Rejection of *Mycobacterium aquae*

Request for an Opinion

ERNEST H. RUNYON

South African Medical Research Council, Tuberculosis Research Unit, Onderstepoort, South Africa

The name *Mycobacterium aquae* has been used since 1922, but for much of this time there has been disagreement as to the nature of the taxon referred to by this name. Recently, it has been used to refer to what is otherwise designated as *M. gordonae* Bojalil, Cerbón, and Trujillo, 1962. However, confusion surrounding the name *M. aquae* continues, and any of four different taxa may be indicated by this name. The Subcommittee on Mycobacteria of the ICSB strongly favors rejection of the name *M. aquae*. The name *M. gordonae*, having definite reference, should be conserved and *M. aquae*, having ambiguous reference, should be rejected.

Two recent publications necessitate Judicial Commission action with regard to the name *Mycobacterium aquae*. One is Tárnok's note (14) promoting this name on the basis of priority. The other is the use by Jenkins et al. (10) of the name for one of their newly recognized taxa. Prior to consideration of these proposals, a review of the devious uses of the name *M. aquae* is in order.

Although Maië was the first to use the name *M. aquae* in a publication (11), it may have been suggested by Maië's employer, Galli-Valerio. Maië refers to "*M. aquae* B. Galli-Valerio," and Galli-Valerio (8) also uses the expression "*M. aquae* Galli-Valerio," thus implying his proposal of the name. Neither stated that a new species with the name *M. aquae* was being described. The history of confused reference to *M. aquae* begins immediately. Although both Maië and Galli-Valerio worked in the same institute at Lausanne, Maië described *M. aquae* as being a rapid grower and only whitish-yellow, whereas Galli-Valerio described bacteria of his species to be brilliant yellow, near-orange, and to grow more rapidly at 37 C than at the "ordinary" temperature. The strain he deposited in the Centre de Collection de Types Microbiens, Lausanne, under the name *M. aquae* was the reference culture of this species for many years. Gordon and Smith (9) found it to belong to *M. smegmatis*.

Bönicke (2) applied the name *M. aquae* Galli-Valerio to all the slowly growing scotochromogenic mycobacteria that are pigmented even when grown in liquid culture media. He

studied a large number of strains from water and other strains from a variety of clinical specimens, but he did not include Galli-Valerio's reference strain. Although he designated two subspecies of *M. aquae* (on the basis of amidase activity) (3), these do not correspond to *M. scrofulaceum* Prissick and Masson 1956 (syn. *M. marianum* Suzanne and Penso 1953) and *M. gordonae* Bojalil, Cerbón, and Trujillo, 1962, which we now know to be important taxa of these scotochromogens.

The name *M. aquae* has been used at times to refer not to a specific taxon but merely to mycobacteria isolated from water. Tacquet et al. (13) used "*Myc. aquae* species" as a taxonomic entity comprising six kinds of mycobacteria. In 1967, Professor Hauduroy, then Chairman of the ICSB Subcommittee on Mycobacteria, summarized the difficulties with respect to *M. aquae* (report not published). He listed eight publications (1932 through 1943) which, in his words, were studies on *M. aquae*. But in at least four of these publications (1, 4, 6, 7) there is no mention of *M. aquae*; the papers relate only to mycobacteria from water. Hauduroy concluded that the study of strains of *M. aquae* from various sources, including Galli-Valerio's Lausanne strain, revealed many organisms not comparable to each other. Many investigators have found multiple species of mycobacteria in water. Caroli and Mazzerone (5) found in water 8 unidentifiable strains, 21 strains of *M. fortuitum*, 27 strains of *M. avium*, and 38 strains of *M. aquae*, including 6 that they designated as *M. aquae scrofulaceum*.

In the ensuing years, *M. aquae* came to be

used more commonly for the "tapwater scotochromogens" as distinct from *M. scrofulaceum*. In 1970, Wayne (15) reviewed facts indicating the invalidity of *M. aquae* and provided evidence that Bojalil's name *M. gordonae* should replace it. In 1971, the Subcommittee on Mycobacteria of the ICSB voted nine to two in favor of *M. gordonae*. The two not voting for *M. gordonae* reserved judgement pending further investigation. This strong majority approval of the name *M. gordonae* carries with it implication of discard of the name *M. aquae*. Stanford and Gunthorpe (12) state that *M. aquae* "is ill defined and probably includes several species."

Tárnok's promotion of *M. aquae* and rejection of *M. gordonae* are based in part on misunderstanding. Tárnok (14) reported that the mycobacteria Bojalil, Cerbón, and Trujillo called *M. gordonae* were isolated from water taps. In fact, Bojalil et al. clearly stated that the strains which, by numerical analysis, comprised their *M. gordonae* cluster were from clinical specimens. Furthermore, Wayne, contrary to Tárnok's statement, did not test the Galli-Valerio strain from Lausanne; he did receive and test a strain sent to him from Lausanne by Hauduroy, but this was the type of Bönicke's *M. aquae* subsp. *nonureolyticum* (16). Tárnok has no basis for rejecting the finding of Gordon and Smith that Galli-Valerio's Lausanne strain of *M. aquae* is, in fact, *M. smegmatis*. Even if the name *M. aquae* Galli-Valerio had been validly published, Tárnok's plea of priority carries no weight since the representative culture of *M. aquae* is *M. smegmatis*, not *M. gordonae*.

Jenkins et al. (10) have proposed a revival of the name *M. aquae* for application to a taxon they distinguished from *M. gordonae* on the basis of thin-layer chromatographic analysis. Marks (personal communication) now concedes that this proposed new concept for *M. aquae* is in error and that the taxon should be a subspecies of *M. gordonae*.

In conclusion, there are dubious and conflicting ascriptions of *M. aquae* as follows: *M. aquae* Shin Maië 1922; *M. aquae* Galli-Valerio 1927; and *M. aquae* Jenkins, Marks, and Schaefer 1973; in addition, the name *M. aquae* has been used to refer to *M. smegmatis*, *M. gordonae*, *M. gordonae* plus *M. scrofulaceum*, and a splinter taxon from *M. gordonae*. Confusion will be eliminated by rejection of the name *M. aquae* as a nomen ambiguum. The Judicial Commission of the ICSB is requested to designate *Mycobacterium aquae* a nomen rejiciendum.

LITERATURE CITED

1. Bablet, J., F. van Deinse, and R. Schwartz. 1938. Sur un bacille acido-alcool-résistant chromogène isolé d'eau de Seine. C. R. Soc. Biol. 128:350-352.
2. Bönicke, R. 1961. Die Bedeutung der Acylamidasen für die Identifizierung und Differenzierung der verschiedenen Arten der Gattung Mycobacterium. Jahresber. Borstel 5:7-87.
3. Bönicke, R. 1962. Identification of mycobacteria by biochemical methods. Bull. Int. Un. Tuberc. 32:13-68.
4. Cabasso, V. 1941. Sur diverses souches de bacilles acido-résistants paratuberculeux saprophytes. Arch. Inst. Pasteur Tunis 30:26-54 and 165-202.
5. Caroli, G., and R. Mazzarone. 1966. Studi su micobatteri isolate da acque di varia natura. Ann. Sclavo 8:746-756.
6. Van Deinse, F. 1939. Production tardive de "Tuberculine" dans une culture de saprophytes acido-résistants. C. R. Soc. Biol. 132:358-359.
7. Eichbaum, F. 1932. Erfahrungen und Beobachtungen an säurefesten Stäbchen (Wasserbakterien, Leprabazillen, Tuberkelbazillen). Immunitätsforsch. Allerg. Klin. Immunol. 74:31-55.
8. Galli-Valerio, B., and M. Bornand. 1927. Le *Mycobacterium aquae* Galli-Valerio et son action pathogène. Zentralbl. Bakteriologie. Parasitenk. Infektionskr. Hyg. Abt. 1 Orig. 101:182-193.
9. Gordon, R. E., and M. M. Smith. 1955. Rapidly growing, acid-fast bacteria. J. Bacteriol. 69:502-507.
10. Jenkins, P. A., J. Marks, and W. B. Schaefer. 1972. Thin-layer chromatography of mycobacterial lipids as an aid to classification: the scotochromogenic Mycobacteria, including *Mycobacterium scrofulaceum*, *M. xenopi*, *M. aquae*, *M. gordonae*, *M. flavescens*. Tubercle 53:118-127.
11. Maië, S. 1922. Experimentelle Versuche bei Goldfischen (*Carassius auratus*) mit säurefesten Bazillen. Zentralbl. Bakteriologie. Parasitenk. Infektionskr. Hyg. Abt. 1 Orig. 88:28-38.
12. Stanford, J. L., and W. J. Gunthorpe. 1971. A study of some fast-growing scotochromogenic mycobacteria including species descriptions of *Mycobacterium gilvum* (new species) and *Mycobacterium duvalii* (new species). Brit. J. Exp. Pathol. 52:627-637.
13. Tacquet, A., F. Tison, Th. Plancot, B. Devulder, and Ph. Roos. 1967. Scotochromogenic mycobacteria. Bull. Int. Un. Tuberc. 39:36-43.
14. Tárnok, I. 1973. Über die taxonomische Position der Species *Mycobacterium aquae* und *Mycobacterium gordonae*. Zentralbl. Bakteriologie. Parasitenk. Infektionskr. Hyg. Abt. 1 Orig. 225: 85-88.
15. Wayne, L. G. 1970. On the identity of *Mycobacterium gordonae* Bojalil and the so-called tap water scotochromogens. Int. J. Syst. Bacteriol. 20:149-153.
16. Wayne, L. G., J. R. Doubek, and G. A. Diaz. 1967. Classification and identification of mycobacteria. IV. Some important scotochromogens. Amer. Rev. Resp. Dis. 96:88-95.