International Committee on Systematic Bacteriology Subcommittee on the Taxonomy of the Genus *Bacillus*

Minutes of the Meeting, 5 September 1978

Munich, F.R.G.

Session 1. Closed meeting

Minute 1. Call to order. The meeting was called to order at 1400 on 5 September 1978 by the Chairman, D. Claus.

Minute 2. Record of attendance. Members present were: D. Claus (Chairman), J. R. Norris (Secretary), E. Afrikan and G. J. Bonde.

Minute 3. Minutes of the previous meeting. The minutes of the meeting held in Tokyo in 1974, having previously been circulated to members of the Subcommittee, were accepted.

Minute 4. Changes in membership and officers. The appointment of D. Claus as Chairman in place of J. Larkin was ratified by the Subcommittee. W. Haynes had resigned from the Subcommittee. M. Goodfellow and R. C. W. Berkeley were elected to membership.

Minute 5. List of approved names. The provisional list circulated in the Newsletter was considered and a final list was agreed upon. The Chairman undertook to check the information regarding type strains, etc., supplied in V. B. D. Skerman's letter of 27 July 1978, and the Secretary agreed to circulate the list to all Subcommittee members for final comment before it was submitted. Major decisions were to exclude some of the more recently described organisms on the grounds that they were insufficiently studied or that too few isolates were available and not to accord varietal or subspecies status to *Bacillus anthracis*, *B. mycoides*, and *B. thuringiensis* on the grounds that not enough was known about the relationships between these organisms and *B. cereus*.

Minute 6. Standardization of tests. The difficulties in obtaining acceptable reproducibility were discussed, and the more satisfactory performance of the API tests was noted. It was agreed that this subject would be considered in more detail at the open meeting when a short paper by Berkeley and Logan would be presented.

Minute 7. Newsletter and computerized list of publications. It was agreed that the newsletter and list of publications were both of value to members of the Subcommittee and that their production would continue.

Minute 8. Future program of work

Minute 8.1. A need was recognized for a detailed study of percent guanine plus cytosine and deoxyribonucleic acid (DNA) hybridization figures reported in the literature. It was noted that reported figures for percent guanine plus cytosine cover a very wide range for the genus *Bacillus*.

Minute 8.2. The API test system clearly merits further study, and attempts should be made to carry out a further survey to test interlaboratory reproduc-

ibility. API Ltd. has agreed to make the test materials available free of charge.

Minute 8.3. It was agreed that progress with the definition of minimum tests for characterization would not be possible until some of the broader problems about test methods and definition of taxa had been resolved. The target would, however, be borne in mind.

Minute 9. Next meeting. It was agreed that the next meeting of the Subcommittee would be held in the United Kingdom on 6 April 1979. This would be the day following the meeting of the Systematics Group of the Society for General Microbiology in Cambridge. That meeting would be devoted to Aerobic Sporeforming Bacteria, and several members of the Subcommittee would be taking part.

Minute 10. Adjournment. The meeting was adjourned at 1525.

Session 2. Open meeting

Minute 11. Call to order. The second session was called to order at 1530 by the Chairman, D. Claus.

Minute 12. Record of attendance. The members of the Subcommittee present at the first session were joined by R. C. W. Berkeley, the newly elected member, and by the following nonmembers: H. Backes (F. R. G.), E. de Boer (The Netherlands), M. Colson (Belgium), M. Doucet (France), C. S. Gutteridge (U.K.), N. A. Logan (U.K.), L. de Mey (Belgium), H. Mitze (F.R.G.), M. Morgado (France), A. G. O'Donnell (U.K.), R. Pierron (France), A. Ramos-Cormenzana (Spain), H. van der Velde (F.R.G.), and A. A. Yousten (U.S.A.).

Minute 13. Chairman's remarks. The Chairman outlined the work of the Subcommittee and introduced the members.

Minute 14. Short contributions. Short papers were presented.

Minute 14.1. R. C. W. Berkeley described work by N. Logan and himself on the application of the API test systems to the classification of the genus *Bacillus*. The tests were largely reproducible. The careful quality control was emphasized.

Minute 14.2. A. G. O'Donnell described a study of 32 strains representing *B. subtilis*, *B. pumilus*, *B. licheniformis* and *B. amyloliquefaciens*. DNA hybridization, pyrolysis gas-liquid chromatography, and API tests had all confirmed the separation of the four species, but the Subcommittee's standard tests had failed to differentiate *B. amyloliquefaciens* from *B. subtilis*.

Minute 14.3. G. J. Bonde discussed the application

of statistical methods to the analysis of test results in the genus *Bacillus*.

Minute 14.4. D. Claus described a study of the citrate utilization test which had shown that the test as described in the Subcommittee's methods was very unreliable. The problem was overcome by addition of magnesium and potassium ions, suggesting that a better medium than S-C 18.1 should be developed.

Minute 14.5. A. A. Yousten described a study he had been carrying out with *B. sphaericus*, arising from its interest as a mosquito pathogen. DNA homology studies showed that at least five DNA subgroups exist.

Minute 15. Current membership. Current membership of the Subcommittee is as follows: D. Claus

(Chairman), Göttingen, F.R.G.; J. R. Norris (Secretary), Bristol, U.K.; E. Afrikan, Abovian City, Armenian S.S.R.; K. Aizawa, Fukuoka, Japan; H. de Barjac, Paris, France; R. C. W. Berkeley, Bristol, U.K.; G. J. Bonde, Aarhus, Denmark; I. Epstein, Jerusalem, Israel; M. Goodfellow, Newcastle upon Tyne, U.K.; R. E. Gordon, Piscataway, N.J., U.S.A.; W. G. Murrell, North Ryde, N.S.W.; J. Wolf, Leeds, U.K.; F. E. Young, Rochester, N.Y., U.S.A.

Minute 16. Adjournment. After discussion of the contributions, the meeting was adjourned at 1650.

D. CLAUS, *Chairman*

International Committee on Systematic Bacteriology Subcommittee on the Taxonomy of *Bifidobacterium*

Minutes of the Meeting, 2 September 1978

Munich, F.R.G.

Minute 1. Call to order. The third closed meeting of the subcommittee was convened at 1500.

Minute 2. Record of attendance. Members present at the meeting were: O. Kandler (Chairman), G. Reuter (Secretary), K. W. Knox, T. Mitsuoka, M. Rogosa, V. Scardovi, M. E. Sharpe, and A. G. Stouthamer. The following were present as observers from the *Lactobacillus* Subcommittee: Hemme (representing G. Mocquot), London, and P. H. A. Sneath. Gherna, Lauer, and Sgorbati were present as invited guests.

Minute 3. Agenda. The proposed agenda of the meeting was accepted.

Minute 4. Minutes of the previous meeting. The minutes of the second meeting of the Subcommittee at the Frij University of Amsterdam were accepted.

Minute 5. Changes in membership. M. Rogosa announced that Prof. Dr. Kitahara had passed away and expressed the general appreciation of the subcommittee members with regard to his contributions. His proposal to send a letter of condolence to Dr. Kitahara's family was unanimously accepted.

Minute 6. List of approved names. The draft of the list of approved names, which had been circulated among the members before the meeting, was discussed and the following agreements were reached:

Minute 6.1. The proposed type strain of *Bifidobacterium bifidum*, "Ti," is maintained in the collection of the Pasteur Institute at Lille. Since some members who received the strain from H. Beerens during recent years had difficulties in growing the organism, Beerens and Mitsuoka, who may still have a living subculture, were asked to send the strain to Scardovi and Kandler

once more. If the strain still shows the characteristics of *B. bifidum*, it will be conclusively included as the type strain in the approved list. It will also be mailed to the American Type Culture Collection. If the reinvestigation is not successful, strain E 319 f, isolated by Reuter and investigated extensively by Scardovi and by Kandler and Lauer, will be listed as the type strain.

Minute 6.2. The type strain of *B. asteroides* has not been unequivocally designated. Although strain C51 is usually referred to as the type strain, strain C3, also isolated by Scardovi in his original study, fits the description of the species much better, as shown by the results of Lauer and Kandler (manuscript in preparation) circulated among the members of the Subcommittee. It was agreed to include C3 (ATCC 25909 = DSM 20431) as the type strain in the approved list.

Minute 6.3. The strains of *B. infantis*, *B. suis*, and *B. longum* are identical with respect to their murein type and the electrophoretic mobility of their lactic dehydrogenase and transaldolase. They also exhibit a high degree of deoxyribonucleic acid/deoxyribonucleic acid homology. They are therefore considered to belong to a single species, although they may be distinguished on the subspecies level on the grounds of differences in regard to sugar fermentation and growth requirements. However, a thorough publication demonstrating the necessary phenotypical criteria must be awaited in order to justify such a differentiation. Since *B. longum* has page priority, the names *B. infantis* and *B. suis* must be omitted from the list of approved names at this time.

Minute 6.4. *B. dentium* is identical with *B. eriksonii* with respect to phenotypic (Mitsuoka et al., 1974) as