

Interested in hosting IMC12 (2022)?

Under the Statutes of the IMA (<http://www.ima-mycology.org/society/statutes>), the deadline for receipt of pre-proposals from Member Mycological Organizations (MMOs) to host the next International Mycological Congress is 12 months before the date of the current IMC – **15 July 2017**. The pre-proposals will then be reviewed by the Executive Committee, and a vote to solicit full proposals from not fewer than two of the MMOs submitting pre-proposals

is due not later than 10 months before the date of the current IMC – **15 September 2017**. Full proposals to host the next IMC must then be received by the Secretary-General for distribution to the Executive Committee not later than six months before the current IMC – **15 January 2018**. The venues and dates for the next IMC will then be voted on by the Executive Committee not later than three months before the current IMC. The President and

Secretary-General will visit the proposed venue selected by the Executive Committee before final ratification by the Executive Committee. The final decision will then be announced to the General Assembly of the IMA, to be held at the upcoming IMC.

For further information, or to submit a pre-proposal, contact the IMA Secretary-General, Pedro Crous (p.crous@westerdijkinstituut.nl).

CBS becomes the Westerdijk Fungal Biodiversity Institute



Johanna Westerdijk. Photo courtesy of the Westerdijk Fungal Biodiversity Institute.

The Centraalbureau voor Schimmelcultures (CBS-KNAW) was established in 1903 by Friederich A.F.C. Went (1863–1935) in The Netherlands, with the mission to house the world's fungal strains. In 1907, at the tender age of 24, Johanna Westerdijk became its first director, a position she held until 1952. One hundred years ago, on the 10th of February 1917, Johanna Westerdijk also became the first female professor in The Netherlands when the University of Utrecht appointed her as a professor in phytopathology and she gave her inaugural lecture at the university. Under her inspiring leadership as director of the CBS, and starting with a mere 80 living fungi, the collection evolved into the largest and most versatile fungal resource centre in the world, containing over 100 000 different strains today.

In honour of its' first Director, and to reflect the legacy this institute is built on, the name of the CBS-KNAW changed to the Westerdijk Fungal Biodiversity Institute on the centenary of her professorship.

Joanna was a renowned multi-talented

scientist, a believer in equal opportunity and inclusion, and a globetrotter; a true 'homo universalis'. She educated 56 PhD students, almost half of which were female, and thought fungi had the potential to contribute to the solution of some of the world's greatest challenges. The mission of the Institute remains the same today, to "explore, culture and preserve". It continues to explore the world and collect new fungi, and investigate their characteristics to address relevant societal challenges.

For the anniversary of Westerdijk's professorship, 2017 has been designated as the "Westerdijk year" in The Netherlands, where scientists celebrate her contribution to science. As a research institute of the Royal Dutch Academy of Arts and Sciences (KNAW), together with the universities of Utrecht and Amsterdam and other parties, the Institute will commemorate Johanna Westerdijk's contributions to science and women's position in science. Many events will take place during this year of celebration. The University Museum in Utrecht has prepared an exhibition about Westerdijk and phytopathology and

mycological research in general. Institute researchers visit schools to show and tell young children about fungi, scientists hold lunchtime lectures on campus, and, best of all, a citizen science project has been initiated: "World fame, a fungus with your name". Visitors to the exhibition and schools in the Utrecht region receive a special collection kit to take soil samples in their gardens, which they then submit to the Westerdijk Institute for analysis and identification. To date 241 soil samples have been received (and continue to flow) and are now being analysed. With this citizen science project, the Institute aims to involve the public in scientific research, and present the past and future of fungal research. During the research period, the results will be shown online (<http://www.westerdijkinstituut.nl/>). When a new fungus is identified, it will be named after the submitter, hence the theme "World fame, a fungus with your name". The newly discovered fungi will be added to the collection and can be used for future research by the global community, and simultaneously screened for potential new



The new logo of the Westerdijk Fungal Biodiversity Institute.

WESTERDIJK
FUNGAL BIO
DIVERSITY
INSTITUTE



Spring holiday at the Utrecht University Museum: staff of the Westerdijk Fungal Biodiversity Institute introduced children (and their parents or caretakers) to science. They could experience what it was like to be a technician working with fungi. No fungi were harmed in the process! Plates courtesy staff of the Westerdijk Institute.



Citizen Science project "Wereldfaam, een schimmel met je naam" ("World fame, a fungus with your name") proved to be a great success with almost 250 soil samples being sent to the institute by visitors of the Utrecht University Museum (both young and old), eager to earn eternal fame.

antibiotics. Plans are afoot to upscale this project to include all 7000 Dutch primary schools in 2018.

With a new name comes a new logo. The new logo still represents the legacy of the former logo. With a name change, a number of other things change as well, most importantly the website and e-mail addresses. The website has changed to www.westerdijkinstituut.nl, but www.cbs.knaw.nl will redirect automatically to the new website. The e-mail address has changed to name@westerdijkinstituut.nl, but e-mails sent to the old email address will still be forwarded to the new address. The international acronym to be used for the collections remains as CBS.

From 28 August until 1 September 2017, the Institute is to host a symposium week (<http://www.westerdijkinstituut.nl/BioloMICSNews.aspx?Rec=7728>), which will start with the "2nd Symposium on Plant Biomass Conversion by Fungi", followed by one on the "Leading Women in Fungal Biology", featuring leading female mycologists from around the world, and a final symposium "Cryptic Speciation in Classifications". The week will close with the opening of the new Building of the Westerdijk Fungal Biodiversity Institute in Utrecht, and a fungal barbeque. During

the week the Institute will also present new discoveries from the citizen science project in a special public engagement evening, "Famous Fungi".

Last but not least, the Institute will also launch its own beer, especially brewed for the occasion from the ex-type strain of *Saccharomyces cerevisiae*, "Schoone Geest" [Healthy Spirit], a word play on the Westerdijk motto which was chiselled in the lintel stone above the door to her laboratory: "Werken en feesten vormt schoone geesten" [Work and play forms a healthy spirit]. Another Westerdijk saying, was to avoid a dull life (or die) [Even a fungus dies from a dull life], and all mycologists who can are invited to join the party, get the T-shirt, drink the beer in a special Westerdijk cup, and talk about fungi!

For further details, consult the Institute website (<http://www.westerdijkinstituut.nl/>).

DNA sequence data as types: a potential loophole in the rules discovered?

F *Lawreymyces pulchellae* (MF070063)

Type illustration for *Lawreymyces pulchellae*. Reproduced from Lücking & Moncada (2017).

The issue of whether or not to give formal scientific names to organisms only known from DNA sequences is becoming an increasing cause for debate. Proposals of how this issue might be addressed for fungi were first made by Hibbett *et al.* (2011). Subsequently, proposals to modify the *International Code of Nomenclature for algae, fungi, and plants* (McNeill *et al.* 2012) have been published (Hawksworth *et al.* 2016) and are due to be voted on at the International Botanical Congress, Shenzhen, China, this July.

A species known only from sequence data, with no cultures or other specimens, was described last year as *Hawksworthiomyces sequentia* with only the actual base sequences of selected DNA regions given as the “type” (De Beer *et al.* 2016). Species names, however, are required to have a physical type, or in some cases an illustration, in order to be validly published, so that name does not meet the current criteria and must be ruled as invalid. Lücking & Moncada (2017), who found a new genus *Lawreymyces* with seven new species from sequences obtained from lichen thalli, argue that there is a loophole in the

existing rules as illustrations are permitted as types of microscopic fungi when no material can be preserved. They therefore designated illustrations of the alignments for the new species as the types) and consider that this approach “opens the door to the formal recognition of thousands of species of voucherless fungi detected through environmental sequencing techniques under the current Code”.

Whether this loophole will be considered acceptable is likely to be hotly debated, and questioned as the illustrations designated are a diagram showing alignments rather than the molecules themselves *in situ*. If the proposals on this matter are rejected in the upcoming congress, the Nomenclature Committee for Fungi (NCF) may well be asked to give a formal opinion on this particular case – whether this is a loophole or not. If the opinion is in the affirmative, the issue will become whether the Code should be modified to permit or to stop such practices in the future.

De Beer ZW, Marincowitz S, Duong TA, Kim J-J, Rodrigues A, Wingfield MJ (2016)

Hawksworthiomyces gen. nov. (*Ophiostomatales*), illustrates the urgency for a decision on how to name novel taxa known only from environmental nucleic acid sequences (ENAS). *Fungal Biology* 120: 1323–1340.

Hawksworth DL, Hibbett DS, Kirk PM, Lücking R (2016) (308–310) Proposals to permit DNA sequence data to serve as types of names of fungi. *Taxon* 65: 899–900.

Hibbett DS, Ohman A, Glotzer D, Nuhn M, Kirk PM, Nilsson RH (2011) Progress in molecular and morphological taxon discovery and options for formal classification of environmental samples. *Fungal Biology Reviews* 25: 38–47.

Lücking R, Moncada B (2017) Dismantling *Marchandiomphalina* into *Agonimia* (*Verrucariaceae*) and *Lawreymyces* gen. nov. (*Corticaceae*): setting a precedent to the formal recognition of thousands of voucherless fungi based on type sequences. *Fungal Diversity*: DOI 10.1007/s13225-017-0382-4.

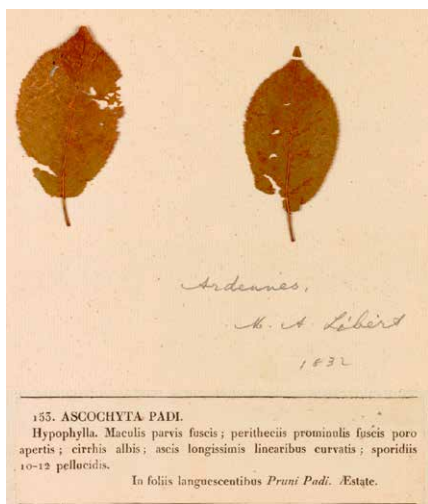
McNeill J, Barrie FR, Buck WR, Demoulin V, Greuter W, *et al.* (eds) (2012) *International Code of Nomenclature for algae, fungi, and plants (Melbourne Code) adopted by the Eighteenth International Botanical Congress Melbourne, Australia, July 2011*. [Regnum Vegetabile No. 154.] Königstein: Koeltz Scientific Books.

Who were the pioneer women in taxonomic mycology?

The forthcoming centenary of the appointment of Johanna Westerdijk as a professor at Utrecht University (to be celebrated at the Leading Women in Fungal Biology symposium at the newly christened Westerdijk Fungal Biodiversity Institute in August this year - see page (2) in this issue) prompts a consideration of her female predecessors in mycology around the world.

Given the dispersed nature of mycological records, the relatively centralised and complete records of taxonomic mycology offer a practical means of investigating this subject. An initial survey of *Authors of Fungal Names* (Kirk 2003) and other sources reveals that only a handful of women described new fungal taxa prior to 1900. Such women include, in order of birth date: Catharina Helena

Dörrien (1717–1795, Germany), Marie-Anne Libert (1782–1865, Belgium), Mary Elizabeth Banning (1832–1901, USA), Elisa Caroline Bommer (*née* Destrée, 1832–1910, Belgium) [who also published on fungi of The Netherlands under the name Caroline E. Destrée], Marietta Rousseau (*née* Hannon, 1850–1926, Belgium) and lichenologist Annie Lorrain Smith (1854–1937, UK; Ainsworth 1996).



Marie-Anne Libert, and *Ascochyta padi*¹, which she described in her exsiccate *Plantae cryptogamicae, Arduenna*, fasc. 2: no. 153 (1832).

A somewhat larger group of women made early contributions to mycology as researchers, collectors, illustrators and popularizers of fungi. These include: prolific collector Josephine Kablíková (1787–1863, Czech Republic), Elisabetta Fiorini-Mazzanti (1799–1879, Italy), Anna Maria Hussey (1805–53, UK) whose much sought-after *Illustrations of British Mycology* was issued in 1855, Anna Russell

¹The current name for this species is given as *Blumeriella jaapii* (Rehm) Arx 1961 in *Species Fungorum* (<http://www.indexfungorum.org/>) but that may need revision since the separate naming of fungal morphs was discontinued in 2011.

(née Worsley, 1807–76, UK), Margaret Plues (ca.1840–1903, UK) author of the 1864 delightfully illustrated volume *Rambles in Search of Flowerless Plants* (with a second edition in 1865), Flora Martin (née Campbell, 1845–1923, Australia), myxomycete specialist Gulielma Lister (1860–1949, UK), Beatrix Potter (1866–1943, UK), and Helen Charlotte Isabella Gwynne-Vaughan (née Fraser, 1879–1967; Ainsworth 1996) who prepared the well-used textbook *The Structure and Development of Fungi* in 1927 (2nd edn, 1937).

While a select group of women had access to higher education as early as the 1860s, the impact of systematic accredited study was not evident in the numbers of women participating in mycology until after the turn of the twentieth century. We have identified around 100 university educated female mycologists born prior to 1900 (some working on taxonomy, others on other facets of fungi). Detailed biographical accounts of many of this cohort of women graduates can be found in Creese (1998–2015) and Ogilvie & Harvey (2000).

Relatively well-documented individuals who made contributions to mycology include: Rose Stoppel (1874–1970), first German female professor of botany, Ethel Mary Doidge (1887–1965), first South African woman to obtain a doctorate (Jacobs 2016), Flora Wambaugh Patterson (1847–1928; Rogers 1981), first female mycologist at the United States Department of Agriculture (USDA; Rossman 2002), Effie Almira Spalding (née Southworth, 1860–1947), first female plant pathologist at USDA (Ristaino & Peterson 2002), and, of course, in The Netherlands, Johanna Westerdijk (1883–1961), whose foundation of the Central Bureau voor Schimmelcultures (now the Westerdijk Fungal Biodiversity Institute) underpinned Dutch taxonomic mycology in the 20th century.

We are preparing a historical analysis of early women taxonomic mycologists, with a focus on the group who were not university or college-educated, or those who, like Gulielma Lister (see above) in the UK, had some access to higher education but did not gain formal qualifications. This group were exceptional examples of women who

challenged, and helped to change, cultural norms around the participation of women in science. We are interested to hear about women who were active pre-1900 who have been overlooked in mycological history, especially those who described new taxa, but also collectors and illustrators who may have been on the threshold of making taxonomic contributions (Maroske 2014).

Our experience leads us most readily to women in the English speaking and Western world, but we are mindful that exceptional mycological women may have been active elsewhere. We especially welcome information on pioneering female taxonomic mycologists in Asia, Africa, and South America.

- Ainsworth GC (1996) *Brief Biographies of British Mycologists*. Stourbridge: British Mycological Society.
- Creese MRS, Creese TM (1998-2015) *Ladies in the Laboratory*. 4 vols. Lanham, MD: Scarecrow Press.
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- Ogilvie MB, Harvey JD (2000) *The Biographical Dictionary of Women in Science: Pioneering Lives From Ancient Times to the Mid-20th Century*. 2 vols. New York: Routledge.
- Ristaino J, Peterson P (2002) Effie A. Southworth, first woman plant pathologist hired at USDA. *The Plant Health Instructor*: DOI: 10.1094/PHI-I-2002-0201-01.
- Rogers DP (1981) *A Brief History of Mycology in North America*. Augmented edn. Amherst, MA: Mycological Society of America.
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Online game changer for tree health?



Photos: M. Coleman.

Computer games that save trees! Is that even possible? That's the aim of scientists involved in the PROTREE project funded by the Tree Health and Plant Biosecurity Initiative, and they have a big challenge to meet, with new threats to tree health arising all the time.

A consortium of seven Scottish research institutes (Royal Botanic Garden Edinburgh; The James Hutton Institute; Forest Research; Scotland's Rural College, SRUC; University of Aberdeen; The University of Edinburgh; and Centre for Ecology and Hydrology) – working with games designers Hyper Luminal Games, have come up with CALEDON. The game falls within the survival strategy genre and aims to raise awareness of tree health problems, and communicate how we might go about ensuring trees are more resilient in the future.

Since the 1970s we have had an ever growing number of tree pests and diseases arriving in the UK. Sometimes they have spread under their own steam, but more often than not we humans unwittingly give them a helping hand through global trade. Infected timber and young trees slip through the net and before too long we have a new tree health problem on our hands.

Should we shut down trade to protect our trees? No. We can't ignore globalisation if we value shared prosperity. We do need to reduce risks as much as possible, be vigilant, and adopt strategies of forest and tree management that encourage resilience. Accepting that tree health problems are here to stay highlights the need for a step change in how we deal with this inevitable aspect of forestry.

So why use computer games to tackle tree health? The hope is that through a popular and engaging medium a wide range of people, including children, can be switched on to tree health and potential new approaches to dealing with the problems we face. Engaging a new generation of potential plant health professionals is a vital part of the solution. All too often the media portrays tree health as a disaster waiting to happen. The truth is more nuanced. In nature the diversity of species and genes means that populations cope with, and bounce back from, attack. What we need to do is acknowledge and work with the natural processes that keep trees healthy. Putting it another way we need to help nature to help itself.

What does this mean in practice? Our forestry is heavily reliant on single species plantations, often with limited genetic variation between individuals. The wisdom of old sayings is worth taking note of here as this is a case of putting all our eggs in what we hope will be one highly productive basket. Unfortunately, this approach is also an ideal incubator for pests and diseases. The solution is diversity, and the hope is that CALEDON will help to get that message across.

Educational games or 'games with a purpose' are a growing niche in the market. The trick is not to lose the fun factor. The best educational games maintain a balance of reality, meaning and play. In CALEDON the player is a forest manager responsible for keeping a forest healthy and productive. Although the game follows the popular survival model, this aspect of the game is switched around so that survival becomes

something that is all about the trees and not the player.

The information needed to make informed decisions is built into an encyclopaedia that players can consult at any point in play. Further information is presented as tips after each turn. In this way the game achieves education by stealth and players learn without even realising. In the process of managing their virtual forest it will also become apparent to players what works and what does not. It is hoped that the features of the game that make it like a simulation will give it application within the forestry sector. It has potential to enable people to learn about a range of pests and diseases and to appreciate the role of diversity in building resilience.

Another motivator in the game is money. Players can fell trees to generate income in order to be able to plant more trees and deal with problems that arise, such as pathogens or herds of deer. In this way the game gives a sense of the commercial side of forestry and the balancing of issues like financial sustainability and environmental benefit. As there is potentially so much to consider at each turn this is not a fast and furious game. Instead, the game is played at the pace determined by the player. As long as there is money in the bank a player can continue making management decisions and will only advance to the next turn when no more decisions are needed or the money has run out.

Today, a small number of scientists are battling a growing number of tree health problems. By combining gaming with education, to educate widely, as well as to encourage a new generation of plant health scientists, we can have hope for the future.

CALEDON is free of charge and can be played online at www.rbge.org.uk/caledon and is also available for iPad on the App Store.

[The Editor-in-Chief thanks Joanne Taylor for drawing this initiative to his attention.]

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Fleming *Penicillium* disc sold for US\$ 14 560



© Bonhams/BNPS

A disc of the *Penicillium* labelled by Alexander Fleming (1881–1955) as part of

the original culture that led to the discovery of penicillin in 1928 was sold by auctioneers Bonhams on 1 March 2017 for US\$ 14 560 as part of a sale of various Fleming artefacts (Anon 2017), which also included letters and photographs. Similar discs have been sold in the past, and it appears that he made several such medallions as gifts. This is not the most such a disc has reached in a sale, however, as Pfizer is reported to have paid £ 23 000 for one in 1996. As might have been anticipated, the species was named as *P. notatum* in the sale particulars and *P. chrysogenum* in the report cited, the correct

identification as *P. rubens* having been overlooked (Houbraken *et al.* 2011) here as in a recent book focussing on the penicillin story (Rosen 2017; see also pp. (31)–(32) in this issue).

Anon (2017) Mould money. *Nature* 543: 155.

Houbraken J, Frisvad JC, Samson RA (2011)

Fleming's penicillin producing strain is not *Penicillium chrysogenum* but *P. rubens*. *IMA Fungus* 2: 87–95.

Rosen W (2017) *Miracle Cure: the creation of antibiotics and the birth of modern medicine*. New York: Viking.

Australian fungi photographer's footage in Planet Earth II

Fungal photographer Steve Axford, based in northern New South Wales, Australia, has produced some stunning video time-lapse of fungi that appears in *Planet Earth II*, the BBC nature documentary narrated by David Attenborough. The fungal footage is included in the Jungle episode, which was

first aired late in 2016. Iconic fungi included in the *Planet Earth II* segment include Anemone Stinkhorn *Aseroe rubra* and the luminous *Mycena chlorophos*.

You can see more of Steve's fungal photography at: <https://steveaxford.smugmug.com/> and examples of video footage at: <https://www.youtube.com/watch?v=ZpCARk689zU>. Inclusion of fungi footage in *Planet Earth* was reported on the Australian Broadcasting Commission news and in the *Australia Wide* documentary series. See: <http://www.abc.net.au/news/2017-03-11/planet-earth-fungi-photographer-stephen-axford/8346090>.

Fungi have always struggled for equal time in nature documentaries, especially in relation to their diversity and ecological significance. No matter how beautiful — static images are hard to 'sell' in documentaries. Bringing motion to fungi introduces drama, and hence human interest. Steve's fungi in motion show dramatic changes from egg to expanded stinkhorn and from primordium to mature mushroom, while capturing the evanescent

nature of many fungal sporophores. The video footage also reveals fascinating details for the developmental biologist (for example, in some agarics, a circling motion when pilei are viewed from above, as the sporophore expands). In addition, there is a cast of tiny invertebrates rushing around, taking nibbles from sporophores.

A key aspect of achieving high quality fungi video footage is avoiding unwanted movement of the subject. Steve uses a 'fungarium' where he places substrate with primordia in a moist environment, so that he can follow the production of sporophores in a still atmosphere.

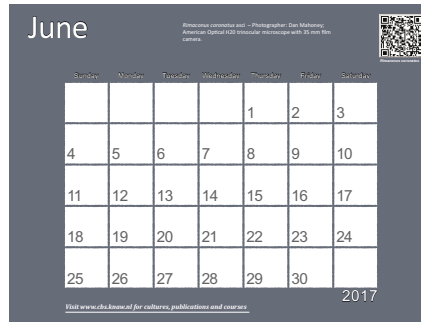
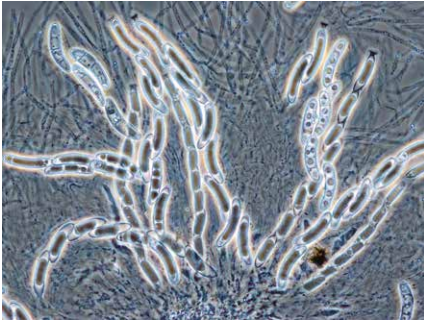
Relatively inexpensive digital video cameras are readily available. Mycologists are encouraged to create quality video, of both macrofungi and microfungi, and upload to video sharing channels, to give fungi the prominence they deserve. Perhaps one day we will be watching a whole series entitled *Planet Fungi* — something that is long overdue!

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Hygrocybe anomala at Minyon Falls, New South Wales. Image: Steve Axford, reproduced with permission.

Westerdijk calendar 2018



In April 2013 the Westerdijk Fungal Biodiversity Institute (then still CBS-KNAW) launched its new (12 month) fungal calendar series, focusing on the beauty of fungal biodiversity.

The next calendar is scheduled for August 2017, and will be handed out at the

“Leading Women in Fungal Biology” symposium (30–31 August) in Utrecht. To this end we invite all female mycologists making photographs or micrographs to submit their most beautiful fungal illustrations. Photographs of fungi cultivated in the laboratory, or observed in nature will be considered. Il-

lustrations should be identified by the species name. Images should be in landscape layout, at least 300 dpi (3600 x 2400 px) and in full colour.

The publication of the 2018 calendar is scheduled for August 2017 and the submissions for the 2018 calendar are welcome until 31 July, 2017.

Show us your fungi!

Submissions can either be sent to p.crous@westerdijkinstituut.nl or r.samson@westerdijkinstituut.nl.

For larger files we recommend using www.wetransfer.com, [dropbox](https://www.dropbox.com) or any other service that will allow you to share large files.

STOP PRESS!

IMA Fungus was issued with its first Impact Factor by Thomson-Reuters while this issue was going to press. We are pleased to inform readers that this is 4.69, placing *IMA Fungus* fourth in the mycology category. Papers from all issues from the first in 2010 are being incorporated into the Web of Science. We thank all contributors and readers for making this achievement possible.

IF = 4.69