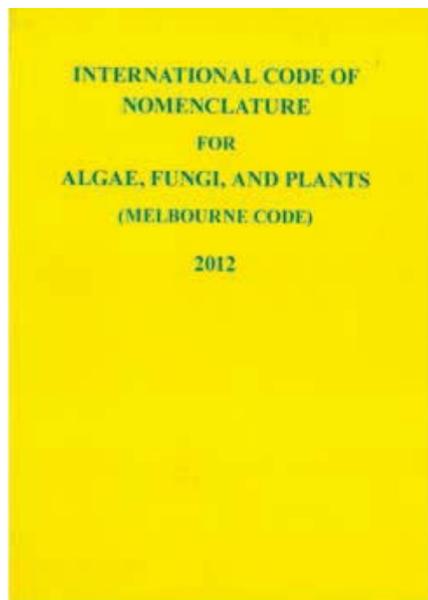


Mycologists' committees strongly support changes to the governance of fungal nomenclature



At the 10th International Mycological Congress (IMC10) in Edinburgh in 2010, 86 % of mycologists responding to a questionnaire favoured that the nomenclature of fungi should continue to be governed by the then *International Code of Botanical Nomenclature* provided that matters relating only to fungi were decided at International Mycological rather than International Botanical Congresses. A suggestion supported by 71 % was that the name of the *Code* be changed to make clear it covered fungi (Norvell *et al.* 2010). At the 18th International Botanical Congress (IBC XVIII) in Melbourne in 2011, mycologists were instrumental in getting the name of the *Code* changed to the *International Code of Nomenclature for algae, fungi, and plants* (McNeill *et al.* 2012), but the issue of governance was referred to a Special Subcommittee on Governance of the *Code* with Respect to Fungi, which was charged with reporting to the next IBC to be held in Shenzhen, China, in July 2017. In the interim, 93.6 % (104:7:6) of those responding to a questionnaire distributed at IMC11 in Bangkok in 2014 agreed that decisions relating to fungal nomenclature should be voted at IMCs and not IBCs (Redhead *et al.* 2014). In line with these sentiments, a detailed and carefully

considered set of proposals was published by the Subcommittee (May *et al.* 2016) and these are now to be voted on in Shenzhen. Essentially, the proposals replicate procedures for altering the *Code* already in place at the Nomenclature Section of an IBC at a proposed formal “Nomenclature Session” of an IMC, charged with dealing with matters in the *Code* solely related to fungi. The recommendations of the Special Subcommittee were supported by 80 % of the Subcommittee membership and also endorsed by the International Mycological Association (May 2016).

Proposals made to an upcoming IBC are considered by the General Committee on Nomenclature (GC) appointed by the previous IBC, commented on by the Rapporteurs for the Congress, and a guiding mail vote is requested. Only individual members of the International Association for Plant Taxonomy (IAPT), members of Committees appointed by IBCs (e.g. the Nomenclature Committee for Fungi, NCF), and those who had made formal proposals are allowed to participate in the mail vote.

The International Commission on the Taxonomy of Fungi (ICTF) was pleased to note that the NCF had supported the proposals of the Subcommittee (11:5:2¹), but disappointed that the GC had voted against them (8:14:3) (Turland & Wiersema 2017). The results of the mail vote are expected to be reported in the June issue of *Taxon*. Given the extremely strong support among the mycological community for changes to the governance of fungal nomenclature, mycologists expect that the proposals from the Special Subcommittee will be considered with due care and respect at the Shenzhen Nomenclature Section — emphasising to the Section that the “fungi governance” proposals relate only to matters specific to fungi. Notwithstanding the expectation of a positive outcome for fungi governance at Shenzhen, following a telephone conference on 6 March 2017, the ICTF considered it prudent for mycologists to start to consider how to respond either to the proposals being accepted; rejected; or referred to another Special Committee. Special Committees established at an IBC report to the next IBC, which in this case

would be in 2023 – and with no assurance that any proposals made would be accepted at the next IBC.

The ICTF therefore established an *ad hoc* Working Group to consider the various options. The Working Group comprised interested members of the Commission, with the addition of several other mycologists: Lei Cai (China), Pedro W. Crous (The Netherlands), Z. Wilhelm De Beer (South Africa), David L. Hawksworth (UK, Convenor), Kevin D. Hyde (Thailand), Paul M. Kirk (UK), Robert Lücking (Germany), H. Thorsten Lumbsch (USA), Tom W. May (Australia), Andrew Miller (USA), Amy Rossman (USA), Conrad Schoch (USA), and Keith A. Seifert (Canada). This report has been prepared following e-mail exchanges amongst members of the *ad hoc* Working Group, and provides a consensus of its opinions.

There was overwhelming support for: (a) Remaining within the framework of the existing *Code*, especially in view of the change in title and the adoption of organism-neutral language wherever possible, agreed in 2011; (b) fungal-only matters being under the control of IMCs not IBCs; and (c) fungal-only material controlled by IMCs being presented as a separate section within the body of the *Code*. The optimum outcome is therefore that the fungi governance proposals (with the amendment introduced below) are accepted at Shenzhen (Option 1 in Box 1). Nevertheless, four other options were identified during discussions (Box 1). While a few felt the idea of a separate *MycCode* attractive, it was felt there was much to be gained by continuing to draw on the expertise and support of the wider botanical, mycological and phycological nomenclatural community. The *BioCode* option (Greuter *et al.* 1998) could have much to commend it for the future, but could not be implemented until there were comprehensive lists of names at all ranks to be accepted as validly published.

An amendment to the already published fungi governance proposals made here,

¹Ballots are reported in the form yes : no : abstain.

Box 1: Possible options for the future governance of the nomenclature of fungi

- (1) Separate out all fungal-only provisions into a separate chapter in the *Code* to be modified only by decisions at IMCs, with the proposals necessary to enact this being accepted at Shenzhen.
- (2) If the proposals in (1) are not accepted at Shenzhen, present the proposals to the next IMC and should they be accepted there, announce any new changes agreed at IMCs through IMA/ICTF with an instruction they are to be followed by mycologists.
- (3) Delete all non-fungal provisions in the *Code* to be adopted in Shenzhen and issue it as a separate publication with fungal rather than plant examples under a title such as the *International Code of Nomenclature for Fungi (based on the International Code of Nomenclature for algae, fungi and plants)*.
- (4) Develop an independent *MycCode*, based on the current *Code*, but not following its precise arrangement and numbering.
- (5) Adopt the organism-neutral *BioCode* developed by the International Commission on Bionomenclature.

providing additional clarity, is to collect all material in the *Code* relating to fungi into a single section; this being the matter that will be controlled by IMCs. As IBCs are on a six-year cycle and IMCs one of four years, in some cases there would be two IMCs between IBCs; for example, IMC11 and IMC12 will be in 2018 and 2022, and the XXth IBC in 2023. Making changes in the body of the *Code* between IBCs could potentially become rather messy and confusing to mycologists, and the Working Group saw great advantage in having all material relating to fungi in a single section. This concept was originally proposed by Werner Greuter (General Committee, Germany) on 7 April 2017 during discussions of the proposals at the Botanical Garden and Museum in Berlin. It was noted that there is already a precedent for having a particular section in the *Code* devoted to particular groups of organisms in Appendix I dealing with the names of hybrids, and this and perhaps other organisms with special rules (e.g. fossils) might also be brought together in separate sections in the existing *Code*; perhaps better indicated as Chapters rather than Appendices.

In conclusion, this *ad hoc* Working Group suggests that the Nomenclature Section of the XIXth IBC, meeting in Shenzhen on 17–22 July 2017, might favourably view the following proposal to be made from the floor during the Congress as a clarifying amendment to the set of proposals already in place concerning “fungi governance” (May *et al.* 2016):

“The Section instructs the Editorial

Committee to bring together all material relating only to fungi into a separate section or chapter within the Code, and that this section be subject to modification only by International Mycological Congresses operating as proposed by the Special Subcommittee on the Governance of the Code with Respect to Fungi.”

The “material” comprises pertinent Articles, Notes, and Recommendations: Articles 13.1 (d) (starting point date), 14.3 and 56.3 (lists of names for protection or suppression), 15 (sanctioning), 42 (registration), 57.2 (take up of names typified by asexual morphs), and 59 (pleomorphic fungi). Of these, there is strong support for Art. 57.2 to be removed at Shenzhen (Hawksworth 2016). The parts of Preamble 8, addressing what organisms are treated as “fungi” for nomenclatural purposes, would also be better moved to the start of the new section or chapter. Fungal examples given elsewhere in the *Code* would remain in their current positions (which mycologists would need to consult on matters not only related to fungi), as would mentions in the Glossary. Similarly, the fungal entries in the Appendices would remain; although, for lists of fungi generated through Art. 14.13, there are various options for delivery as discussed by Wiersema *et al.* (2017).

The Working Group considers that this outcome would be in the best interests of the nomenclature of fungi. The proposal above is regarded by the Special Subcommittee on Governance of the *Code* with Respect to Fungi as a friendly amendment to their formal proposals,

agreed by eight of the ten voting members (being those who supported the original published proposals of the Subcommittee). The proposal has also been circulated to the complete membership of the ICTF which strongly support the Working Group’s conclusion (18:2:1), and also to the Executive Committee of the International Mycological Association (IMA) 19 members of which (100 % of those responding) voted in favour.

The ICTF *ad hoc* Working Group is indebted to Sandra A. Knapp (Chair of the Shenzhen Nomenclatural Section) and Nicholas J. Turland (Rapporteur-General to the Section; Germany) for constructive and frank discussions and advice.

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Andrew Miller
(Secretary, ICTF; amiller7@illinois.edu)
Lei Cai, Pedro W. Crous,
Z. Wilhelm De Beer, David L.
Hawksworth, Kevin D. Hyde,
Paul M. Kirk, Robert Lücking,
H. Thorsten Lumbsch, Tom W.
May, Amy Y. Rossman, Conrad L.
Schoch, and Keith A. Seifert

Programme planning continues for IMC 11

In the previous issue of *IMA Fungus* (7(2): (57)–(59), December 2016), IMA Vice President and Chair of the Local Organizing Committee of the 11th International Mycological Congress, Sharon A. Cantrell, provided an overview and the venue for this conference, to be held in San Juan, Puerto Rico on 16–21 July 2018. Over the past six months, co-chairs Chris Scharld and Donald H. Pfister, have been leading the Scientific Programme Committee in the development of the scientific programme for this marquis event of the mycological calendar. An outline of the scientific programme is presented here. Please place this meeting on your calendar as your priority event for 2018!

Keynote Speaker



Paola Bonfante

The keynote speaker for IMC11 is Paola Bonfante, a Professor of Plant Biology, University of Turin, Italy. Well-known for her work on microbe-plant interactions, Paola is a pioneer in the study of arbuscular mycorrhizal (AM) fungi and a leading figure in studying bacterial-fungal interactions, playing a pivotal role in the discovery of

intrafungal bacteria in AM fungi. Her plenary presentation at the European Conference on Fungal Genetics last year was outstanding in preparation, delivery and breadth, including overviews of her work on evolution, ecology, cell biology and molecular biology. A recent profile of Paola and her research (*Trends in Plant Science* 19: 744–746, 2014) provides a personal portrait of this dynamic and internationally known researcher.

The title of her keynote speech will be *Fungi, plants, bacteria: a network of dialogues and interactions*

Plenary Speakers

The scientific programme for IMC11 is divided into eight subject themes (Applications, Cell Biology, Ecology, Education, Environment, Evolution, Genomics and Pathology). Each morning and afternoon of the conference will feature a plenary address. Our speakers are distinguished researchers with broad mycological expertise, often covering multiple conference themes. Winners of the Young Mycologist Awards (see pp. (16)–(17) in this issue of *IMA Fungus*) will make short presentations before each keynote address.



Russell Cox

Applications Theme: Russell Cox, Professor in the Institute of Organic Chemistry, Leibniz Universität, Hannover, Germany. Research in the Cox group focuses on the discovery, understanding and engineering of biosynthetic pathways in fungi. Their work fuses organic chemistry, microbiology, molecular biology and enzymology and focuses on secondary metabolites from the polyketide, peptide and terpene families.

The title of his plenary talk will be *Heterologous expression of secondary metabolite biosynthetic gene clusters as a tool for understanding and engineering fungal natural products*



Jesús Aguirre

Cell Biology Theme: Jesús Aguirre, Institute of Cellular Physiology, Universidad Nacional Autónoma de México. Jesús works with the model fungi *Aspergillus nidulans* and *Neurospora crassa*, to approach questions related to stress signaling and cell differentiation.

The title of his plenary talk will be *ROS Signaling and fungal development*

Ecology Theme: Tom Bruns, Department of Plant and Microbial Ecology, University of



Tom Bruns

California Berkeley, USA. Tom Bruns' work is in fungal ecology, especially the ecology of ectomycorrhizal and post-fire fungi.

The title of his plenary talk is *Experimental fungal communities: tools for testing theory and determining mechanisms.*



Matthew Fisher

Environment Theme: Matthew Fisher, Imperial College London, UK.

The title of his plenary speech will be *Big data approaches to addressing big fungal problems.*



Priscilla Chaverri

Evolution Theme: Priscilla Chaverri, University of Maryland, USA and University of Costa Rica.

The title of her plenary speech will be *Evolution of protective mutualism in plant-fungal endosymbiosis.*



Chengshu Wang

Genomics Theme: Chengshu Wang, Director of the Institute of Plant Physiology and Ecology, Shanghai Institutes for Biological Sciences, Chinese Academy of Sciences, Shanghai, China, and President of the Mycological Society of China.

The title of his plenary speech will be *From one to many: fungal genomics and the future of population genetics.*



Anuradha Chowdhary

Pathology Theme: Anuradha Chowdhary, Vallabhbhai Patel Chest Institute, University of Delhi, India.

The title of her plenary speech will be *Fungal human pathogens: from obscure significance to impending disasters.*

Symposia and workshops at IMC11

The list of symposia and their organizers is now being finalized. The preliminary list below reflects the symposia approved by the Scientific Programme Committee of IMC11. It gives a first look at what promises to be a dynamic agenda for this congress. Additional late-breaking symposia will be added over the next several months to address timely or emerging issues of interest to mycologists.

Applications Theme

- Food mycology in the 21st century: impacts on food security and safety
- Home life: the mycobiomes of built environments
- Fungi and fungal enzymes for a more sustainable world
- Challenges in the exploitation of beneficial fungal secondary metabolites
- Applications and molecular aspects of mycoparasitic fungi
- Fungi as biocontrol agents for sustainable agriculture

Cell Biology Theme

- Membrane dynamics in fungal cells
- Morphogenesis and invasion (Fungal-host interactions)
- Light sensing in fungi
- Fungal Sexual Development and Exploitation
- Biology of the fungal pigmentation: advances and perspectives of the study of melanin in fungi.

Ecology Theme

- Bringing the dark taxa into the light - prospects and challenges (Original proposal: Can DNA sequences be used as the sole identifying criterion for naming species?)
- Hot fungi in hot spots in a hot region
- Resolving uncharacterized symbiotic relationships: the delicate balance from mutualist to parasite
- A big puzzle to assemble: using taxonomy to unravel ecology and biogeography of ectomycorrhizal symbiosis in the tropics
- Fungal-bacterial interactions and functions of the fungal metaorganism
- Fungal communities and the functioning of forest ecosystems
- Marine Mycology
- Experimental Approaches to the Conservation of Rare Fungi

Education Theme

- Teaching mycology around the world: examples from South America, North America, Europe, Japan and Australia
- Bringing awareness to fungi – for teachers and the general public
- Oral history for mycology
- Mycology and Outreach
- Boosting Diversity in Mycology

Environment Theme

- Rhizobiomes – their interactions with the hosts and function in a changing environment
- Fungi in a changing environment
- Polyextremotolerant fungi in natural and urban extreme environments
- Evolution and diversity of lichenization in the Basidiomycota
- Ethnomycology: Scientists and Shaman on Historic and Current Uses of Fungi

Evolution Theme

- Evolutionary genomics
- Gondwana reunited! Fungal biogeography in the Southern Hemisphere

- Early fungi that changed the world: phylogenomic and fossil evidence.
- Lichens on Islands: evolution, endemism, and conservation
- Species limits in the age of genomics.
- Integrative approaches to understanding the diversity and function of the *Boletales*

Genomics Theme

- Integrative approaches to understand the ecology and evolution of fungi
- Fungal pan-genomes
- Metagenomics: whole fungal genomes from complex samples
- *Fusarium*: The genomics of functional and ecological diversity
- Expanding the taxonomic context of genome sampled fungi

Pathology Theme

- Threatening fungal plant pathogens for tropical countries: acting before the foes arrive
- Deciphering fungi-archaea/bacteria interactions for biocontrol of soil-borne pathogens

- Fungal extracellular vesicles
- Molecular mechanisms of human fungal pathogenesis
- Breeding for resistance to fungal pathogens of crops
- IMC/ISHAM Symposium: Human pathogenic fungi, taxonomy and global emergence

In addition to the symposia, many Special Interest Group meetings and Workshops are being planned during IMC11. The list is not yet finalized, but proposals include sessions on Ascomycetes, Bacterial-fungal Interactions, Forest Pathology, Fungal Conservation, Tropical Plant Pathogenic Microfungi, and endophytic *Xylariaceae*.

Keith A. Seifert is thanked for assistance in putting this information together for *IMA Fungus*.

Chris I. Schardl, Donald H. Pfister, and Sharon A. Cantrell Rodríguez
(chris.schardl@uky.edu)

International Commission on the Taxonomy of Fungi (ICTF)

The International Commission on the Taxonomy of Fungi (ICTF) has been quite active the past year holding online meetings, organizing lists of competing genera, and pushing forward several issues significant to the mycological community. An online meeting was held on 11 October 2016 via Adobe Connect to discuss the upcoming International Botanical Congress in Shenzhen in July, progress on the various lists of competing names, DNA-based nomenclature, administrative structure of the ICTF, and synchronization of the three name repositories. The ICTF voted to approve the following motion:

“Should the three current repositories for the registration of fungal names synchronize their data (at least weekly) by July 1, 2017? Otherwise, the ICTF recommends that the NCF² reduce the official repositories to

only those that are fully synchronized or a single repository of their choosing if no synchronization occurs by July 1, 2017.”

This was seen as an essential step for ending several years of stagnation and non-compliance among the three repositories and a key issue that the ICTF hopes the NCF will soon act upon. Another online meeting was held on 6 March 2017 to approve the “*Sordariomycetes* excluding *Diaporthales*, *Hypocreales* and *Magnaporthales* Working Group” and to form *ad hoc* groups that are currently working on five key action items:

- (1) An official ICTF statement on IMC/IBC governance³
- (2) Adjustments to current statutes regarding memberships, member turnover, and new a Vice-President position

- (3) Reassessment of the 2013 “Without prejudice list of generic names” article
- (4) Manuscript on PubMed keywords for papers containing novel taxa
- (5) Guidelines for the use of DNA as types in fungi.

In addition, the ICTF is to host or co-host two symposia and a debate/discussion at IMC11 in 2018:

Symposia:

“Expanding the taxonomic context of genome sampled fungi”

²NCF = Nomenclature Committee for Fungi, which is currently appointed by the Nomenclature Section of each six-yearly International Botanical Congress.

³See pp. (9)–(11) in this issue.

“Bringing the dark taxa into the light - prospects and challenges”

Debate/Discussion

“Can DNA sequences be used as the sole identifying criterion for naming species?”

Meeting recordings can be found at: <http://www.fungaltaxonomy.org/meetings>; Working groups at: <http://www.fungaltaxonomy.org/subcommissions/>; and Lists of publications at: <http://www.fungaltaxonomy.org/lists>

Conrad L. Schoch, *ICTF Chair*
Andrew N. Miller, *ICTF Secretary*
(amiller7@illinois.edu)

2nd Chinese Lingzhi (*Ganoderma lucidum*) Conference



On 9–12 September 2016, the 2nd Chinese Lingzhi (*Ganoderma lucidum*) Conference, jointly hosted by the Chinese Academy of Engineering (CAE), China Chamber of Commerce of Foodstuffs and Native Produce (CFNA), Mycological Society of China (MSC), Jilin Agricultural University (JAU), National Strategic Alliance of Technological Innovation of Edible & Medicinal Fungi Industry (NSATIEMFI), International Society of

Medicinal Mushrooms (ISMM), and the Peoples Government of Longquan City was ceremoniously held in Longquan, Zhejiang Province – the hometown of Chinese lingzhi production.

The 229th International Conference on Economic Fungi & Forum of the Chinese Academy of Engineering on Engineering Science of Economic Fungi, initiated by Li Yu, Chinese academician of engineering, foreign academician of the

Russian Academy of Science, and President of ISMM, was held at the same time. Ten Academicians of the Chinese Academy of Engineering in ten different areas, covering plant germplasm, pomology, and mycology, as well as scientists concerned with edible fungi were invited to the event for in-depth discussions on lingzhi. The invitees included Lin Zhibin (Peking University Health Science Center), David L. Hawksworth (Royal Botanic Gardens





Kew, etc.), Anthony J. Whalley (Liverpool John Moores University), Patricia Wiltshire (University of Southampton), Kakishima Makoto (University of Tsukuba), Ian R. Hall (New Zealand), and Shoji Ohga (Kyusu University).

“Clear water, green mountains are wealth as great as a mountain” was the development philosophy of the conference, with “quality control and construction of system of standards for evaluation” as the theme, and to “enhance quality of lingzhi products, shape health industry of lingzhi” as the goal. The latest developments and technology of the lingzhi industry were focused on in the conference, in combination with the superior ecological resources available in Longquan with a pollution-free cultivation model. This occasion not only informed the world on the achievements of the ecological cultivation technology of Longquan’s

lingzhi, of which the city is especially proud, but also aimed to assist in upgrading and enhancing a healthy lingzhi industry in China.

Scientists, researchers, and leaders of the industry from around the world were attracted to the conference to enjoy as many as 40 presentations in which specialists shared the latest development and achievements in different aspects of lingzhi production. These included policies, laws and regulations, breeding and production, quality control of products, evaluation standards, research and development and deep-processing products, marketing, brand building, and promotion.

The 1st Chinese Lingzhi Conference was in 2015, and the 2nd again incorporated additional activities including: signing of a business, investment and talent introduction project; celebrating high school student winners in a poster competition; an advisory

meeting of academicians and specialists for the strategic development of Longquan county’s economy; an edible fungi resource utilization and fungal foray arranged by the country’s technological system for edible fungi; a visit to the Meidi original ecological lingzhi cultivation base in Lanju Town, Longquan, the only ecological lingzhi farm in a forest in Zhejiang Province; the Meidi Lingzhi Culture Exhibition Hall; the *Dendrobium officinale* farm in Xijiezhou Village; and the opening ceremony of the Chinese Edible Fungi Trading Center in Lucai. At an award ceremony incorporated in the opening session of the conference, plates with the engravings “Fungal Foray Base of the International Medicinal Mushrooms”, “Education and Practice Base of Jilin Agricultural University”, “Research and Education Base of the Engineering Research Centre of Chinese Ministry of Education for Edible and Medicinal Fungi”, “Demonstration Zone for Cultivation in Original Ecology of Chinese Lingzhi”, and “Longquan Service Station for Zhejiang Edible Fungi Association” were presented to participating organizations.

This was the third international forum on engineering related to mycology initiated by Li Yu, the first two being an “International Top-level Forum on Engineering Science and Technology Development - Medicinal Mushrooms” held during the 7th International Conference on Medicinal Mushrooms in Beijing in 2013, and the “186th Forum of the Chinese Academy of Engineering on Engineering Science – Systematics and Ecology of Myxomycetes” held during the 8th International Conference on Systematics and Ecology of Myxomycetes held in Changchun in 2014.

Chang-tian Li
(changtianli@126.com)

