

Tailoring fungal nomenclature to suit user needs

DAVID L. HAWKSWORTH

International Mycological Institute,
Bakeham Lane, Egham, Surrey TW20 9TY, UK

Hawksworth D. L. (1995): Tailoring fungal nomenclature to suit user needs. – Czech Mycol. 48: 3–10

The nomenclature of fungi is controlled by the International Code of Botanical Nomenclature, revised at intervals of six years. The latest revision by the XV International Botanical Congress in Tokyo in 1993 signalled a major shift in botanical nomenclature towards increased pragmatism. The "top-ten" changes relevant to mycologists are summarized, and attention is drawn to a resolution of the Congress urging taxonomists to refrain from name changes for non-scientific reasons. Discussions have also been taking place between representatives of the Codes or Rules regulating the names of other organisms with a view to increasing harmonization between their practices and the eventual production of a single Code. Significant common ground has been established and the formation of an International Commission on Bionomenclature has been proposed. The pressure for change comes from both the generators and the users of names, and has targets which if realized will be of benefit to both groups.

Key words: Bionomenclature, code, harmonization, names, nomenclature, taxonomy.

Hawksworth D. L. (1995): Přizpůsobení nomenklatury hub potřebám uživatelů. – Czech Mycol. 48: 3–10

Nomenklatura hub je řízena Mezinárodním kódem botanické nomenklatury, který je upravován každých šest let. Poslední revize přijatá Patnáctým mezinárodním botanickým kongresem v Tokiu 1993 signalizovala velký obrat v botanické nomenklatuře směrem k narůstajícímu pragmatismu. Je zde nastíněno stručně deset nejdůležitějších změn, vztahujících se na mykologii a upozorňuje na resoluci Kongresu vybízející taxonomy, aby upustili od změn jmen z mimovědeckých důvodů. Probíhala též jednání se zástupci autorů kódů nebo pravidel regulujících jména ostatních organismů, s vyhlídkou na sladění jejich uplatňování a na případné vytvoření jednotného kódu pro všechny organismy. Významný společný základ byl vytvořen a bylo navrženo zřídit Mezinárodní komisi pro bionomenklaturu. Tlak na navržené změny přichází jak ze strany tvůrců tak i ze strany uživatelů jmen a směřuje k cílům, které kdyby byly uskutečněny, byly by k užítku obou skupin.

INTRODUCTION

The subject of nomenclature is not something which excites the active mycologist. Rather, it is perceived as an unavoidable and too often also a laborious chore by the systematist, and as a cause of irritation by mycologists in general who view name changes as a way of obfuscating communication.

The situation has been aptly summarized by Weresub (1970: 788): "... botanists cherish labyrinthine convolutions of thought and claim the right to burden the future with tortuous mazes".

In the last 6-7 years in particular, the realization that the *status quo* is unsatisfactory to both the generators and users of scientific names has become

widely recognized. Here I wish to draw attention both to some significant changes which have already taken place, and also to new directions currently being pursued. As these changes are already affecting the working practices of systematic mycologists, and will increasingly do so in the future, it is important that they are broadcast widely and fully debated at this time.

BACKGROUND

The nomenclature of fungi (including yeasts and lichen-forming fungi) is covered by the International Code of Botanical Nomenclature (ICBN). This is revised at six-year intervals by each International Botanical Congress, the most recent being the XVth held in Yokohama, Japan, in August-September 1993 (Greuter *et al.* 1994a).

Proposals to change the way in which the Code operates must first be published in *Taxon*, the official journal of the International Association for Plant Taxonomy (IAPT). These are compiled prior to each Congress and issued together with comments (Greuter and McNeill 1993). A mail ballot of IAPT individual members and those making proposals is conducted, and made available to those present at the Nomenclature Section of the Congress (McNeill 1994).

At the Nomenclature Section, the proposals are debated and the often impassioned debates taped for subsequent transcription and publication (Greuter *et al.* 1994b). Individual botanists registered for the Congress and also institutions which are represented all have votes, the number given to an institution being decided in advance by an IAPT committee. A 60 % majority is required for a proposal to be accepted. Most decisions are effective immediately, although the new Code is not now issued until 10-12 months after the Congress. An Editorial Committee appointed by the Congress decides the final arrangement and in some cases wordings when charged so to do by the Congress.

The Code is now officially published only in English, but translations in French, German, Japanese, and Russian were prepared and authorized by the IAPT after the Berlin Congress in 1987.

The objective of the Code is to promote stability in the names applied to a taxon in a particular taxonomic position and rank. I.e. it does not dictate or impede changes in names for scientific reasons. The reality is rather different. The way the Code now operates repeatedly leads to name changes for nomenclatural rather than scientific reasons. These changes can be due to either the application of the rules themselves or to changes in the rules.

The 1993 Congress was confronted by 320 proposals to change the rules. In the 127 years since the first Code was issued in 1867 (De Candolle 1867), even stable rules have not been attained.

This has become a major cause for concern amongst the users of names and increasingly of taxonomists. Indeed it gives taxonomists a negative and irritating

image and engenders a reluctance to take up name changes generally, and even where they represent new scientific insights.

The International Union of Biological Sciences (IUBS), to which the IAPT and International Botanical Congresses are affiliated, has become increasingly anxious about this situation. IUBS was one of the main sponsors of a meeting held at Kew in 1991 to openly debate various ways of reducing name changes for non-scientific reasons (Hawksworth 1991). Many of the fundamental proposals considered at the Tokyo Congress in 1993 were formulated at that meeting.

CHANGES AT THE TOKYO CONGRESS 1993

It was auspicious that the close of the Nomenclature Session of the Tokyo Congress coincided with a typhoon. The net effect of a raft of proposals which received the necessary majority was a shift towards pragmatism, and has been perceived as placing botanists "on the threshold to a new nomenclature" (Greuter and Nicolson 1993: 925).

The new edition of the Code must be consulted for the numerous changes enacted at this Congress (Greuter *et al.* 1994a). My "TOP TEN" selection of those changes which will impact most on mycologists are summarized in Table 1, and fuller information about these is provided by Greuter and Nicolson (1993), Hawksworth (1993), and Nicolson and Greuter (1994).

The net effect of this suite of changes is that it is now possible to avoid name changes for non-scientific reasons in almost all ranks, although this appears to have come as rather a shock to at least one participant at the Tokyo Congress (Brummitt 1994).

Especially important and symptomatic of the changed attitude was an all-Congress Resolution which: "urges ... taxonomists, while such work continues, to avoid displacing well established names for purely nomenclatural reasons, whether by change in their application or by resurrection of long-forgotten names; ...". This is a clear instruction from the body from which the Code derives its authority, and one which transcends the Code itself. It does not mean that the Code should not be followed, but rather that the full power of the new possibilities should be tried first. If they have not, making changes for non-scientific reasons should be delayed until at least the next International Botanical Congress to be held in St Louis in 1999.

The type of statement which will increasingly be seen in the work of responsible taxonomists is exemplified by that of Vitikainen (1994: 217) who did not take up an earlier name for *Peltigera laciniata* as "Its adoption would... be a disadvantageous nomenclatural change, and a proposal to include it [*i.e.* the earlier name] in the list of nomina rejicienda will accordingly be made elsewhere".

The President of IUBS wrote to its national and scientific members in March 1994 to request them to alert systematists, editors and referees to this changed position – to discourage them from accepting papers proposing name changes for non-scientific reasons. In order to enhance the standing of our subject, it is important that all taxonomists take due note and act accordingly in response to this dramatically changed situation.

NAMES IN CURRENT USE

One important series of proposals submitted to the Congress, but which did not receive the requisite majority, was the provision to grant a protected status to Lists of Names in Current Use (NCUs). It had been proposed that names on suitably checked lists would be protected against earlier unlisted names and homonyms, with spellings, places of publication, dates, and types as listed.

Three Lists has been prepared for consideration by the Tokyo Congress (Greuter *et al.* 1993a, b, c), that on generic names (Greuter *et al.* 1993a) being especially significant in covering 28 041 names and having received input from 219 taxonomists, and in being prepared and published in only five years.

While the NCU proposals failed by a whisker, gaining 55 and not the required 60% of the vote at the Nomenclature Section, the Congress did agree to establish a Permanent Committee on NCUs with a mandate “to initiate, assist, coordinate and vet the production of lists and updatings of the existing lists of NCU”.

However, sympathy for the concept of adopting well-researched lists was evidenced by a special resolution on the list of species and varietal names within one family, the *Trichocomaceae* (which includes *Aspergillus* and *Penicillium* anamorphs; Greuter *et al.*, 1993c): the “Nomenclature Section, noting that the List of Names in Current use for the *Trichocomaceae*, which has already been approved by the International Commission on *Penicillium* and *Aspergillus* of IUMS, urges taxonomists not to adopt names that will compete with or change the application of any names on that List”.

With this precedent established, it is anticipated that further well-researched lists and internationally mandated lists produced before and submitted the 1999 Congress are also likely to be the subject of special resolutions.

HARMONIZATION BETWEEN CODES OF NOMENCLATURE

Biological nomenclature as a whole is under greater scrutiny than at any time in its history, and the five different internationally mandated Codes or Rules have common problems to confront; apart from botany (Greuter *et al.* 1994), these are concerned with bacteria (Sneath 1992), cultivated plants (Brickell *et al.* 1980),

viruses (Francki *et al.* 1990, Mayo 1994), and zoology (International Commission on Zoological Nomenclature 1985).

The International Union of Microbiological Societies (IUMS) and IUBS sponsored an inter-code Exploratory Meeting on "Harmonization between Codes of Nomenclature" with 2-3 representatives of each Code in March 1994. The need to work towards increased harmonization, and to a unified Biological Code was embraced for the first time. Common ground was identified, and different practices were discussed in depth.

Highlights amongst the conclusions of this Exploratory Meeting are summarized in Table 2. A full account of the pioneering discussions held on that occasion is provided in Hawksworth *et al.* (1994). In the event that the proposed International Commission on Bionomenclature is established, significant developments towards a more effective system for the nomenclature of all organisms can be anticipated, so that appropriate proposals can be developed and submitted to the International Botanical Congress in 1999.

Attention is also drawn to a draft glossary of official and unofficial terms used in bionomenclature developed from one of the background documents prepared for the Exploratory Meeting (Hawksworth 1994a).

WHY THE DIRECTION HAS CHANGED

The drive for change comes from both the generators and the users of names. The generators of taxonomies need to be freed from as much nomenclatural drudgery as possible. A poll in 1991 indicated that this was on average about 20 % of the research time available (Hawksworth 1992). In the case of mycology, this is critical in the light of our level of ignorance and the limited and declining taxonomic workforce. There is a need to concentrate on the 95 % or so unknown fungi and not continually rework the "known" 5 %.

The user community has become irritated with the numbers of name changes for reasons they do not understand. In the case of *Aspergillus* and *Penicillium*, 38% (41 of 205) and 53% (73 of 150) respectively of names used in previous monographs were not used in the more recent (Hawksworth 1994b).

The result is that such work is often ignored, as indicated by the take-up of names in the *Biological Abstracts* (BIOSIS) database (Hawksworth 1992, 1994b). For example, the change in name from *Aspergillus nidulans* to *A. nidulellus* has for all practical purposes been ignored (1 usage out of 1026 since 1985), as has that of *Podospora anserina* to *P. pauciseta* (2 usages out of 318 since 1970). Even after over 20 years, *Cephalosporium acremonium* still predominates over *Acremonium chrysogenum* and *A. strictum* in use (337 out of 449 usages since 1970). Changes in names which reflect advances in science, and which add to the predictive value and utility of names, should be enthusiastically embraced by users, yet they are

Tab. 1 – A “TOP TEN” of changes to the International Code of Botanical Nomenclature pertinent to mycologists in adopted at the International Botanical Congress in 1993

-
- 1 Rejection of names extended to any name that could cause a disadvantageous change.
 - 2 Conservation of species names without restriction.
 - 3 Metabolically inactive cultures accepted as types.
 - 4 The ability to designate an “epitype” when the original material is not diagnostic
 - 5 Establishment of a list of “suppressed works” not to be used as a source of names.
 - 6 Registration of names to be a condition of valid publication from 2000.
 - 7 “Phylum” approved as an acceptable alternative to “Division”.
 - 8 Clarification that taxa traditionally treated in the Botanical Code remain covered even if now referred to other kingdoms.
 - 9 The word “in” not to be used as a part of author citations.
 - 10 The “Committee for Fungi and Lichens” renamed as the Committee for Fungi“.
-

Tab. 2 – Highlights from the IUBS/IUMS Exploratory Meeting on Inter-code Harmonization 1994 (Hawksworth *et al.* 1994)

-
- 1 To work towards a unified system of biological nomenclature.
 - 2 There is considerable scope for harmonization, even though differences in procedures could not be fully reconciled for the nomenclature of the past.
 - 3 The availability of lists of published names, and the registration of new names, will facilitate the harmonization of procedures.
 - 4 Author citations should be made optional (and be recommended only in a strictly taxonomic context).
 - 5 The nomenclatural problems posed by ambiregnal organisms, can be accommodated by modifications to the existing Codes.
 - 6 Authors of new generic names should avoid proposing a name established under another Code, and provisions be introduced into each Code to disallow new generic names that are junior homonyms under any Code.
 - 7 The use of different type faces for scientific names in all ranks is desirable.
 - 8 A unified *Glossary of Terms Used in Bionomenclature* to be produced.
 - 9 An IUBS/IUMS *Commission on Bionomenclature* to be established.
-

being ignored along with the research that provided the basis for those changes in classification. The baby is being thrown out with the bathwater.

FUTURE PROSPECTS

I find it remarkable that so much progress has been made towards making nomenclature a pragmatic servant of science, rather than a historical and pseudolegalistic endeavour, in so short a time. The issue only started to be raised in earnest in 1987, prior to the XIV International Botanical Congress held in Berlin.

Well-established changes in working practices are never easy to accept, but if the benefits are sufficient, we should not be deterred and "grasp the nettle". The key benefits being targeted are:

- (1) An increasingly unified approach to nomenclature across all biology.
- (2) A reduction in the nomenclatural burden of biosystematists to an acceptable level.
- (3) A reduction in name changes for non-scientific reasons.
- (4) A rise in the standing of biosystematics within biology.

I believe these four targets are well-worth aiming at. We may not score bulls-eyes first time, and any new procedures require very full debates before implementation. However, we can be certain that if no arrows are fired, no target will be hit.

A c k n o w l e d g e m e n t s

I am indebted to Drs J. I. Pitt and O. Fassatiová for inviting me to contribute to the symposium on "Trends in Fungal Taxonomy and Nomenclature" on the occasion of the IUMS Division of Mycology's Congress in Prague on 4 July 1994. This article is based on the presentation given on that day.

REFERENCES

- BRICKELL C. D., VOSS E. G., KELLY A. F., SCHNEIDER F. and RICHENS R. H. (eds) (1980): *International Code of Nomenclature of Cultivated Plants*. [Regnum vegetabile No. 36.] - Utrecht: Bohn, Schlechtema and Holkema.
- BRUMMITT R. K. (1994): What did we think we were voting for at Tokyo? - *The Linnean* 10(2): 13-15.
- DE CANDOLLE A. P. (1867): *Lois de la Nomenclature Botanique*. - Paris: Masson.
- FRANCKI R. I. B., FAUQUET C. M., KNUDSON D. L. and BROWN F. (1990): Classification and nomenclature of viruses. - *Archives of Virology, Supplement* 2: 1-445.
- GREUTER W., BARRIE F., BURDET H. M., CHALONER W. G., DEMOULIN V., HAWKSWORTH D. L., JØRGENSEN P. M., NICOLSON D. H., SILVA P. C., TREHANE P. and MCNEILL J. (eds) (1994a): *International Code of Botanical Nomenclature (Tokyo Code)*. [Regnum Vegetabile No. 131.] - Königstein: Koeltz Scientific Books.
- GREUTER W., BRUMMITT R. K., FARR E., KILIAN N., KIRK P. M. and SILVA P. C. (1993a): NCU-3 Names in Current Use for Extant Plant Genera. [Regnum vegetabile No. 129.] - Königstein: Koeltz Scientific Books.

- GREUTER W., HOOGLAND R. D., REVEAL J. L., CROSBY M. J., GROLLE R., ZIJLSTRA G. and DAVID J. C. (1993b): NCU-1 Family Names in Current Use for Vascular Plants, Bryophytes, and Fungi. [Regnum Vegetabile No. 126.] – Königstein: Koeltz Scientific Books.
- GREUTER W., MCNEILL J. and BARRIE F. R. (1994b): Report on botanical nomenclature – Yokohama 1993. – *Englera* 14: 1-265.
- GREUTER W., MCNEILL J. (1993): Synopsis of proposals on botanical nomenclature – Tokyo 1993. A review of the proposals concerning the International Code of Botanical Nomenclature submitted to to XV International Botanical Congress. – *Taxon* 42: 191-271.
- GREUTER W. and NICOLSON D. H. (1993): On the threshold to a new nomenclature? – *Taxon* 42: 925-927.
- GREUTER W., PITT J. I., SAMSON R. A., AHTI T., FARJON A. and LANDOLT E. (1993b): NCU-2 Names in Current Use in the Families Trichocomaceae, Cladoniaceae, Pinaceae, and Lemnaceae. [Regnum vegetabile No. 128.] – Königstein: Koeltz Scientific Books.
- HAWKSWORTH D. L. (ed.) (1991): Improving the Stability of Names: Needs and Options. [Regnum vegetabile No. 123.] – Königstein: Koeltz Scientific Books.
- HAWKSWORTH D. L. (1992): The need for a more effective biological nomenclature for the 21st century. – *Bot. J. Linn. Soc.* 109: 543-567.
- HAWKSWORTH D. L. (1993): Name changes for purely nomenclatural reasons are now avoidable. – *Systema Ascomycetum* 12: 1-6.
- HAWKSWORTH D. L. (1994a): A Draft Glossary of Terms Used in Bionomenclature. In press. – Paris: International Union of Biological Sciences.
- HAWKSWORTH D. L. (1994b): Constraints to pest characterization caused by biological nomenclature. In: *The Identification and Characterization of Pest Organisms* (D.L. Hawksworth, ed.): 93-105. – Wallingford: CAB International.
- HAWKSWORTH D. L., MCNEILL J., SNEATH P. H. A., TREHANE R. P. and TUBBS P. K. (1994): Towards a Harmonized Bionomenclature for Life on Earth. [Biology International, Special Issue No. 30.] – Paris: International Union of Biological Sciences.
- INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE (1985): International Code of Zoological Nomenclature. 3rd edition. – London: International Trust for Zoological Nomenclature.
- MCNEILL J. (1993): Preliminary mail vote and report of Congress action on nomenclatural proposals. – *Taxon* 42: 907-924.
- MAYO M. A. (1994): Modifications to the rules for virus nomenclature. – *Archives of Virology*: in press.
- NICOLSON D. H. and GREUTER W. (1994): Guidelines for proposals to conserve or reject names. – *Taxon* 43: 109-112.
- SNEATH P. H. A. (ed.) (1992) International Code of Nomenclature of Bacteria, 1990 Revision. – Washington, D.C.: American Society for Microbiology.
- VITIKAINEN O. (1994): Notes of some Peltigera of the neotropics. – *Acta Bot. Fenn.* 150: 217-221.
- WERESUB L. K. (1970): Automatic tautonyms: zoological vs. botanical code. – *Taxon* 19: 787-788.