Taxonomic note: necessary correction of specific and subspecific epithets according to Rules 12c and 13b of the International Code of Nomenclature of Bacteria (1990 Revision)

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Specific epithets and subspecific epithets treated as adjectives must agree in gender with the generic names (Rules 12c and 13b of the International Code of Nomenclature of Bacteria). Thirty-four cases that do not respect these Rules are corrected.

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Latin is the only language permitted for the classification of living organisms and, in microbiology, Latin designations have been used from the beginning (MacAdoo, 1993). Not all bacteriologists are Latin scholars and, in spite of the guidelines provided by the International Code of Nomenclature of Bacteria (Lapage *et al.*, 1992), Buchanan (1957, 1994), MacAdoo (1993) and Trüper (1996), numerous mistakes have been made in naming species and genera of prokaryotes.

Changes in the spelling of bacterial names irritate a lot of bacteriologists who think that there are more important things to do in science than this hair-splitting business. On the other hand, Rule 57a states that 'Any name or epithet should be written in conformity with the spelling of the word from which it is derived and in strict accordance with the rules of Latin and latinization', and according to Rule 3, 'Names contrary to a Rule cannot be maintained, ...'.

Among the more serious mistakes that cannot be allowed in Latin are adjectives modifying a noun but that do not agree in gender with this noun. Rules 12c and 13b therefore state that specific epithets and subspecific epithets that are adjectives must agree in gender with the generic names.

I recently proposed (Euzéby, 1998) an emendation of the note of Rule 61 to avoid changes in the spelling of names included in the Approved Lists of Bacterial Names (Skerman *et al.*, 1980), and I shall not propose corrections for such epithets even if they are in violation of Rules 12c and 13b. On the contrary, the following names should be changed.

References for effective and valid publications of the

names cited below can be found in the *List of Bacterial Names with Standing in Nomenclature* <http://www-sv.cict.fr/bacterio/> (Euzéby, 1997).

Epithets that do not agree with generic names assigned to the masculine gender

Bacteroides tectum should be changed to *Bacteroides tectus* (L. part. masc. adj. *tectus* concealed).

Haloicola saccharolytica, *Haloicola saccharolytica* subsp. *saccharolytica* and *Haloicola saccharolytica* subsp. *senegalensis* should be changed to *Haloicola saccharolyticus* (Gr. n. *sacchar* sugar; Gr. adj. *lytos* loosening, dissolving; M.L. adj. *lyticus*, -a, -um dissolving; M.L. masc. adj. *saccharolyticus* sugar-dissolving), *Haloicola saccharolyticus* subsp. *saccharolyticus* and *Haloicola saccharolyticus* subsp. *senegalensis*, respectively.

Methanoculleus bourgense should be changed to *Methanoculleus bourgensis* (Bourg-en-Bresse, name of a locality; L. suff. -ensis, -is, -e relating to; M.L. masc. adj. *bourgensis* referring to Bourg-en-Bresse).

Nocardioides fastidiosa should be corrected to *Nocardioides fastidiosus* (L. masc. adj. *fastidiosus* fastidious).

Paenibacillus durum should be changed to *Paenibacillus durus* (M.L. masc. adj. *durus* hard, tough, resistant).

Streptococcus difficile should be changed to *Streptococcus difficilis* (L. masc. adj. *difficilis* difficult). However, Vandamme *et al.* (1997) recently demonstrated that *Streptococcus difficile* Eldar *et al.* 1995 is a variant of *Streptococcus agalactiae* Lehmann and Neumann

1896 (Approved Lists 1980) and that this name is illegitimate (but it is not placed on the list of rejected names).

Streptomyces viridoflavus should be changed to *Streptomyces viridiflavus* (L. adj. *viridis*, -is, -e green; preferred connecting vowel -i-; L. adj. *flavus*, -a, -um yellow; M.L. masc. adj. *viridiflavus* green-yellow).

Epithets that do not agree with generic names assigned to the feminine gender

Colwellia psychroerythrus should be changed to *Colwellia psychrerythraea* [Gr. adj. *psychros* cold; no extra connecting vowel is required; L. adj. *erythraeus*, -a, -um red; M.L. fem. adj. *psychrerythraea* cold (adapted) and red].

Erwinia persicinus should be changed to *Erwinia persicina* (M.L. fem. adj. *persicina* peach-coloured).

Gordonia rubropertinctus should be corrected to *Gordonia rubripertincta* (L. adj. *ruber* bra brum red; preferred connecting vowel -i-; L. pref. *per* very; L. part. adj. *tinctus*, -a, -um dyed; M.L. fem. adj. *rubripertincta* heavily dyed red).

Halomonas pantelleriense should be changed to *Halomonas pantelleriensis* (Pantelleria island, name of a locality; the vowel *a* should be dropped; L. suff. -ensis, -is, -e relating to; M.L. fem. adj. *pantelleriensis* referring to Pantelleria island).

Megamonas hypermegas should be changed to *Megamonas hypermegale* (Gr. pref. *hyper* over, more than; Gr. adj. *megas*, *megale*, *mega* big; M.L. fem. adj. *hypermegale* very big). As MacAdoo (1993) says, the Greek adjectives are so complicated that one needs to be an expert in both languages to put the Greek properly into Latin form. However, Pliny (*Plinius Secundus*), in *Naturalis historia*, uses the feminine adjective *megale* (Gaffiot, 1934).

Mitsuokella multiacidus should be changed to *Mitsuokella multacida* (L. adj. *multus*, -a, -um many; no connecting vowel is required; L. adj. *acidus*, -a, -um sour; M.L. fem. adj. *multacida* producing much acid).

Saccharothrix aerocolonigenes subsp. *staurosporeus* should be changed to *Saccharothrix aerocolonigenes* subsp. *staurosporea* (Gr. n. *stauros* stave; Gr. n. *spora* a spore; M.L. fem. adj. *staurosporea* referring to a slender spore).

Tsukamurella paurometabolum should be *Tsukamurella paurometabola* (Gr. adj. *paurus* little; Gr. adj. *metabolus* changeable; M.L. fem. adj. *paurometabola* little changeable, probably meaning 'producing little change').

Epithets that do not agree with generic names assigned to the neuter gender

Acetomicrobium faecalis should be corrected to *Acetomicrobium faecale* (M.L. neut. adj. *faecale* pertaining to faeces).

Acidiphilium aminolytica should be changed to *Acidiphilium aminilyticum* (M.L. n. *aminum* amine; preferred connecting vowel -i-; Gr. adj. *lytos* loosening, dissolving; M.L. adj. *lyticus*, -a, -um dissolving; M.L. neut. adj. *aminilyticum* amine-dissolving).

Acidiphilium facilis should be changed to *Acidiphilium facile* (L. neut. adj. *facile* easy).

Clostridium fervidus should be *Clostridium fervidum* (L. neut. adj. *fervidum* boiling).

Clostridium intestinalis should be changed to *Clostridium intestinale* (M.L. neut. adj. *intestinale* pertaining to the intestine).

Corynebacterium variabilis should be *Corynebacterium variabile* (L. neut. adj. *variabile* changeable, variable).

Cyclobacterium marinus should be corrected to *Cyclobacterium marinum* (L. neut. adj. *marinum* of the sea, marine).

Desulfomicrobium baculatus should be changed to *Desulfomicrobium baculatum* (M.L. neut. adj. *baculatum* rod-shaped).

Dictyoglomus turgidus should be changed to *Dictyoglomus turgidum* (L. neut. adj. *turgidum* swollen). The original authors failed to indicate the gender of the genus *Dictyoglomus*. However, according to Rule 65(2), the genus *Dictyoglomus* is of neuter gender (L. neut. n. *glomus* ball).

Hyphomicrobium facilis, *Hyphomicrobium facilis* subsp. *facilis*, *Hyphomicrobium facilis* subsp. *tolerans* and *Hyphomicrobium facilis* subsp. *ureaphilum* should be changed to *Hyphomicrobium facile* (L. neut. adj. *facile* easy), *Hyphomicrobium facile* subsp. *facile*, *Hyphomicrobium facile* subsp. *tolerans* and *Hyphomicrobium facile* subsp. *ureaphilum*, respectively.

Methanohalobium evestigatus should be changed to *Methanohalobium evestigatum* (L. neut. adj. *evestigatum* discovered).

Sinorhizobium xinjiangensis should be corrected to *Sinorhizobium xinjiangense* (Xinjiang, name of a locality; L. suff. -ensis, -is, -e relating to; M.L. neut. adj. *xinjiangense* referring to Xinjiang).

Sphingobacterium antarcticus should be changed to *Sphingobacterium antarcticum* (M.L. neut. adj. *antarcticum* pertaining to the Antarctic).

To avoid further mistakes in the future, authors are recommended to consult a classicist before proposing new names for bacteria.

References

- Buchanan, R. E. (1957). How bacteria are named and identified. In *Bergey's Manual of Determinative Bacteriology*, 7th edn, pp. 15–28. Edited by R. S. Breed, E. G. D. Murray & N. R. Smith. Baltimore: Williams & Wilkins.
- Buchanan, R. E. (1994). Taxonomic notes: an aid to formation of bacterial names. Chemical terminology and microbiological nomenclature. *Int J Syst Bacteriol* **44**, 588–590.

- Euzéby, J. P. (1997).** List of bacterial names with standing in nomenclature: a folder available on the Internet. *Int J Syst Bacteriol* **47**, 590–592.
- Euzéby, J. P. (1998).** Proposal to amend the Rule 61 of the International Code of Nomenclature of Bacteria (1990 revision). *Int J Syst Bacteriol* **48**, 611–612.
- Gaffiot, F. (1934).** *Dictionnaire Latin Français*. Paris: Hachette.
- Lapage, S. P., Sneath, P. H. A., Lessel, E. F., Skerman, V. B. D., Seeliger, H. P. R. & Clark, W. A. editors (1992).** *International Code of Nomenclature of Bacteria (1990 Revision)*. Washington, DC: American Society for Microbiology.
- MacAdoo, T. O. (1993).** Nomenclatural literacy. In *Handbook of New Bacterial Systematics*, pp. 339–358. Edited by M. Goodfellow & A. G. O'Donnell. London: Academic Press.
- Skerman, V. B. D., McGowan, V. & Sneath, P. H. A. (editors) (1980).** Approved lists of bacterial names. *Int J Syst Bacteriol* **30**, 225–420.
- Trüper, H. G. (1996).** Help! Latin! How to avoid the most common mistakes while giving Latin names to newly discovered prokaryotes. *Microbiología* (Sociedad Española de Microbiología) **12**, 473–475.
- Vandamme, P., Devriese, L. A., Pot, B., Kersters, K. & Melin, P. (1997).** *Streptococcus difficile* is a nonhemolytic group B, type Ib streptococcus. *Int J Syst Bacteriol* **47**, 81–85.