COLECTOMY SUCCESSFUL, BUT *NOMINA SEQUENTIA* MARK TIME

The colon (:) expunged from the ICN!



Some of the participants in the IMC11 Nomenclature Session.

After 37 years, the recommendation to use a colon (:) to indicate the sanctioned status of fungal names has been removed from the *International Code of Nomenclature for algae, fungi, and plants* (*ICN*; Turland *et al.* 2018). This has been a lengthy procedure, but the operation was completed successfully on 19 July 2018 by a 67 % vote in favour during the Nomenclature Session of the XI[th] International Mycological Congress (IMC11) in Puerto Rico, and that this decision came into effect when ratified by the Plenary Session of the Congress on 21 July 2018 (May *et al.* 2018). The tortuous history of the colon is summarized in Box 1.

The hottest issue before this first-ever formal Nomenclature Session meeting was what to do about the naming of fungal taxa which were only known from DNA sequences, and especially from environmental samples. There were wide-ranging debates but no changes to the *ICN* with respect to fungal sequences were made. It was, however, agreed to establish a Special-purpose Committee on "DNA Sequences as Types for Fungi" charged with reporting to IMC12 in 2022. It is to be hoped that appropriate changes to the *ICN* can be made at that time, but in the meantime, any names of fungi based only on DNA sequences will continue to be treated as not validly published. If such names introduced in the interim comply with other criteria for valid publication and are registered and allocated an identifier by one of the three approved repositories (i.e. Fungal Names, Index Fungorum or MycoBank), they could be used and their invalid status indicated by adding "nom. seq." (nomen sequentium) in the formal citation. This would parallel the use of established annotations such as "nom. illegit.", "non. inval.", "nom. nud.", and "nom. prov." to indicate the nomenclatural status of the name. With the speed with which molecular investigations of environmental samples are proceeding today, it is to be hoped that it will not take the 37 years to 2055 to resolve this issue!

The suggestion that decision-making on matters solely concerning the nomenclature of fungi should be transferred from International Botanical to International Mycological Congresses, had been supported by 86 % of those completing a questionnaire at IMC9 in Edinburgh in 2010 (Norvell *et al.* 2010), and by 93.6 % of those answering this same question at IMC10 in Bangkok in 2014 (Redhead *et al.* 2014). This vision became a reality when this move was approved by the International Botanical Congress in Shenzen last year (Hawksworth 2017, Hawksworth *et al.* 2017). It was gratifying to see how smoothly the first formal decision-making Nomenclature Session went, and the participation of so many mycologists in the process, either through the guiding e-mail vote or participating in the Session. This augers well for the future of fungal nomenclature. Full information on the changes to the nomenclatural rules for fungi that had been proposed for consideration at IMC11, and the actions taken on them by the Nomenclature Session, are summarized elsewhere in this issue (May *et al.* 2018). The resulting changes will be included in a revised "Chapter F" of the *ICN* which will be published in *IMA Fungus* early in 2019, and also included in the online version of the *ICN*.

Hawksworth DL (2017) Success in Shenzhen! *IMA Fungus* **8**: (40).

Hawksworth DL, May TW, Redhead SA (2017) Fungal nomenclature evolving: changes adopted by the 19[th] International Botanical Congress in Shenzhen 2017, and procedures for the Fungal Nomenclature Session at the 11[th] International Mycological Congress in Puerto Rico 2018. *IMA Fungus* **8**: 211–218.

May TW, Redhead SA, Lombard L, Rossman AY (2018) XI International Mycological Congress: report of Congress action on nomenclature proposals relating to fungi. *IMA Fungus* **9**: (xii)-(xxv).

Norvell LL, Hawksworth DL, Petersen RH, Redhead SA (2010) IMC9 Edinburgh Nomenclature Sessions. *IMA Fungus* **1**: 143–147.

Redhead SA, Demoulin V, Hawksworth DL, Seifert KA, Turland NJ (2014) Fungal nomenclature at IMC10: report of the Nomenclature Sessions. *IMA Fungus* **5**: 449–462.

Turland NJ, Wiersema JH, Barrie FR, Greuter W, Hawksworth DL, *et al.* (eds). *International Code of Nomenclature for algae, fungi, and plants (Shenzhen Code) adopted by the Nineteenth International Botanical Congress Shenzhen, China, July 2017*. [Regnum Vegetabile No. 159.] Glashütten: Koeltz Botanical Books.

A HISTORY OF THE COLON

The colon had been used informally as an alternative to "ex" by a few mycologists prior to the adoption of 1 May 1753 as the starting point date for all fungal names (*see* Petersen 1977). This was considered as an option when the concept of sanctioned names was being introduced by a subcommittee of the Nomenclature Secretariat of the International Mycological Association (IMA). The colon possibility was raised at IMC2 at Tampa, Florida, in 1977, but was not included in the formal proposals from that Congress (Van Warmelo 1979) or the detailed proposals on the change in starting point date for fungal nomenclature (Demoulin *et al.* 1981) to be put before the Nomenclature Section of the International Botanical Congress to be held in Sydney that year. The Nomenclature Committee for Fungi, however, had in the meantime made a proposal to make the use of the colon mandatory to indicate the sanctioned status of names (Petersen 1981), which came too late for inclusion in the Synopsis of Proposals to that Congress (Voss & Greuter 1981), but was raised from the floor. Following debate, the colon was approved – but as a Recommendation rather than a mandatory Article (Greuter & Voss 1982). Arguing against that entirely at the Sydney Congress risked jeopardizing the whole starting point initiative, so those opposed to the colon did not press their opinions further. Since that time, the correct use of the colon has been a source of continuing confusion, despite the guidance provided by Korf (1982, 1996). Further, over 30 years later sanctioning works continue to be repeatedly misinterpreted and cited as if a place of valid publication with only the date of the sanctioning work. Also, as the notation was optional, it was not adopted by all mycologists, and not adopted in the *Index of Fungi* and later the *Index Fungorum* nomenclatorial database.

A proposal to delete the colon Recommendation was included in a questionnaire circulated at IMC10 in Bangkok in 2014, where 71.8 % of the mycologists who responded to this question voted for removal (Redhead *et al.* 2014). Following that poll, a formal proposal to replace the colon by "nom. sanct." was made to the 2017 International Botanical Congress in Shenzhen (Hawksworth 2015), but there it was decided to add that as an alternative, and not delete the colon. This was largely because the Nomenclature Committee for Fungi had not supported the deletion, but now there were two options recommended. This unsatisfactory situation was finally resolved at IMC11 when the proposal for deletion of the colon but retention of the single optional use of "nom. sanct." (Hawksworth 2018) was accepted.

Demoulin V, Hawksworth DL, Korf RP, Pouzar Z (1981) A solution of the starting point problem in the nomenclature of fungi. *Taxon* **30**: 52–63.

Greuter W, Voss EG (1982) Report on botanical nomenclature – Sydney 1981. *Englera* 2: 1–124.

Hawksworth DL (2015) (063-085) Proposals to clarify and enhance the naming of fungi under the *International Code of Nomenclature for algae, fungi, and plants*. *IMA Fungus* **6**: 199–205; *Taxon* 64: 858–862.

Hawksworth DL (2018) (F-003-004) Proposals to simplify the indication of the nomenclatural status of sanctioned names. *IMA Fungus* **9**: (iii)–(v).

Korf RP (1982) Citation of authors' names and the typification of names of fungal taxa published between 1753 and 1832 under the changes in the Code of nomenclature enacted in 1981. *Mycologia* **74**: 250–255.

Korf RP (1996) Simplified author citations for fungi and some old traps and new complications. *Mycologia* **88**: 146–150.

Petersen RH (1977) Starting points for naming of fungi: a primer for IMC2. *Taxon* **26**: 310–321.

Petersen RH (1981) Report of the Committee for Fungi and Lichens. *Taxon* **30**: 472–473.

Redhead SA, Demoulin V, Hawksworth DL, Seifert KA, Turland NJ (2014) Fungal nomenclature at IMC10: report of the Nomenclature Sessions. *IMA Fungus* **5**: 449–462.

Van Warmelo KT (1979) Proposals for the modification of the Code of Botanical Nomenclature: IMC2 proposals. *Taxon* **28**: 424–4341.

Voss EG, Greuter W (1981) Synopsis of proposals to amend the International Code of Botanical Nomenclature submitted to the Thirteenth International Botanical Congress Sydney – 1981. *Taxon* **30**: 97–293.

State of the World's Fungi Report puts fungi on the world stage

This event, organized by the Royal Botanic Gardens Kew on 13–14 September 2018 (see *IMA Fungus* **9** (1): (7), June 2018), reached an unprecedent number of people worldwide, heightening awareness of the state and importance of mycology. The symposium to launch the report was over-subscribed and people had to be turned away due to the capacity limits of the lecture theatre. There were 263 delegates from 128 institutions in 24 countries spreads across five continents, who heard 28 presentations by leading mycologists and participated in seven panel discussions. The preparation of the report itself involved 112 scientists from 18 countries, with all sections being subject to review by world specialists. Especially impressive was that the event generated 151



reports in the national and international press, and that according to the Kew Press Office the number of contacts made was a staggering 172 358 472!

This was the brain-child of Katherine ("Kathy") J. Willis, and marked the end of her term as Director of Science at Kew. Copies of the 88 page lavishly illustrated report (Willis 2018) are available free of charge in hard copy (while stocks last) and online (https://stateoftheworldsfungi.org/). There is much in it that will be of value to those teaching mycology classes or championing the cause for increasing attention being given to mycology in national and international programmes.

Willis KJ (ed.) (2018) *State of the World's Fungi*. Kew: Royal Botanic Gardens.

Dutch citizen science project: two years of fungal fun

The Dutch citizen science project "World fame: a fungus with your name" was initiated in 2017 as part of the Westerdijk year to commemorate that a hundred years ago Johanna Westerdijk became the first female professor in The Netherlands (see *IMA Fungus* **9** (1): (4)–(5), June 2018).

A fungal exhibition was organised at the University Museum Utrecht, which provided a platform to interact with children from families and schools in The Netherlands. After a visit to the museum, children could pick up a kit and instructions that informed them how to collect soil from their own garden. The samples were subsequently sent to the Westerdijk Fungal Biodiversity Institute, where scientists grew at least 20 fungi from each sample, single-spored and re-plated them (clonally), and submitted all cultures for DNA sequence analysis. Based on the initial results, candidates of potential "new" species were examined in detail morphologically, and additional gene loci sequenced as needed to facilitate identification at species level.

In total 600 odd kits were distributed, of which half were returned for analysis, representing various locations from all over The Netherlands. Out of the 293 samples that were analysed, more than 3000 isolates were obtained representing 1840 different fungal species. The top five most frequently found species were *Neopyrenochaeta inflorescentiae* (15.1 %), *Volutella ciliata* (14.5 %), *Paecilomyces carneus* (13.0 %), *Clonostachys rosea* (11.1 %), and *Plectosphaerella plurivora* (10.5 %). New taxa included: one new family, *Vandijckellaceae*, two new genera, *Vandijckella*, and *Verhulstia*, and several new species: *Acaulium pannemaniae*, *Collariella hilkhuijsenii*, *Conioscypha boutwelliae*, *Fusarium petersiae*, *Fusicolla septimanifiniscientiae*, *Gamsia kooimaniorum*, *Gibellulopsis simonii*, *Hanseniaspora mollemarum*, *Lasionectria hilhorstii*, *Lectera nordwiniana*, *Leptodiscella rintelii*, *Ogataea degrootiae*, *Parasarocladium debruynii*, *Phaeoisaria annesophieae*, *Pichia gijzeniarum*, *Plectosphaerella niemeijerarum*, *Saccharomycopsis oosterbeekiorum*, *Sarocladium dejongiae*, *Striaticonidium deklijnearum*, *Talaromyces annesophieae*, *Trichomonascus vanleenenius*, *Umbelopsis wiegerinckiae*, *Vandijckella johannae*, *Verhulstia trisororum*, and *Zygoascus flipseniorum* (Crous *et al.* 2017, 2018, Groenewald *et al.* 2018).

As part of the project, children and the general public could go online to consult the Westerdijk website to follow the isolation procedure, and also see which fungi were being isolated from their respective samples. As advertised in the slogan, fungi were named after the children or schools who collected them. The first set of fungi were published in Fungal Planet as a paper in *Persoonia*, and the event was also covered on national TV and other public media. The second set was again published in a similar fashion in *Persoonia*, and the certificates handed out to children during the "National Weekend of Science", in which most universities and institutes in The Netherlands participated in organising an "open day", with exciting exhibits attracting many members of the public. Other than these framed certificates, there are also stand-alone papers, like the one on yeasts from Dutch garden soils by Groenewald *et al.* (2018) published in *FEMS Yeast Research*, and several others that are still in preparation. The project not only increased public awareness of the importance of fungi for society, but also fostered a better collaboration among scientific institutions, including universities, research institutes, and museums.

Future plans for IMC12: Starting in 2019, the plan is to initiate a new pan-European project "World fame: a fungus and its genome with your name". To attain this goal, partners in various European countries are being sought that want to coordinate national/local outreach activities (or an event) with schools. Interested children should then mail the kits to the local organiser, who will, subject to compliance with national regulatory requirements, in turn mail the batch to The Netherlands for isolation. Unfortunately, due to the logistics involved only a limited number of kits will be available for each country that is able to co-operate, although there will be no limit on the number of samples that could be processed in the country of origin, meaning that each country could effectively decide to go for the standard minimum option (say 20–40 kits), or extrapolate the project to be much larger in scope. Isolated fungi will be deposited in the CBS culture collection of the Westerdijk Fungal Biodiversity Institute, as well as in a Microbial Biological Resource Centre in the country of origin.

Plans are also afoot to organise a mycologist COST action to enable researchers to meet, and actively participate in the description of fungal novelties. Furthermore, other than describing novel fungal biodiversity, the project will also strive to show the relevance of undiscovered European fungal biodiversity.

Infectious diseases are a major threat to human health, and antimicrobial resistance is presently a major problem facing humanity, as superbugs have emerged that are resistant to all currently known antibiotics. Fungi are well known for the wealth of secondary metabolites (SMs) that they produce, often with biological activities. To this end the ex-type cultures will be used to generate full genome sequences, to enable the identification of fungal gene clusters that produce novel

antibiotics, and other potential beneficial properties. Full genome sequences will be generated of all new taxa by the Joint Genome Institute in California, USA. DNA isolation will be conducted in the respective European countries where possible, or in the Westerdijk Institute.

All activities will be linked to workshops, symposia, and special issues to be published in mycological journals. A further aim is to have a big press event with children from various European countries during the IMC12 in Amsterdam in 2022, "World fame: a fungus and its genome with your name". Interested parties who want to act as node for a specific country should contact p.crous@westerdijkinstitute.nl for further details. A full press release will follow once all participating countries have been identified.

Crous PW, Wingfield MJ, Burgess TI, Carnegie AJ, Hardy GEStJ, *et al.* (2017) Fungal Planet description sheets: 625–715. *Persoonia* **39**: 270–467.

Crous PW, Luangsa-ard JJ, Wingfield MJ, Carnegie AJ, Hernández-Restrepo M, *et al.* (2018) 785–867. *Persoonia* **41**: 238–417.

Groenewald M, Lombard L, de Vries M, Giraldo Lopez A, Smith M, *et al.* (2018) Diversity of yeast species from Dutch garden soil and the description of six novel ascomycetes. *FEMS Yeast Research* **18**: doi: 10.1093/femsyr/foy076

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Citizen Science event hosted by the Westerdijk Fungal Biodiversity Institute during the Weekend of Science.

Mushroom/fungi recipes wanted!

For IMC12 2022 in Amsterdam, we would like to explore positive aspects of fungi. In addition to brewing some speciality beers with selected yeast strains from the Westerdijk collection (CBS), we would like to prepare a *Mycologists' Cookbook*. This idea was put forward at IMC7 in Oslo in 2002, but for personal reasons this project sadly never came to fruition, despite many recipes having been submitted by mycologists around the world.

At IMC12, I wanted to give this idea a new try – hopefully with the collaboration of some chefs, sommeliers, and zythologists (= beer experts) – to explore unique combinations of fungal products. I would also wish to include fungal fermentations of foods using yeasts or moulds.




Mushrooms on Amsterdam Farmers Market (with permission owner).

If you have a special recipe, using a common or uncommon edible mushroom, or fermentation, and you are willing to share this, please sent this to me with a photograph of yourself. Note that we will only consider recipes using food-safe fungi!

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STOP PRESS!

NEW PUBLISHING ARRANGEMENTS FOR *IMA FUNGUS* FROM JANUARY 2019

As noted in the President's Message on pp. (45)–(46) of this issue, the IMA Executive Committee has selected BMC/Springer as the publishing house that will be responsible for production of the journal from 1 January 2019. As this issue goes to press, final details of the contract and new procedures for the submission of articles for consideration are being finalized. Further information will be included on the IMA home-age as soon as the necessary details have been settled. The Association is indebted to the Westerdijk Fungal Biodiversity Institute, and especially Pedro W. Crous (Managing Editor) and Manon J. van den Hoeven-Verweij (Layout Editor) for all the work they have put into making the journal a success over the last nine years since its launch at IMC9 in 2010.