonas* gen. nov. as *Natronomonas pharaonis* comb. nov. [Kamekura, M., Dyll-Smith, M. L., Upasani,

V., Ventosa, A. & Kates, M. (1997). *Int J Syst Bacteriol* **47**, 853–857].

Strain NCIMB 13488 was proposed as neotype of *Halorubrum trapanicum* in view of the fact that NRC 34021^T, the established type strain, is no longer available [Grant, W. D., Oren, A. & Ventosa, A. (1998). *Int J Syst Bacteriol* **48**, 1077–1078]. H. G. Trüper reported that the Judicial Commission had decided not to issue an Opinion as strain NCIMB 13488 was derived from the type strain and no reasons exist to suspect that it may differ from the original type strain.

Natrinema gen. nov. with *Natrinema pellirubrum* (type species) sp. nov. with type strain NCIMB 786^T, and *Natrinema pallidum* sp. nov., with type strain NCIMB 777^T [McGenity, T. J., Gemmell, R. T. & Grant, W. D. (1998). *Int J Syst Bacteriol* **48**, 1187–1196].

Halogeometricum borinquense gen. nov., sp. nov. [Montalvo-Rodríguez, R., Vreeland, R. H., Oren, A., Kessel, M., Betancourt, C. & López-Garriga, J. (1998). *Int J Syst Bacteriol* **48**, 1305–1312], with type strain ATCC 700275^T.

Transfer of *Halococcus turkmenicus*, *Halobacterium trapanicum* JCM 9743 and strain GSL-11 to *Haloterrigena turkmenica* gen. nov., comb. nov. [Ventosa, A., Gutiérrez, M. C., Kamekura, M. & Dyll-Smith, M. L. (1999). *Int J Syst Bacteriol* **49**, 131–136], with VKM B-1734^T as the type strain. It was noted that the new genera *Natrinema* and *Haloterrigena* overlap at least in part, and that these genera may have to be unified in the future.

Proposal of the new genus *Natronorubrum* with two species, *Natronorubrum bangense* (type species of the genus, with type strain AS 1.1984^T) and *Natronorubrum tibetense*, with type strain AS 1.2123^T [Xu, Y., Zhou, P. & Tian, X. (1999). *Int J Syst Bacteriol* **49**, 261–266].

Haloarcula quadrata [Oren, A., Ventosa, A., Gutiérrez, M. C. & Kamekura, M. (1999). *Int J Syst Bacteriol* **49**, 1149–1155], with type strain DSM 11927^T.

Species descriptions are in preparation for the following isolates:

Halorhabdus utahensis gen. nov., sp. nov. [Wainø, M., Tindall, B. J. & Ingvorsen, K. (2000). *Int J Syst Evol Microbiol* **50**, 183–190].

Halosimplex carlsbadensis gen. nov., sp. nov., isolated from a salt mine in New Mexico by the group of R. H. Vreeland.

Natrinema versiforme, isolated from a salt lake of the Xinjian province, China, to be described by the group of P. Zhou and M. Kamekura, with type strain XF10^T = JCM 10478^T.

Haloterrigena thermotolerans, a thermotolerant isolate from a saltern pond in Puerto Rico, to be described by R. Montalvo-Rodríguez, J. López-Garriga, R. H. Vreeland, A. Oren, A. Ventosa and M. Kamekura, with type strain ATCC 700274^T.

Minute 13. Species incertae sedis. A number of species *incertae sedis* are awaiting taxonomic assessment and if necessary valid description as new species. These include ‘*Haloarcula aidinensis*’, ‘*Haloarcula californiae*’, ‘*Haloarcula sinaiensis*’, ‘*Haloferax alicantei*’ (to be described as *Haloferax lucentensis*), ‘*Haloferax larsenii*’, ‘*Natrono-*

bacterium chanhamnaoensis’, ‘*Natronobacterium innermongoliae*’ and ‘*Natronobacterium wudunaoensis*’. The subcommittee calls upon those colleagues who isolated these strains to publish full descriptions of these isolates and to validate the names of the taxa.

Minute 14. Mislabelled strains in culture collections. Catalogues of some culture collections, including ATCC and NCIMB, contain mislabelled strains and/or use names that were never validated. These include *Halobacterium salinarum* subsp. *lipolyticum*, *Halobacterium simoncinii*, *Halobacterium volcanii* subsp. *lipolyticum* and others. The NCIMB presently lists 32 strains as *Halobacterium* sp. (including those to be renamed as *Natrinema*) and 43 strains as *Halococcus* sp., many of which probably belong to other genera. The Secretary of the subcommittee will write to the curators of these culture collections with the request that the proper nomenclature is used in their catalogues.

Strains designated by culture collections as *Halococcus acetoinfaciens*, *Halococcus agglomerans* and *Halococcus nondenitrificans* are members of the domain *Bacteria*, and do not belong to the archaeal genus *Halococcus*. R. H. Vreeland is presently studying the taxonomic status of these strains. The Secretary of the subcommittee will write to the curators of the relevant culture collections to point out that the name *Halococcus* cannot be used for these isolates.

Minute 15. Collections of Halobacteriaceae in endangered culture collections. The National Research Council of Canada is presently in the process of disengaging its culture collection. The NRC collection is of the utmost historical importance for the study of the *Halobacteriaceae*, especially thanks to the large number of strains isolated by the late Dr Norman Gibbons. Most of these strains are not available elsewhere. Commercial culture collections are not interested in maintaining the large number of strains of halophilic *Archaea* kept at the NRC. The Secretary read a letter received from subcommittee member B. J. Tindall with reflections on the commercial dimensions of most culture collections and the lack of interest to be expected from the service culture collections in the NRC strains. R. H. Vreeland is willing to maintain the NRC collection in his laboratory. The Secretary of the subcommittee will approach the NRC with the request to collaborate in this venture and to provide the strains free of charge, so that the valuable collection can remain available to future generations.

Minute 16. Abbreviation of names of genera. The subcommittee agreed on the recommendation of the use of three-letter abbreviations for genera of the family *Halobacteriaceae* as follows: *Haloarcula* (*Har.*), *Halobacterium* (*Hbt.*), *Halobaculum* (*Hbl.*), *Halococcus* (*Hcc.*), *Haloferax* (*Hfx.*), *Halogeometricum* (*Hgm.*), *Halorhabdus* (*Hrd.*), *Halorubrum* (*Hrr.*), *Haloterrigena* (*Htg.*), *Natrialba* (*Nab.*), *Natrinema* (*Nnm.*), *Natronobacterium* (*Nbt.*), *Natronococcus* (*Ncc.*), *Natronomonas* (*Nmn.*) and *Natronorubrum* (*Nrr.*). The subcommittee suggested that authors describing new genera be asked to propose appropriate three-letter abbreviations in the genus descriptions.

Minute 17. New editions of Bergey's Manual and The Prokaryotes. The forthcoming edition of *Bergey's Manual of Systematic Bacteriology* will contain information on all validly described genera in sections prepared by various members of the subcommittee in collaboration with other colleagues.

A. Oren reported on the chapter on the *Halobacteriales* he

recently completed, to appear in the upcoming (electronic) 3rd edition of *The Prokaryotes*.

Minute 18. Next meeting. The next meeting of the subcommittee will either be held at the International Union of Microbiological Societies Congress in Paris, France, in 2002,

or at a symposium on halophilic micro-organisms, tentatively planned to take place in Seville, Spain, in 2001.

Minute 19. Adjournment. The meeting was adjourned at 18:45.

Aharon Oren, *Secretary*
Antonio Ventosa, *Chairman*