On the status of the species name *Streptomyces ruanii* Kumar and Goodfellow 2008.

B. J. Tindall

Leibniz-Institut DSMZ–Deutsche Sammlung von Mikroorganismen und Zellkulturen GmbH, Inhoffenstraße 7B, 38124 Braunschweig, Germany

The species name *Streptomyces ruanii* Kumar and Goodfellow 2008 was published in the International Journal of Systematic and Evolutionary Microbiology in 2008. It is generally treated as a legitimate and validly published name. However, closer examination of the publication indicates that this name is contrary to the Rules of the Nomenclatural Code dealing with prokaryotes and is both illegitimate and not validly published.

In a publication dealing with a number of ‘strains received as’, among others, *Streptomyces hygroscopicus* subsp. *hygroscopicus*, Kumar & Goodfellow (2008) dealt with the taxonomy of strain ISP 5276. Based on the studies carried out by these authors they concluded that strain ISP 5276 was distinct from other *Streptomyces hygroscopicus* subsp. *hygroscopicus* strains as well as other members of the group designated by the authors as the ‘Streptomyces violaceusniger 16S rRNA gene clade’. Based on that evaluation the authors concluded that strain ISP 5276 represented a novel taxon, *Streptomyces ruanii*. The strain is also deposited in the DSMZ as DSM 40276. However, at the 1999 plenary meeting of the International Committee on Systematics of Prokaryotes changes were made to the existing wording of the Rules of the Nomenclatural Code dealing with prokaryotes (Lapage *et al.*, 1992) to the effect that type strains were to be deposited in two different culture collections in two different countries (De Vos & Trüper, 2000; Labeda, 2000). Although the strain designation ISP 5276 appears to be used as a collection number, this was a number issued as part of the International Streptomyces Project and while all such strains may have been handled in one location in the past there is no evidence that this collection physically exists anywhere, except perhaps as part of accession policies of other culture collections. The only other deposit documented is DSM 40276, allowing the reader to draw the inevitable conclusion that evidence was only provided for the deposit of the type strain in a single collection. Since at the time of publication deposit in two collections in two different countries [Rule 27 (3) and 30] was (and still is) a requirement of valid publication of a name one must also come to the conclusion, based on the information presented in the publication, that the name is not validly published, despite being published in the pages of the International Journal of Systematic and Evolutionary Microbiology.

However, there is documented evidence that strain ISP 5276 is deposited in a diverse range of collections, including ATCC, NCIMB, LMG, BCRC, JCM, NRRL and NBRC. While this would appear to solve the issue of valid publication it highlights another issue, the fact that in most collections the strain deposited as ISP 5276 is listed as the type strain of the species *Streptomyces nigrescens* (Sveshnikova 1957) Pridham *et al*. 1958 (for example AS 4.1410, ATCC 23941, BCRC 15127, CBS 925.68, CGMCC 4.1410, DSM 40276, JCM 4401, LMG 19332, NBRC 12894, NCIMB 9856, NRRL B-12176 and VKM Ac-1705). Of interest is the inclusion of DSM 40276 as the type strain of *S. nigrescens*, which is given as the type strain of *S. ruanii* by Kumar & Goodfellow (2008). It is here that closer reading of the paper by Kumar & Goodfellow (2008) only indicates that they studied a strain of *Streptomyces hygroscopicus* subsp. *hygroscopicus* bearing the number ISP 5276 and provide no information as to the source of the strain. DSM 40276 appears to have been deposited by E. B. Shirling, ISP, who obtained it from G. F. Gause, INA. While the actinomycete collection of the DSMZ (at the time DSM) was in Darmstadt (until 1988) members of the genus *Streptomyces* were given 40xxx numbers, those strains with ISP numbers were pre-fixed with 40 and the last 3 digits of the ISP number retained, i.e. ISP 5276 became DSM 40276 (R. M. Kroppenstedt, personal communication).

Although the 16S rRNA gene sequence of ISP 5276 investigated by Kumar & Goodfellow (2008) is deposited as EF408737 and this sequence supports the arguments of Kumar & Goodfellow (2008) it is not identical to the sequences of *S. nigrescens* CGMCC 4.1410 (HQ244445), *S. nigrescens* NRRL B-12176 (DQ442530) and *S. nigrescens* NBRC 12894 (AB184225), all of which are derived from ISP 5276, a designation of the type strain of *S. nigrescens* (Sveshnikova 1957) Pridham *et al*. 1958. It should be noted that *S. nigrescens* NRRL B-12176 (DQ442530) is

The GenBank/EMBL/DDBJ accession number for the 16S rRNA gene sequence of *Streptomyces nigrescens* DSM 40276 is HG794417.
assigned to clade 70 while S. ruanii ISP 5276 (EF408737) is assigned to clade 75 in the work of Labeda et al. (2012), but the strain history of NRRL B-12176 indicates that it is also ISP 5276 and this is one of the strain designations associated with the (co)-type strains of S. nigrescens (Sveshnikova 1957) Pridham et al. 1958 deposited worldwide in different collections.

This raises a number of issues:

1) The identity of the strain studied by Kumar & Goodfellow (2008), which is clearly not identical to other derivatives of strain ISP 5276 held in a number of culture collections, remains to be documented. It is also peculiar that this strain bore the name Streptomyces hygroscopicus subsp. hygroscopicus.

2) The ISP number of the type strain of Streptomyces hygroscopicus subsp. hygroscopicus appears to be ISP 5578 and there is always the possibility that the number ISP 5578 has been incorrectly transcribed as ISP 5276. However, this would still indicate that the strain studied by Kumar & Goodfellow (2008) is neither a type strain of Streptomyces hygroscopicus subsp. hygroscopicus nor is it an authentic representative of ISP 5276.

3) There is no evidence that the strain (ISP 5276) studied by Kumar & Goodfellow (2008) was deposited by them in the DSMZ. DSM 40276 first appears in the 1977 printed version of the DSM Catalogue of Strains (Deutsche Sammlung von Mikroorganismen, 1977). This would imply that if the strain studied by them was not obtained from any of the collections or subsequently deposited, then no type strain is available in any collection that represents S. ruanii Kumar and Goodfellow 2008.

4) In designating DSM 40276 as the type of S. ruanii Kumar and Goodfellow 2008, for which there is no direct evidence that this strain is either the source of or identical with the strain studied by Kumar & Goodfellow (2008), they have selected a strain that is also the designated type of S. nigrescens. In the absence of any data to the contrary that DSM 40276 is misidentified, the selection of one of the (co)-type strains of S. nigrescens as the type of S. ruanii Kumar and Goodfellow 2008 is dealt with by Rule 51b:

**Rule 51b**

Among the reasons for which a name may be illegitimate are the following.

2) If the author did not adopt for a binary or ternary combination the earliest legitimate generic name, specific epithet or subspecific epithet available for the taxon with its particular circumscription, position and rank.

In other words, in the absence of any data to the contrary, DSM 40276 is a strain that bears the name S. nigrescens and the attempt to change that name to S. ruanii Kumar and Goodfellow 2008 creates an illegitimate combination.

5) The determination of the 16S rRNA gene sequence of DSM 40276 (HG794417) and comparison against the sequences HQ244445 (S. nigrescens CGMCC 4.1410), DQ442530 (S. nigrescens NRRL B-12176), AB184225 (S. nigrescens NRBC 12894) and EF408737 (S. ruanii ISP 5276) indicated that the 16S rRNA gene sequence of DSM 40276 corresponded with that of the S. nigrescens sequences and is clearly not a strain of S. ruanii (C. Spörrer & J. Swiderski, personal communication).

Although the data presented by Kumar & Goodfellow (2008) indicate that a novel species has been discovered there is no evidence that a strain representing this species was ever deposited in a culture collection, a requirement of Rules 27 (3) and 30 of the Code for valid publication. Based on the information presented here the name S. ruanii Kumar and Goodfellow 2008 is, in the absence of deposits of the type strain in two collections in two different countries, clearly not validly published. In addition, the attempt to use the strain designations associated with the type strain of S. nigrescens as the type of S. ruanii Kumar and Goodfellow 2008 creates an illegitimate combination. While it is possible that the strain designated S. ruanii by Kumar and Goodfellow 2008 may indeed belong to a novel species this needs to be documented by the deposit of the type strain used in that publication in two collections in two different countries as well as clearly indicating the history of the strain in question which is clearly not identical to ISP 5276. Once the link is broken with strain ISP 5276 and DSM 40276 there would be no obstacle to the use of the combination S. ruanii, but date of valid publication and authorship would have to then be associated with a future publication that properly documents the deposit of authentic type material as laid down by the current Code. The link between ISP 5276 and DSM 40276 as the type of both species names S. ruanii by Kumar and Goodfellow 2008 and S. nigrescens (Sveshnikova 1957) Pridham et al. 1958 also causes problems in databases that automatically gather data and do not search for such erroneous cross-linking.

**ACKNOWLEDGEMENTS**

I would like to thank Dr Reiner M. Kroppenstedt for information on the accession of strains to the DSM(Z) during the early years of the collection and to Dr Cathrin Spörrer and Jolanda Swiderski (DSMZ) for providing access to and evaluation of the 16S rRNA gene sequence of DSM 40276. The author is employed by an organization that commercially offers both taxonomic services as well as biological material to the scientific community. This may be perceived as a potential conflict of interest.

**REFERENCES**


http://ijs.sgmjournals.org
Kumar, Y. & Goodfellow, M. (2008). Five new members of the *Streptomyces violaceusniger* 16S rRNA gene clade: *Streptomyces castelarensis* sp. nov., comb. nov., *Streptomyces himastatinicus* sp. nov., *Streptomyces mordarskii* sp. nov., *Streptomyces rapamycinicus* sp. nov. and *Streptomyces ruanii* sp. nov. *Int J Syst Evol Microbiol* 58, 1369–1378.

