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MICROBIOLOGY SOCIETY

International Committee on Systematics of Prokaryotes Subcommittee on the taxonomy of *Bifidobacterium, Lactobacillus* and related organisms Minutes of the closed meeting, 20 June 2019, Prague, Czech Republic

Paola Mattarelli[1,*], Giovanna E. Felis[2], B. Pot[3], Wilhelm H. Holzapfel[4] and Charles M.A.P. Franz[5]

MINUTE 1. CALL TO ORDER

The meeting of the International Committee on Systematics of Prokaryotes, Subcommittee on the Taxonomy of *Bifidobacterium, Lactobacillus* and Related Organisms was held within the frame of the 13th International Scientific Conference on Probiotics, Prebiotics, Gut Microbiota and Health (IPC 2019, Prague, Czech Republic). The ICSP Subcommittee on The Taxonomy of *Bifidobacterium, Lactobacillus* and Related Organisms was officially a scientific partner of IPC2019. C. Franz called the closed meeting to order at 11:00 on 20 June 2019.

MINUTE 2. RECORD OF ATTENDANCE

The Subcommittee members present were E. Brockman, G. E. Felis (Deputy Chairperson), C. M. A. P. Franz (Chairman), W. H. Holzapfel, P. Mattarelli (Secretary), B. Pot and K. Watanabe. E. Salvetti was connected via Skype. Apologies for absence were received from B. Biavati, J. Björkroth, A. Endo, L. M. T. Dicks, P. Lawson and C. Bonaparte.

MINUTE 3. APPROVAL OF THE AGENDA

The proposed agenda was approved.

MINUTE 4. MINUTES OF THE PREVIOUS MEETINGS

The minutes of the meetings of the Subcommittee in Berlin, Germany, on 4 September 2018 were approved.

MINUTE 5. CALL FOR OLD BUSINESS

Regarding the old issues about the high similarity of the species *Bifidobacterium indicum–Bifidobacterium coryneforme*, type strains deposited in two different collection, original type strains and other two strains for both *B. indicum* and *B. coryneforme* species are currently being sequenced in order to clarify the taxonomic position of these two species. C. Franz and P. Mattarelli are taking care of this work.

MINUTE 6. UPDATE ON *LACTOBACILLUS* RECLASSIFICATION

G. E. Felis briefly explained the main results obtained by the task force (G. Felis, C. Franz, P. Mattarelli, B. Pot and K. Watanabe) to address this topic. The genus *Lactobacillus* has been divided into new genera according to data based on genome comparisons. The discussion on the new names and their etymology has been carried out: appropriate names for the new groups have been discussed and approved in order to be accepted by both scientific community and the other stakeholders. The paper on the reclassification of the genus *Lactobacillus* which was in progress at the time of the Subcommittee meeting is currently submitted and under revision (January 2020).

MINUTE 7. ROLE OF THE SUBCOMMITTEE FOR SCIENTISTS AND INDUSTRIES: NEW PAPER ON MINIMAL STANDARDS AND WEBSITE

A discussion on updating of minimal standards has been conducted. Phenotypic data requirements has been proposed to be restricted to a minimum set of features; genome sequencing, average nucleotide identity and digital DNA–DNAhybridization have been proposed to be added as mandatory requirements. It should be kept in mind that minimal standards imply that the minimal requirements should be defined restrictively. All the members agreed.

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For what concerns the website, this has been created under the umbrella of University of Bologna (Italy) and P. Mattarelli is taking care of uploading all the materials that it was shared and approved by the members. The link for the website is https://site.unibo.it/subcommittee-lactobacillus-bifidobacterium/en. This site is very important for the update of news on nomenclature of genera belonging to the scope of the Subcommittee.

MINUTE 8. TAXONOMIC STATUS OF *LACTOBACILLUS BOBALIUS*, *LACTOBACILLUS KIMCHI* AND *LACTOBACILLUS PARALIMENTARIUS*

G. Felis informed us about the case of *Lactobacillus bobalius*, *Lactobacillus paralimentarius* and *Lactobacillus kimchi*. Two papers published in the *International Journal of Systematic and Evolutionary Microbiology* described different taxonomic position for these species (Pang *et al.*, *Int J Syst Evol Microbiol* 2012; 62:2383–2387 and Yang *et al.*, *Int J Syst Evol Microbiol* 2017; 67, 4515–4517. The Subcommittee proposed to insert the adopted taxonomic relevant criteria in the next released version of the Minimal Standards.

MINUTE 9. REVIEW OF NOVEL SPECIES

The reporting period is from November 2018 to June 2019. The following novel species were acknowledged by the Subcommittee (as from November 2018 to June 2019).

Lactobacillus kosoi sp. nov. [Chiou *et al.*, *Int J Syst Evol Microbiol* 2018; 68:2707 (Validation List no. 183); effective publication: *Antonie van Leeuwenhoek* 2018; 111:1149] with type strain 10H^T (=BCRC 81100=NBRC 113063)

Lactobacillus chiayiensis sp. nov. [Huang *et al. Int J Syst Evol Microbiol* 2018; 68:3379 (Validation List no. 184); effective publication; *Syst Appl Microbiol*. 2018; 41:270] with type strain NCYUAS^T (=BCRC 81062=NBRC 112906).

Lactobacillus bambusae sp. nov. [Guu *et al.*, *Int J Syst Evol Microbiol* 2018; 68:2424] with type strain BS-W1^T (=BCRC 80970=NBRC 112377).

Lactobacillus porci sp. nov. [Kim JS *et al.*, *Int J Syst Evol Microbiol* 2018; 68:3118] with type strain SG816^T (=KCTC 21090=NBRC 112917).

Lactobacilus nuruki sp. nov. [Heo J *et al.*, *Int J Syst Evol Microbiol* 2018; 68:3273] with type strain SYF10-1a^T (=KACC 18726=NBRC 112011).

Lactobacillus paragasseri sp. nov. [Tanizawa Y *et al.*, *Int J Syst Evol Microbiol* 2018; 68:3512] with type strain JCM 5343^T (=ATCC 4963=LMG 11478=NCFB 1375=KCTC 3172=NCIMB 8931=VPI 0334).

Lactobacillus salitolerans sp. nov. [Tohno M *et al.*, *Int J Syst Evol Microbiol* 2019; 69:96] with type strain YK43^T (=JCM 31331=DSM 103433).

Lactobacillus suantsaii sp. nov. [Liou *et al.*, *Int J Syst Evol Microbiol* 2019; 69:1484] with type strain L88^T (=BCRC 12945=NBRC 113535).

Lactobacillus zhachilii sp. nov. [Zhang Z *et al.*, *Int J Syst Evol Microbiol* 2019; 69:2196–2201] with type strain HBUAS52074^T (=GDMCC 1.1417=KCTC 21106).

Lactobacillus hulanensis sp. nov. [Zhao *et al.*, *Int J Syst Evol Microbiol* 2019; 69:2147–2152] with type strain ZW163^T (=NCIMB 15193=CCM 8926=CCTCC AB 2019015).

Lactobacillus jixianensis sp. nov. [Long GY *et al.*, *Int J Syst Evol Microbiol* 2019; 69:2340–2353] with type strain 159-4^T (=NCIMB 15175=CCM 8911).

Lactobacillus baoqingensis sp. nov. [Long GY *et al.*, *Int J Syst Evol Microbiol* 2019; 69:2340–2353] with type strain 47-3^T (=NCIMB 15165=CCM 8903=LMG 31064).

Lactobacillus jiayinensis sp. nov. [Long GY *et al.*, *Int J Syst Evol Microbiol* 2019; 69:2340–2353] with type strain 257-1^T (=NCIMB 15166=CCM 8904=LMG 31065)

Lactobacillus zhaoyuanensis sp. nov. [Long GY *et al.*, *Int J Syst Evol Microbiol* 2019; 69:2340–2353] with type strain 187-3^T (=NCIMB 15172=CCM 8910).

Lactobacillus lindianensis sp. nov. [Long GY *et al.*, *Int J Syst Evol Microbiol* 2019; 69:2340–2353] with type strain 220-4^T(=NCIMB 15163=CCM 8902=KCTC 21136).

Lactobacillus huananensis sp. nov. [Long GY *et al.*, *Int J Syst Evol Microbiol* 2019; 69:2340–2353] with type strain 151-2B^T (=NCIMB 15164=CCM 8913=KCTC 21129=LMG 31063).

Lactobacillus tangyuanensis sp. nov. [Long GY *et al.*, *Int J Syst Evol Microbiol* 2019; 69:2340–2353] with type strain 137-3^T (=NCIMB 15170=CCM 8907=KCTC 21125=LMG 31053).

Lactobacillus fuyuanensis sp. nov. [Long GY *et al.*, *Int J Syst Evol Microbiol* 2019; 69:2340–2353] with type strain 244-4^T (=NCIMB 15168=CCM 8906=KCTC 21137=LMG 31052).

Lactobacillus tongjiangensis sp. nov. [Long GY *et al.*, *Int J Syst Evol Microbiol* 2019; 69:2340–2353] with type strain 218-10^T(=NCIMB 15167=CCM 8905=KCTC 21135=LMG 31055).

Lactobacillus fujinensis sp. nov. [Long GY *et al.*, *Int J Syst Evol Microbiol* 2019; 69:2340–2353] with type strain 218-6^T (=NCIMB 15171=CCM 8908=KCTC 21134=LMG 31067).

Lactobacillus mulengensis sp. nov. [Long GY *et al.*, *Int J Syst Evol Microbiol* 2019; 69:2340–2353] with type strain 112-3^T (=NCIMB 15174=CCM 8909=KCTC 21123=LMG 31049).

Bifidobacterium anseris sp. nov. [Lugli *et al.*, *Int J Syst Evol Microbiol* 2018; 68:2130 (Validation List no. 182); effective publication: *Syst Appl Microbiol* 2016; 39:103] with type strain Goo31D^T (=CCUG 70960=LMG 30189).

Bifidobacterium criceti sp. nov. [Lugli *et al.*, *Int J Syst Evol Microbiol* 2018; 68:2130 (Validation List no. 182); effective

publication: *Syst Appl Microbiol* 2016; 39:103] with type strain Ham19E^T (=CCUG 70962=LMG 30188).

Bifidobacterium imperatoris sp. nov. [Lugli *et al.*, *Int J Syst Evol Microbiol* 2018; 68:2130 (Validation List no. 182); effective publication: *Syst Appl Microbiol* 2016; 39:103] with type strain Tam1G^T (=CCUG 70961=LMG 30297).

Bifidobacterium italicum sp. nov., [Lugli *et al.*, *Int J Syst Evol Microbiol* 2018; 68:2130 (Validation List no. 182); effective publication: *Syst Appl Microbiol* 2016; 39:103] with type strain Rab10A^T (=CCUG 70963=LMG 30187).

Bifidobacterium margollesii sp. nov. [Lugli *et al.*, *Int J Syst Evol Microbiol* 2018; 68:2130 (Validation List no. 182); effective publication: Syst Appl Microbiol 2016; 39:103] with type strain Uis1B^T (=CCUG 70959=LMG 30296).

Bifidobacterium parmae sp. nov. [Lugli *et al.*, *Int J Syst Evol Microbiol* 2018; 68:2130 (Validation List no. 182); effective publication: *Syst Appl Microbiol* 2016; 39:103] with type strain Uis4E^T (=CCUG 70964=LMG 30295).

Bifidobacterium aerophilum sp. nov. [Michelini *et al.*, *Int J Syst Evol Microbiol* 2017; 67:1095 (Validation List no. 175); effective publication: *Syst Appl Microbiol* 2016; 39:229] with type strain TRE 17^T (=DSM 100689=JCM 30941).

Bifidobacterium avesanii sp. nov. [Michelini *et al.*, *Int J Syst Evol Microbiol* 2019; 69:5–9 (Validation List no. 185); effective publication: *Syst Appl Microbiol* 2016; 39:229] with type strain TRE C^T (=DSM 100685=JCM 30943).

Bifidobacterium ramosum sp. nov. [Michelini *et al.*, *Int J Syst Evol Microbiol* 2017; 67:1095 (Validation List no. 175); effective publication: *Syst Appl Microbiol* 2016; 39 : 229] with type strain TREM^T (=DSM 100688=JCM 30944).

Bifidobacterium castoris sp. nov. [Duranti *et al.*, *Int J Syst Evol Microbiol* 2019; 69:1288] with type strain 2020B^T (=LMG 30937=CCUG 72816).

Bifidobacterium callimiconis sp. nov. [Duranti *et al.*, *Int J Syst Evol Microbiol* 2019; 69:1288] with type strain 2028B^T (=LMG 30938=CCUG 72814).

Bifidobacterium goeldii sp. nov. [Duranti *et al.*, *Int J Syst Evol Microbiol* 2019; 69:1288] with type strain 2034B^T (=LMG 30939=CCUG 72815).

Bifidobacterium samirii sp. nov. [Duranti *et al.*, *Int J Syst Evol Microbiol* 2019; 69:1288] with type strain 2033B^T (=LMG 30940=CCUG 72817).

Bifidobacterium dolichotidis sp. nov. [Duranti *et al.*, *Int J Syst Evol Microbiol* 2019; 69:1288] with type strain 2036B^T (=LMG 30941=CCUG 72818).

Bifidobacterium jacchi sp. nov. [Modesto *et al.*, *Int J Syst Evol Microbiol* 2019; Jun 10. doi: 10.1099/ijsem.0.003518] with type strain MRM 9.3^T (=DSM 103362=JCM 31788).

Bifidobacterium catenulatum subsp. *catenulatum* subsp. nov. [Scardovi and Crociani 1974; Nouioui *et al.*, *Int J Syst Evol Microbiol* 2018; 68:3379–3393 (Validation List No. 184); effective publication *Front Microbiol* 2018; 9:2007] with type strain B669^T (=ATCC 27539=DSM 16992).

Bifidobacterium catenulatum subsp. *kashiwanohense* subsp. nov. [Morita *et al.* 2011; Nouioui *et al. Int J Syst Evol Microbiol* 2018; 68:3379–3393 (Validation List No. 184); effective publication *Front Microbiol* 2018; 9:2007] with type strain HM2-2^T (=DSM 21854=JCM 15439).

Bifidobacterium porcinum sp. nov. [Zhu *et al.* 2003; Nouioui *et al.*, *Int J Syst Evol Microbiol* 2018; 68:3379–3393 (Validation List No. 184); effective publication *Front Microbiol* 2018; 9:2007] with type strain P3-14^T (=JCM 16945=LMG 21689).

Bifidobacterium pullorum subsp. *pullorum* subsp. nov. [Trovatelli *et al.*, 1974; Nouioui *et al.*, *Int J Syst Evol Microbiol* 2018; 68:3379–3393 (Validation List No. 184); effective publication *Front Microbiol* 2018; 9:2007] with type strain P145^T (=JCM 1214=LMG 21816).

Bifidobacterium pullorum subsp. *gallinarum* subsp. nov. [Watabe *et al.* 1983; Nouioui *et al.*, *Int J Syst Evol Microbiol* 2018; 68:3379–3393 (Validation List No. 184); effective publication *Front Microbiol* 2018; 9:2007] with type strain Ch206-5^T (=AS 1.2283=DSM 20670=JCM 6291).

Bifidobacterium pullorum subsp. *saeculare* subsp. nov. [Biavati *et al.*, 1992; Nouioui *et al.*, *Int J Syst Evol Microbiol* 2018; 68:3379–3393 (Validation List No. 184); effective publication *Front Microbiol* 2018; 9:2007] with type strain RA161^T (=AS 1.2278=ATCC 49392=DSM 6531).

MINUTE 10. PRESENT MEMBERSHIP

The following individuals are currently members of the Subcommittee on *Bifidobacterium, Lactobacillus* and related organisms: Bruno Biavati (Malta); Johanna Björkroth (Finland); Christine Bonaparte (Germany); Elke Brockmann (Denmark); Leon M.T. Dicks (South Africa); Akihido Endo (Japan); Giovanna E. Felis, Deputy Chairperson (Italy); Charles M.A.P. Franz, Chairman (Germany); Wilhelm H. Holzapfel (South Korea); Paul Lawson (USA); Paola Mattarelli, Secretary (Italy); Bruno Pot (Belgium); Gerhard Reuter (Germany); Elisa Salvetti (Italy); and Koichi Watanabe (Taiwan).

MINUTE 11. DATE AND PLACE OF THE NEXT MEETING

The next meeting of the Subcommittee is scheduled to be held at Food Micro 2020, Greece (Athens, 7–10 September 2020).

MINUTE 12. ADJOURNMENT

The closed meeting was adjourned at 13.30 on 20 June 2019.