

The New Bacterial Nomenclature—What to Do

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ABSTRACT

The effects on plant pathology of the new "International code of nomenclature of bacteria" and the "Approved lists of bacterial names" are discussed. The use of pathovar nomenclature and the "International standards for naming pathovars of phytopathogenic bacteria" and a "List

of pathovar names and pathotype strains" is also considered. The correct way to publish a new species or combination and a new pathovar is described.

General

The "International code of nomenclature of bacteria" governs the names of bacteria down to subspecies but not below that level. The latest revision of the international code (Lapage et al., 1975) included some important changes which affected the acceptability of old names and the publication of new ones. These new rules have been in force since 1 January 1980 and must be followed if one wishes to use or to propose names that are internationally acceptable.

The position with old names has been greatly simplified. If the name was published before 1 January 1980, it is now valid only if it appears in the "Approved lists of bacterial names" (Skerman et al., 1980). This means that hundreds of superfluous old names can be ignored and that searching in old literature in order to establish priority is no longer necessary. One needs only to look back as far as the approved lists, i.e., 1980.

Since 1975 new names have been valid only from the time of publication in the *International Journal of Systematic Bacteriology*. Such publication can be made either by publishing the full description in that journal or by publishing the full description in another scientific journal and having the name included in one of the lists that are periodically published in the *International Journal of Systematic Bacteriology* in order to validate names published elsewhere. In the latter case priority dates from publication in the list not the original description.

When the approved lists were drawn up rigorous selection was made and many species reported to be pathogenic to plants were not accepted. Some were not accepted because of poor descriptions or absence of suitable type cultures, but others were well known and distinct plant pathogens that were too similar to warrant separation into different species. Most of the names in this latter category were nomenclatures of the *Xanthomonas campestris* and *Pseudomonas syringae* groups, which were considered to belong to the species *Xanthomonas campestris* (Pammel) Dowson and *Pseudomonas syringae* van Hall, respectively. Plant pathologists, however, still needed names for these organisms and so a nomenclature was devised using the taxon of pathovar (Young et al., 1978).

A pathovar is a taxon below the level of subspecies that is distinguished from other organisms belonging to the same species or subspecies mainly by characteristics of pathogenicity. These differences in pathogenicity can be in symptoms or in host range. Pathovars may also differ in other characteristics as well as pathogenicity but such differences must be of minor importance, otherwise there would be grounds for separation at subspecies or even species level.

No other system of nomenclature satisfactory for the use of plant pathologists was proposed and the pathovar system has been accepted. In 1980 the Committee on Taxonomy of Phytopathogenic Bacteria of the International Society for Plant Pathology published a list of acceptable pathovars together with their pathotype strains (reference cultures), often referred to as the ISPP list (Dye et al., 1980). As pathovars are below the level of subspecies and are not, therefore, governed by the international code, a set of standards for the naming of pathovars was drawn up by the Committee and published with the ISPP list. The standards, modelled closely on the international code, must be followed if one wishes to propose a new pathovar that is internationally acceptable. Plant pathologists, therefore, have two sets of instructions to follow: the international code for taxa down to subspecies, and the standards for pathovars.

The approved lists and the ISPP list contain currently accepted names arranged alphabetically with full author citations and the culture collection reference numbers of the type or pathotype cultures. They are therefore convenient for looking up currently accepted names of bacterial species, subspecies and pathovars. They do not, however, give old names and synonyms with their currently accepted equivalents. As a result of the major changes in nomenclature the literature concerned with plant pathogenic bacteria is full of old names and synonyms that will not be found in these lists. To find the currently accepted name for such a synonym, or an explanation of why a name has been dropped, one should consult the "Guide to plant pathogenic bacteria" which is about to be published (Bradbury, 1984).

Publishing the Name of a New Organism

First one must be sure that the organism is sufficiently distinct

from other bacteria already named to warrant naming it as a new species, subspecies or pathovar. Taxonomic reference manuals such as "Bergey's Manual of Determinative Bacteriology" (Buchanan and Gibbons, 1974) should be consulted to discover the names of any similar organisms. If a closely similar species or subspecies is found it should be looked up in the approved lists. If it appears, the type culture will be listed and the reference to a description of the organism given. Comparisons should then be made to find out whether the newly isolated organism is indeed unique. A similar search must be made in the *International Journal of Systematic Bacteriology* from 1980 onwards to determine whether the organism has been described and named since the publication of the approved lists. If the organism is found to be distinct after this searching there is justification for naming it as a new species or subspecies. If, on the other hand, the organism shows identical or very similar laboratory characteristics to a named species or subspecies, it should probably be regarded as synonymous with it.

Such an organism may, however, show unusual pathogenicity. In this case the ISPP list should be consulted to determine whether the organism might belong to one of the accepted pathovars of the species. Comparisons should be made with pathovars belonging to the same species and especially those that are pathogenic to the same or related host plants. If the organism shows a different host range, or if it consistently produces different symptoms under identical conditions, there is justification for naming it as a new pathovar.

If the organism is to be named as a distinct species or subspecies, the international code (Lapage et al., 1975) should be consulted as its rules and recommendations must be followed. A suitable latin specific or subspecific epithet must be chosen. This should not duplicate a name already used in the approved lists (Skerman et al., 1980) or in the ISPP list (Dye et al., 1980), nor should it duplicate a name that has been validly published since 1980. The publication of the new name should be in the most suitable scientific journal so as to reach the maximum number of interested scientists. It should include a full and detailed description and also the culture collection reference numbers of the type culture. Finally, if publication is not in the *International Journal of Systematic Bacteriology*, the author must send notification of the new species to the editor of that journal, preferably enclosing a reprint of the

publication.

If the organism is to be named as a pathovar, the "International standards for naming pathovars of phytopathogenic bacteria" (Dye et al., 1980) should be consulted and its standards followed. Again it will be necessary to choose a suitable epithet that does not duplicate a name already used in the approved lists or the ISPP list, or one that has been validly published since 1980. Publication should be in the most suitable scientific journal to reach as many scientists who might be interested as possible and should include a full description and culture collection reference numbers of the pathotype culture. It is not necessary to notify the editor of the *International Journal of Systematic Bacteriology* about publication of a new pathovar, but it is a good idea to notify the Committee on Taxonomy of Phytopathogenic Bacteria of the International Society for Plant Pathology. It has been proposed that the Committee should publish lists of acceptable new pathovars occasionally.

References

- BRADBURY, J. F. (1984). Guide to plant pathogenic bacteria. Commonwealth Mycological Institute, Kew, Surrey, UK. (in press)
- BUCHANAN, R. E. and GIBBONS, N. E. (Eds) (1974). *Bergey's Manual of Determinative Bacteriology*. (Eighth edition.) The Williams and Wilkins Co., Baltimore, USA. 1268 pp.
- DYE, D. W., BRADBURY, J. F., GOTO, M., HAYWARD, A. C., LELLIOTT, R. A. and SCHROTH, M. N. (1980). International standards for naming pathovars of phytopathogenic bacteria and a list of pathovar names and pathotype strains. *Review of Plant Pathology* 59(4): 153-168. (Available as a separate paper, priced £1.30 from CMI, Kew, UK.)
- LAPAGE, S. P., SNEATH, P. H. A., LESSEL, E. F., SKERMAN, V. B. D., SEELIGER, H. P. R. and CLARK, W. A. (1975). International code of nomenclature of bacteria. 1976 Revision. American Society for Microbiology, Washington, DC, USA. 180 pp.
- SKERMAN, V. B. D., MCGOWAN, V., and SNEATH, P. H. A. (Eds) (1980). Approved lists of bacterial names. *International Journal of Systematic Bacteriology* 30(1):225-420. (Also available in covers from the American Society for Microbiology, Washington, DC, USA.)
- YOUNG, J. M., DYE, D. W., BRADBURY, J. F., PANAGOPOULOS, C. G. and ROBBS, C. F. (1978). A proposed nomenclature and classification for plant pathogenic bacteria. *New Zealand Journal of Agricultural Research* 21(1):153-177.