

The Mycological Society of Japan and the Melbourne *Code*

The Mycological Society of Japan (MSJ) held two meetings in 2012, related to the Melbourne *Code*, the *International Code of Nomenclature for algae, fungi and plants* (ICN). The *Code* took effect from 30 July 2011, with some provisions operative from

either 1 January 2012 or 1 January 2013. These meetings were: (1) the “Symposium on Nomenclatural Change” held during the 56th annual meeting of the MSJ on 26 May in Gifu, Japan; and (2) the “Forum on the Future of Microbial Databases” held

on 28 May in Tokyo, and organized by the MSJ in collaboration with the Federation of Microbiological Societies of Japan and a number of other academic societies or associations. The programmes and speakers are shown in the accompanying two boxes.

Symposium on Nomenclatural Change

Mycologists have it easy. *Paul M. Kirk*, CABI Bioservices, UK.

The name that can be named is not the everlasting name - the new rules for the nomenclature of *Asco-* and *Basidiomycota* and their implications. *Roland Kirschner*, National Central University, Taiwan & *Walter Gams*, formerly CBS-KNAW Fungal Diversity Centre, The Netherlands.

One Fungus Which Name: report of the Amsterdam symposium (12-13 April 2012). *Robert A. Samson*, CBS-KNAW Fungal Diversity Centre, The Netherlands.

Impact of the current change of botanical nomenclature at the Melbourne Conference and a practical consideration on its application, especially related to alteration of the Article 59. *Takayuki Aoki*, National Institute of Agrobiological Sciences, Japan.

Forum on the Future of Microbial Databases

Fungal diversity and systematics projects derived from the Tree of Life. *Kentaro Hosaka*, National Museum of Nature and Science, Japan.

Transition of the use of microbial genome information and future perspective. *Natsuko Ichikawa*, National Institute of Technology and Evaluation, Japan.

Moving from a web of information to a web of data. *Paul M. Kirk*, CABI Bioservices, UK.

WDCM databases and biological databases in China. *Juncai Ma*, Institute of Microbiology, Chinese Academy of Sciences, China.

Mycobank an on-line database as a service to the mycological and scientific society. *Robert A. Samson*, CBS-KNAW Fungal Diversity Centre, The Netherlands.

MicrobeDB in National Bioscience Database Center project. *Hideaki Sugawara*, National Institute of Genetics, Japan.

Requirements for industrial microbial genome database. *Tatsunari Nishi*, Genaris, Inc., Japan.

As a leverage for research in industry; microbiological database and stock cultures. *Hideharu Anazawa*, Japan Bioindustry Association, Japan.

Together with the two meetings above, we report on the actions taken by the MSJ in relation to the latest nomenclatural changes (Hawksworth 2011, 2012, Knapp *et al.* 2011, McNeill *et al.* 2011, 2012). These are presented here as they may be found of value by other mycological societies considering actions they should take to comply with the new *Code*.

(1) Actions in publication of the MSJ official journals

The MSJ publishes two journals, *Mycoscience* (in English) and the *Japanese Journal of Mycology* (in Japanese). Important actions were taken by the Editorial Board for the effective publication of fungal names in

Mycoscience, but none are proposed for the *Japanese Journal of Mycology* as it is not expected to have nomenclatural novelties (though this cannot be ruled out). However, use of earlier sexual (teleomorphic) and asexual (anamorphic) names in the *Japanese Journal of Mycology* is also expected because the corresponding names are now treated as synonyms, irrespective of the morphs represented.

For *Mycoscience*, changes to requirements for effective publication relate to: (1) online publication, i.e. electronic distribution of articles in PDF format via the worldwide web (Arts 29–31, Recs 29A, 30A, and 31A); (2) deposition of key nomenclatural information in a recognized repository (Art. 37); and (3) acceptance of

a Latin or English diagnosis or description (Art. 36).

Online publication: For this to be considered effective, Art. 29 requires electronic distribution of papers in Portable Document Format (PDF) with an International Standard Serial Number (ISSN). Rec. 29A.1 recommends that the PDF complies with the PDF/A archival standard (ISO 19005). The PDF format for papers in *Mycoscience* volume 53 is available at the website (<http://www.springer.com/life+sciences/microbiology/journal/10267>; until 31 December 2012), and those of volume 54 at a new site (<http://www.sciencedirect.com/science/journal/13403540>; from 20 July 2012); these meet the PDF/A archival standard

(ISO 19005). Currently, the ISSN number does not appear in the PDF and the Board has requested the publisher (Elsevier Japan), to prominently show this on each PDF. Parallel to the PDF version, a Hypertext Markup Language (HTML) version is also available at the same site which has the online-publication date. *Mycoscience* is being published by Elsevier Japan from volume 54 (2013). All papers published in the printed version of volume 53 (2012) by Springer Japan were already becoming available on the MSJ/Springer Japan site from the end of May 2012.

Art. 29.4 does not permit any alteration in the content of a particular electronic publication after it is released, which is the date of effective publication. To meet this requirement, *Mycoscience* is to publish papers in the electronic version with the final volume number and pagination so that the electronically published PDF and the hard-copy version are exactly the same; i.e. adopting "Article Based Publication".

Rec. 29A.2 recommends the deposition of the online published materials in multiple trusted online digital repositories. Both Springer and Elsevier, as most major publishers, participate in CLOCKSS (Controlled Lot of Copies Save Stuff), a trusted community-governed archive, in which *Mycoscience* is now placed.

Art. 30.2 requires evidence associated with or within the publication that the publisher considers a particular version final; and Rec. 30A.1 recommends a clear indication that an electronically published version is final. "Article Based Publication" fulfills this requirement.

Deposition of key nomenclatural information: Under Art. 37, the deposition of key nomenclatural information in a recognized online repository becomes mandatory for valid publication of all new scientific names of fungi. The requirement to cite the protologue of an identifier issued from the repository where the nomenclatural information has been deposited becomes effective on 1 January 2013. The following repositories are currently operating, although at the time of writing none has been "recognized" by the Nomenclature Committee for Fungi (NCF) appointed by the Melbourne Congress: MycoBank (MB; <http://www.mycobank.org>), Index Fungorum (<http://www.indexfungorum.org/names/IndexFungorumRegister.htm>), and Fungal Name (<http://www.fungalinfo.net/fungalname/fungalname.html>) (Norvell

& Redhead 2012). The latter is built in Chinese, and the former two were created originally in English, but are now translated into several languages. The deposition of key nomenclatural information in MB and citation of that number is already required for papers in *Mycoscience*. This practice will continue, and the MSJ supports a Japanese translation of the interface.

Acceptance of either a Latin or an English diagnosis or description: An amended Art. 36 permitted the use of either English or Latin for the diagnosis or description on all new scientific names from 1 January 2012. *Mycoscience* recommends that authors write both an English diagnosis and a detailed English description for new fungal taxa, although the use of a Latin diagnosis is not rejected.

If a Latin or English diagnosis is provided, the description could then continue to be in any language of the author's choice. However, *Mycoscience* requires authors to use only English except for Latin diagnoses and citations of original writings (in quotation marks). In the *Japanese Journal of Mycology*, a taxonomic novelty with a Latin or English diagnosis and then a Japanese description would be possible, but that practice is not recommended to authors.

Practices at the MSJ Editorial Office: All submitted taxonomic papers are checked against the major changes made in the new *Code*. In particular, the amended Art. 59 does not allow the proposal of two or more names simultaneously for a single taxon. Since 1 May 2012, taxonomic papers proposing two or more names for different morphs of a new fungus have been sent back to authors, notifying them of the changes in the *Code*. In such cases, however, the Editorial Office neither judges nor suggests which of two or more names is correct or appropriate for a fungus under consideration.

A notice of the major changes in the new ICN is provided for authors at the following site: http://www.elsevier.com/framework_products/promis_misc/myc_Fungal_Nomenclature.pdf.

(2) Recent meetings in Japan with a focus on the *Code*

Based on the symposium held at the 56th MSJ meeting, together with the publication of Okada (2011), the MSJ has endeavoured to distribute the most recent information related to the current



Paul Kirk at MSJ.

rule changes, especially on Art. 59, with members who may work with pleomorphic fungi. At the symposium, the now unified fungal nomenclature system was explained by Paul Kirk and Roland Kirschner, respectively, from their own standpoints. Nomenclatural discussion from the One Fungus = Which Name? (1F=WN) symposium in Amsterdam was also reported on by Rob Samson, together with the proposals of the International Commission on *Penicillium* and *Aspergillus* (ICPA). Possible practical examples of procedures towards unification of sexual and asexual states were provided by Takayuki Aoki, with examples from *Fusarium* and related ascomycetes. In moving to the unification of names of pleomorphic fungi, priority of generic names and species epithets should be considered independently. When an asexually typified (anamorphic) generic name has priority by date over a sexually typified (teleomorphic) one, and the sexually typified epithet has priority by date over an asexually typified one, or *vice versa*, a recombination of the priorable specific epithet to the priorable generic name will be necessary. This process could result in many unfamiliar recombinations of generic and specific names. In order to minimize disruption, a democratic process is being initiated, in which active participation by all mycologists, whether users or generators of names, is encouraged. In due course, it is envisaged that lists of protected and suppressed names will be internationally

agreed. In the interim, enquiries should be made to the NCF or the International Commission on the Taxonomy of Fungi (ICTF) on doubtful or ambiguous cases and processes being put in place. The symposium participants saw this as a complicated situation which would be laborious and time-consuming, and a lively discussion on how to reach a unified nomenclature followed (see the below box).

At the Forum on the Future of Microbial Databases, Kentaro Hosaka overviewed projects since Deep Hypha, and

mentioned some DNA barcode projects in which he was involved. Natsuko Ichikawa introduced a new function of genome database created by NITE; information on secondary metabolite genes was being accumulated, which will be attractive to many working in applied areas. Paul Kirk stressed the importance of developing a Global Names Architecture in order to assemble all the mycological data in the world. Juncai Ma announced the transfer of WDCM/WFCC to Beijing. He intends to develop a user friendly catalogue of

fungi and microbes that member biological resource centers can distribute, so that one-stop ordering of strains will be possible. Rob Samson introduced a variety of useful functions being implemented in MycoBank, and Hideaki Sugawara a new project, MicrobialDB.Jp, for the virtual integration of microbial databases in Japan. A physical integration of heterogeneous databases is a considerable challenge, but Semantic Web Technologies will facilitate virtual integration and will be one of the future directions for numerous kinds of databases.

Major questions or comments on the procedures in the new *Code* from the two meetings

For the registration of new names, three different databases are expected to be recognized: Index Fungorum, MycoBank, and Fungal Name. Although each database is different in structure, the registration of names and their data release are planned to be synchronized in a minute (Norvell & Redhead 2012).

If an author describes a morph of a new taxon, a separate name of another morph of the same taxon cannot be adopted in that publication. Some saw this as a problem, but there was no obstacle to the use of informal names (e.g. acremonium-morph).

The 1F=1N process has just begun implementation, and will take a considerable time to work through all fungal organisms affected by 1F=WN. Anybody can participate in the particular working groups or committees now being established, or propose to start a new group.

A user, a geneticist who does not know much about taxonomy or nomenclature, wondered why the dual naming system had been abandoned.

Many scientists confuse taxonomic changes and nomenclatural changes. Nomenclatural change is one based on the requirements of the rules in the *Code*. It is, however, a major challenge to avoid the misapplication of names and to reach taxonomic consensus. All taxonomists need to cooperate closely in this.

Microbial genome datasets will be accelerated to increase; probably more than 1,000 per year. If metagenome data is counted, an enormous increase in the information available is expected.

(3) Expectations of concerned mycologists in Japan

As Rob Samson stated at the symposium, the 1F=1N process has just started and requires a great deal of collaborative work. The MSJ therefore encourages concerned mycologists in Japan to participate in this important mission. Anyone who is interested in a particular taxon is requested to contact Keith Seifert (Chair, ICTF) to either join an existing working group or committee, or initiate a new group (see the ICTF website; <http://www.fungaltaxonomy.org/subcommissions>).

Hawksworth DL (2011) A new dawn for the naming of fungi: impacts of decisions made in Melbourne in July 2011 on the future

publication and regulation of fungal names.

MycKeys 1: 7–20; *IMA Fungus* 2: 155–162.

Hawksworth DL (2012) Managing and coping with names of pleomorphic fungi in a period of transition. *IMA Fungus* 3: 15–24.

Knapp S, McNeil, J, Turland NJ (2011) Changes to publication requirements made at the XVIII International Botanical Congress in Melbourne — what does e-publication mean for you?

Taxon 60: 1498–1501.

McNeill J, Barrie FR, Buck WR, Demoulin V, Greuter W, Hawksworth DL, Herendeen PS, Knapp S, Marhold K, Prado J, Prud'homme van Reine WF, Smith GF, Wiersema JH, Turland NJ (eds) (2012) *International Code of Nomenclature for algae, fungi, and plants (Melbourne Code) adopted by the Eighteenth International Botanical Congress Melbourne, Australia, July 2011*. [Regnum Vegetabile no.

154.] Ruggell: A.R.G. Ganter Verlag.

McNeill J, Turland NJ, Monro A, Lepschi BJ (2011) XVIII International Botanical Congress: preliminary mail vote and report of Congress action on nomenclature proposals. *Taxon* 60: 1507–1520.

Norvell LL, Redhead SA (2012) Registries of names and the new *Code*. *IMA Fungus* 3: (2).

Okada G (2011) Unified nomenclature for anamorphic fungi or fungi with a pleomorphic life cycle adopted at the 18th International Botanical Congress (IBC2011, Melbourne). *Japanese Journal of Mycology* 52: 82–97. [in Japanese]

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COST Action FA1103: European scientists investigating endophytic microorganisms and fungi

As announced in *IMA Fungus* 3 (1): (7) (June 2012), this European Cooperation in Science and Technology (COST) programme aims to promote research into the exploitation of endophytic fungi and bacteria in biotechnology and agriculture. In large funding schemes related to “White Biotechnology” and “Bioeconomy”, these organisms are now being exploited not only as biocontrol agents, but as producers of fine chemicals, industrial enzymes, and even biofuel from plant waste (Stadler & Schulz 2009). However, there are still bottlenecks limiting the full exploitation of their potential, and insufficient knowledge of their ecology.

COST Action FA1103, “Endophytes in Biotechnology and Agriculture”¹, is now getting underway. The Action has so far been joined by 20 countries, and around 150 scientists from over 50 institutions are actively involved. Most have already contributed to the scientific programme, and the number of interested scientists is steadily increasing. The ratios of bacteriologists *vs.* mycologists, and applied *vs.* basic scientists, involved are about balanced. Indeed, several scientists and companies involved are dealing with both bacteria and fungi, and numerous active European research groups in basic and applied mycology and microbiology are represented.

The Action is divided into four thematic working groups (WG), which do, however, closely interact with one another: WG1 (Ecology of endophytes), WG2 (Identification of new competent endophytes), WG3 (Development of new microbial inocula), and WG4 (New industrial products in life sciences). One important goal will be to bring expertise in, for example, molecular ecology, taxonomy, and other fields of basic research, together with applied aspects, such as bioprospecting and biocontrol.

Even though the COST Action cannot provide direct funding for joint research activities, several joint projects, based on



Participants in the Reims COST workshop (March 2012).



Participants in the San Michele dell'Adige COST workshop (November 2012).

synergies and institutional budgets of the participating institutes and companies, have already been initiated. The meetings of the Action provide a fruitful atmosphere for discussions about future international grant applications on interdisciplinary themes that could eventually result in successful applications for calls by the European Commission.

Two well-attended workshops have already been held; in Reims (France) in March 2012) and San Michele dell' Adige near Trento (Italy) in November 2012. Members of the Action presented their scientific results in symposia and poster sessions at these workshops. International experts were invited to deliver keynote lectures, for example Linda Johnson (New Zealand) and T. S. Suryanarayanan (India) addressed the Trento meeting.

It is envisaged that members of the Action will co-organise some symposia at the conference “Endophytes for plant protection: the state of the art” in Berlin in May 2013. The German Society for Plant Protection and Plant Health (DPG) is to sponsor this meeting, which is also being promoted by IUBS (International Union of Biological Sciences). The topics the Working Group sessions will cover include one on the construction and design of a European database on endophytes. Furthermore, training schools are also planned, for instance on analyses of natural

products and statistical computing and graphics. A special issue of *Fungal Diversity*, covering the mycological parts of the Action is planned for publication during 2013. Complementary publications are also planned by participating bacteriologists, and participation in several important European and international conferences will follow. Outreach activities include an interview recently reported in *International Innovation Reports*.

Aside from networking, the Action particularly supports early stage researchers (ESR). Further, the programme also provides for “Short Term Scientific Missions” (STMS), during which ESR and other scientists will receive funding from COST to visit different European laboratories for up to three months for training in complementary disciplines or to conduct joint research; 8-10 such postings can be funded each year. The Action can also provide travel grants to enable highly qualified ESR to attend international scientific meetings.

An example of the kind of results to be expected from the joint investigations of bioprospectors and biodiversity experts is that of Bills *et al.* (2012). That study emphasised that culturing of apparently new phylogenetic lineages will be imperative not only to make them available for sustainable biotechnological exploitation, but also to elucidate life-cycles and ecological

¹For more information see: www.endophytes.eu (Action website), and http://www.cost.eu/domains_actions/fa/Actions/FA1103?parties (corresponding COST website).

interactions. In this respect, pure *in silico* mycology and microbial ecology, merely relying on PCR-based methods, should be discouraged.

In summary, this new COST Action provides a forum for the identification of bottlenecks limiting the use of endophytes in biotechnology and agriculture. It is anticipated that it will ultimately provide solutions for economically and ecologically compatible exploitation of these organisms within Europe and beyond. Non-European participants and European researchers from non-COST countries are invited

to participate in the Action, but will not be eligible for direct reimbursement from the Action budget. I trust that this report will alert mycologists to these new opportunities to fund networking activities and international collaborations. After all, the scope of the COST Actions may also be attractive for other interdisciplinary research fields involving mycological expertise. Indeed some actions targeting plant pathogenic fungi and chemical biology approaches are already under way. The next deadline for proposals will be in March 2013.

Bills GF, González-Menéndez V, Martín J, Platas G, Fournier J, Peršoh D, Stadler M (2012) *Hypoxyton pulicidum* sp. nov. (Ascomycota, Xylariales), a pantropical insecticide-producing endophyte. *PLoS ONE* 7(10): e46687; DOI:10.1371/journal.pone.0046687.

Stadler M, Schulz B (2009) High energy biofuel from endophytic fungi? *Trends in Plant Science* 14: 353-355

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