Opinion

Corynebacterium ilicis is typified by ICMP 2608 =ICPB CI144, *Arthrobacter ilicis* is typified by DSM 20138 =ATCC 14264 =NCPBP 1228 and the two are not homotypic synonyms, and clarification of the authorship of these two species. Opinion 87

Judicial Commission of the International Committee on Systematics of Prokaryotes

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The Judicial Commission rules that the name *Corynebacterium ilicis* Mandel *et al.* 1961 is represented by the type strain ICMP 2608 =ICPB CI144 and is reported to be a plant-pathogenic species. *Arthrobacter ilicis* is represented by the type strain DSM 20138 =ATCC 14264 =NCPBP 1228 and is not a homotypic synonym of *Corynebacterium ilicis* Mandel *et al.* 1961, and is reported not to be a plant pathogen. The authorship is to be cited as *Arthrobacter ilicis* Collins *et al.* 1982 and typification and the description of this species are to be found in Collins *et al.* (1981) [Collins, M. D., Jones, D. & Kroppenstedt, R. M. (1981). *Zentralbl Bakteriologie Parasitenkd Infektionskr Hyg Abt I Orig* **C2**, 318–323].

At its meetings in 2005 at the IUMS Bacteriology and Applied Microbiology Congress in San Francisco, the Judicial Commission of the International Committee for Systematics of Prokaryotes ruled that the name *Arthrobacter ilicis* is represented by the type strain DSM 20138 =ATCC 14264 =NCPBP 1228. The authorship is to be cited as *Arthrobacter ilicis* Collins *et al.* 1982 and the effective publication where this name is first published, typified and described is to be found in Collins *et al.* (1981). The name *Arthrobacter ilicis* appeared on Validation List no. 9 (Collins *et al.*, 1982). In dealing with typification of *Arthrobacter ilicis* Collins *et al.* 1982, the type of *Corynebacterium ilicis* Mandel *et al.* 1961 is affected and must also be dealt with by the Judicial Commission. The type of *Corynebacterium ilicis* Mandel *et al.* 1961 is represented by the type strain ICMP 2608 =ICPB CI144.

It is evident from a number of publications that the organisms represented by the strains ICMP 2608 =ICPB CI144 and DSM 20138 =ATCC 14264 (cited on the Approved Lists of Bacterial Names; Skerman *et al.*, 1980) =NCPBP 1228 are members of different taxa; although it was initially thought that DSM 20138 =ATCC 14264 =NCPBP 1228 were derived from a strain (CR2) that Mandel *et al.* (1961) considered to be pathogenic on American holly (*Ilex opaca*), this has proven not to be the case. Strains CR2 and Y-1 of Mandel studied by Dye & Kemp (1977) under the numbers CJ2 and CJ3 are clearly

not members of the same taxon as CJ1 =NCPBP 1228 (=CR2). It is clear that DSM 20138 =ATCC 14264 =NCPBP 1228 does not exhibit one of the original diagnostic features of *Corynebacterium ilicis*, namely pathogenesis on American holly, and cannot represent this species. The Judicial Commission has therefore ruled that DSM 20138 =ATCC 14264 =NCPBP 1228 cannot serve as the type of the species *Corynebacterium ilicis*, but may serve as the type of a different taxon, *Arthrobacter ilicis*. Although this name is considered by Collins *et al.* (1981) to be a homotypic synonym of *Corynebacterium ilicis* Mandel *et al.* 1961, this is obviously not the case, since the strain studied is not an authentic representative of this taxon. The Judicial Commission therefore rules that the name *Arthrobacter ilicis* Collins *et al.* 1982 is to be typified by DSM 20138 =ATCC 14264 =NCPBP 1228 and that it is not a homotypic synonym of *Corynebacterium ilicis* Mandel *et al.* 1961. Reference to Mandel *et al.* 1961 in the author citation *Arthrobacter ilicis* (Mandel *et al.* 1961) Collins *et al.* 1982 is to be removed and any reference to Mandel *et al.* (1961) is not to be included in any future descriptions. The Approved Lists of Bacterial Names (Skerman *et al.*, 1980, 1989) make reference to the publication of Dye & Kemp (1977) as the source of the description of *Corynebacterium ilicis* Mandel *et al.* 1961, and care must be taken in interpretation. Clearly, the strain listed as CJ1 (derived from NCPBP 1228) is not a member of the same taxon as CJ2 (=ICMP 2608) and CJ3 (=ICMP 2609). Based on later

work, it would appear that data on strain CJ1 (=ICMP 2607) refer to *Arthrobacter ilicis* Collins *et al.* 1982, whereas the results from strain CJ2 and CJ3 are 'atypical'. Notes held in the International Collection of Phytopathogenic Bacteria (ICPB), now housed at the USDA-ARS Foreign Disease-Weed Science Research Unit, Fort Detrick, MD, USA, indicate that strain ICPB CI144 (=CJ2 =ICMP 2608) could reinfect holly, and obviously refer to the pathogen *Corynebacterium ilicis* Mandel *et al.* 1961. This strain was accessioned to the ICPB (then in Davis, CA, USA) in 1960. It was also noted that ICPB CI145 (=CJ3 =ICMP 2609) did not reinfect holly.

Further work has shown that the species *Arthrobacter ilicis* Collins *et al.* 1982, represented by the type strain DSM 20138 =ATCC 14264 =NCPPB 1228, is not pathogenic for American holly and should not be listed as a plant-pathogenic species. In contrast, *Corynebacterium ilicis* Mandel *et al.* 1961, represented by the type strain ICMP 2608 =ICPB CI144, is pathogenic for American holly and has also been shown to be a member of the species *Curtobacterium flaccumfaciens*, where it is recognized as *Curtobacterium flaccumfaciens* pv. *ilicis* (Dye & Kemp, 1977; Young *et al.*, 2004). Although not covered by the Bacteriological Code, the strain ICMP 2608 =ICPB CI144 may serve as the pathotype under the International Standards for Naming Pathovars of Phytopathogenic Bacteria (Young *et al.*, 2001).

The following points should also be noted:

The work of Bousfield (1972), Jones (1975), Schleifer & Kandler (1972) and Keddie & Cure (1978; and relevant citations therein) refers to the species *Arthrobacter ilicis* Collins *et al.* 1982. The work of Collins *et al.* (1981) draws heavily on these data and makes no reference to pathogenicity on American holly. The work of Lelliott (1966) makes no clear reference to the source of the strain, but the work was carried out in the Plant Pathology Laboratory, Harpenden, UK, where the National Collection of Plant Pathogenic Bacteria was housed at the time. According to their printed catalogue from 1977, *Corynebacterium ilicis* NCPPB 1228 had been accessed from the ATCC in 1962. By deduction, one may conclude that the work of Lelliott (1966) used NCPPB 1228, which is a strain of *Arthrobacter ilicis* Collins *et al.* 1982. Reference to Mandel *et al.* (1961) and Starr *et al.* (1975) is inappropriate.

The work of Mandel *et al.* (1961) clearly mentions the pathogenicity of *Corynebacterium ilicis* on American holly. However, Dye & Kemp (1977) suggest that the description of strain CJ2 (=ICMP 2608), an authentic strain of *Corynebacterium ilicis* =*Curtobacterium flaccumfaciens* pv. *ilicis* (and CJ3 =ICMP 2609), is atypical when compared with the description of Mandel *et al.* (1961). The work of Starr *et al.* (1975) deals with the parent strain of strain CJ2, which is the type strain of *Corynebacterium ilicis* and pathotype of *Curtobacterium flaccumfaciens* pv. *ilicis* (ICMP 2608 =ICPB CI144). The description of the species

Arthrobacter ilicis by Keddie *et al.* (1986) also refers to data from two different taxa and should not be cited.

The work of Dye & Kemp (1977) includes work on both *Arthrobacter ilicis* (strain CJ1 =ICMP 2607) and *Corynebacterium ilicis* =*Curtobacterium flaccumfaciens* pv. *ilicis* (strains CJ2 and CJ3). The latter are referred to as being 'atypical'. The description on page 580 makes reference to the holotype, a strain that is clearly derived from the type of *Arthrobacter ilicis*. Based on the cited description (Dye & Kemp, 1977) in the Approved Lists of Bacterial Names (Skerman *et al.*, 1980, 1989), only the data collected on strain CJ2 (ICMP 2608 =ICPB CI144) should be considered as contributing to the description of *Corynebacterium ilicis* Mandel *et al.* 1961. Strain ICPB CI145 (CJ3 =ICMP 2609) does not appear to be pathogenic, although in the study of Dye & Kemp (1977) it appears to be indistinguishable from CJ2 (ICMP 2608 =ICPB 2608). Reference to the description in Mandel *et al.* (1961) is probably best avoided, although this work is to be cited as the source of the name *Corynebacterium ilicis*.

The original Request for an Opinion (Young *et al.*, 2004) suggests that NCPPB 1228 and ATCC 14264 were compared on the basis of their 16S rRNA gene sequences in the work of Collins *et al.* (1981); this is incorrect. Furthermore, in the citation of the type strain of *Arthrobacter ilicis* Collins *et al.* 1982 at the end of the Request for an Opinion, the strain number ICPB CI144 is incorrect as it does not represent the type of this species.

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