APRIL 2024

BMS NEWSLETTER

for British Mycological Society members

Contents

Image: Aspergillus endophyticus. Ledsgaard Jensen, Mikael Rørdam Andersen, Ellen Kirstine Lyhne via Wikimedia Commons

Featured Article

BY ELAINE BIGNELL, BMS PRESIDENT

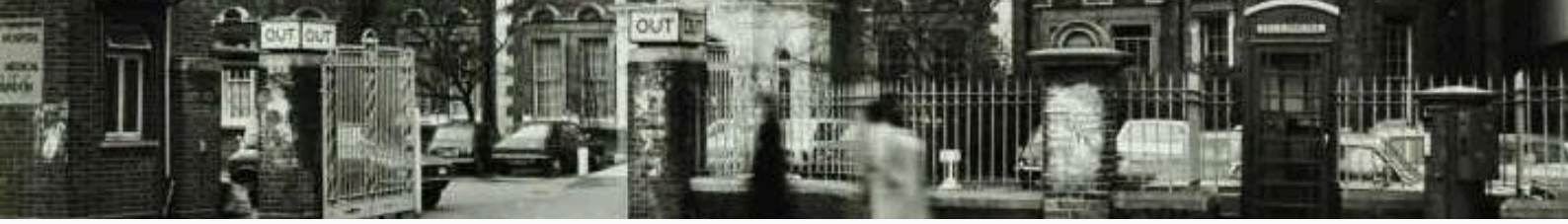
Prof Elaine Bignell is a fungal geneticist who studies the biology of fungi that infect humans, a calling that, she says, resulted from the widespread emergence of invasive fungal infections during the 1980s.

Elaine tells us about her research from those earliest days until now, and her hopes for the BMS in the coming years.

I grew up and was schooled in London during the 70s and 80s; the genetic code had been cracked 4 years before I was born and, in the 70s, fungi were hitting the headlines for all the right reasons, as they were excellent model organisms for studying gene expression in eukaryotes. At the time, a major unsolved problem of eukaryotic gene expression was how the simultaneous expression of two or more genes, which were not colocalised as an operon, could be achieved. Mammalian geneticists had proposed the existence of an integrator gene which would positively regulate genes at disparate chromosomal loci, but had not yet been able to prove it. In the 3 years between 1975 and 1978 – my future PhD supervisor Herb Arst - then a lecturer at the Dept of Genetics in Cambridge - used the model organism *Aspergillus nidulans* to prove this theory to be correct; in simple terms it was the first description of a positively acting transcription factor.

In the mid 1970s breakthroughs in medicine were also coming to fruition. Edward Donnall Thomas had spent 20 years developing treatments for leukaemia by providing new bone marrow cells for people through transplants. Using radiation and chemotherapy, he would suppress his patients' own bone marrow and then cells from a donor were provided through a blood transfusion. By the mid-70s the treatment had been well-enough optimised to become more widely adopted. The first European Centre to pioneer this treatment was the Hammersmith Hospital in West London. It was quite quickly apparent that opportunistic infections in such patients were a deadly threat, in particular those caused by fungi where options for therapy were very limited. Herb Arst was recruited to the Hammersmith Hospital in 1985 to advise the clinical microbiology department on diagnosing and treating diseases caused by *Aspergillus* species.

By the time Donnall Thomas won the Nobel Prize for Physiology or Medicine in 1990, autopsy surveys of patients reported fungal infections in 25% of patients with leukaemia. When I graduated a year later, I took a technician post with Herb in the Clinical Infectious Diseases Department of the hospital. I spent the 1990s working part-time on my PhD, characterising a regulator gene in *Aspergillus nidulans* called PacC that regulates production of secreted proteins. Under Herb's guidance I used classical genetic approaches to identify genes acting upstream of PacC; this work identified two new genes, one of which (PalH) turned out to encode a pH sensor protein that we later showed to be a major regulator of fungal pathogenicity in mammals. I am now working to discover drugs that can inhibit PalH activity.



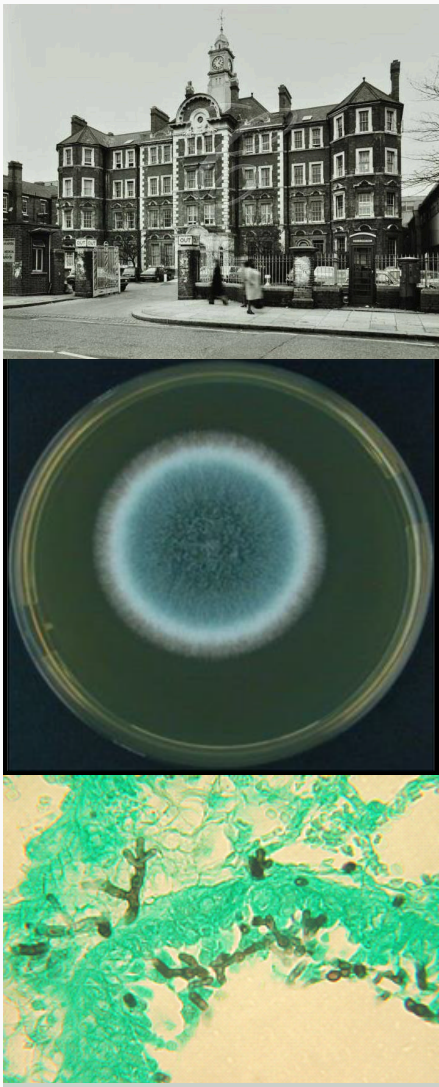
By the end of my PhD I felt I could apply my knowledge of pH signalling to the study of pathogenic fungi. And that is what I did, an ambition which was greatly facilitated by my postdoctoral mentor Ken Haynes.

My research interests cover the broad theme of infection biology. My research involves a multi-scale approach, using *in vitro*, *in vivo*, and *in silico* models of the fungal host-pathogen interaction, to identify regulatory foci driving initiation and resolution of disease. As a Postdoctoral Scientist, I demonstrated a critical role for pH signalling in fungal airway infection and using pH signalling mutants I showed that PacC must be proteolytically processed in order for disease to become established, and that this processing must occur in response to an alkaline-transduced pH signal.

Based upon these studies I secured a New Investigator MRC award to study the role of pH signalling in the major pathogenic mould *Aspergillus fumigatus* and a lectureship at Imperial College London. In 2014 my group published the first mechanistic explanation of tissue invasion which is governed by both the pH-responsive molecular switch and downstream transcription factor, PacC, thereby providing critical insight on the mechanism by which *A. fumigatus* inflicts airway damage.

Transcriptomic analysis revealed the major functional cohorts of PacC-regulated gene products to be secreted proteins thereby paving the way for discovery of the first 'effectors' of tissue invasion for a pulmonary fungal pathogen. I have now analysed more than 900 *A. fumigatus* gene products for their role in pathogenicity identifying critical roles for iron acquisition, alkaline tolerance, amino acid biosynthesis, and calcium signalling in *A. fumigatus* pathogenesis and refuting roles for oligopeptide synthesis, phosphate metabolism and several fungal proteases in fatal disease.

Over the years, I have worked on several committees of the BMS, including Fungal Education & Outreach and Fungal Biology Research. Through this work, and my various academic roles in London, Manchester and Exeter, I have developed a broad appreciation for the breadth and depth of mycology research and ecology in the UK. I am very honoured to have an opportunity to represent and steer the Society's activities as the BMS continues to strengthen and diversify its mechanisms for promoting fungi - at a time when fungi are achieving wider recognition than ever before! I am looking forward to seeing the BMS support and grow its ever-expanding community of fungal enthusiasts over the next few years, and envision that the Society's activities - including field events and scientific meetings - become increasingly internationally recognised for their excellence.



Aspergillus fumigatus is the major mould pathogen of human lungs and a frequent cause of infectious deaths in leukaemia. In 1975, Hammersmith Hospital (top) became the first European allogeneic bone marrow transplant centre, and multiple scientists at the Clinical Infectious Diseases Department studied the pathology of invasive aspergilloses. The fungus grows well at human body temperature depicted here on solid agar (middle) and in the lungs of immunosuppressed mammals (bottom).
Top photograph credit: Khayria M Abdel-Gawad. Am J Biomed Sci & Res. 2021 DOI:10.34297/AJBSR.2021.14.002043

Small Grant Report

MICROSCOPY WORKSHOP

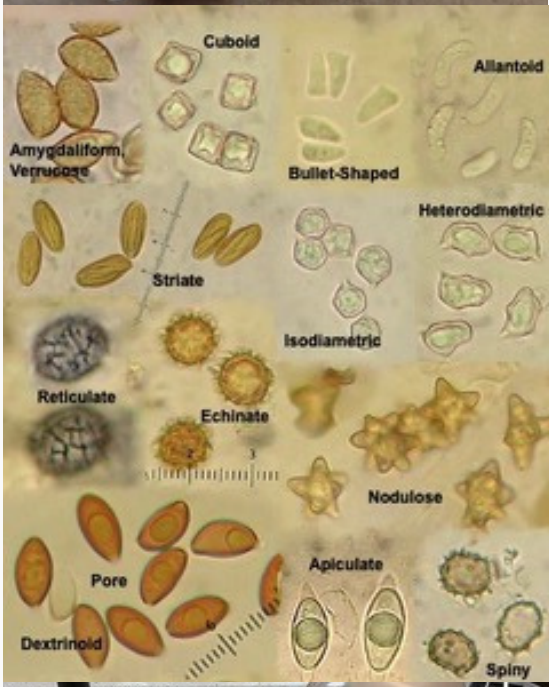
Alison Curran, Chair of the Shropshire Fungus Group

Shropshire Fungus Group held a microscopy workshop at the Field Studies Centre, Preston Montford, Shropshire in September 2023 to introduce our members to the value of using microscopy as an aid to identifying their fungi finds.

The day before the workshop, some attendees participated in a short foray in the grounds at Preston Montford with Carol Hobart, workshop tutor. We hoped to find some interesting fungal material for the workshop and, although conditions had been very dry, we managed to find enough different species to make us happy.

By the time the other attendees arrived the next day - 12 in total - we had a wealth of fungi: some immediately recognisable but others a complete mystery. Carol began by taking us through the macroscopic features to help us reach at least the genus level of identification. She also expertly took us through the proper use of MycoKey, with attendees examining a fungus specimen and supplying the answers to take us through the stages. Excitingly, it got us there!! Next, we needed confirmation of species by looking at what we had found through the microscope. Carol explained good procedure for using microscopes with 3 or 4 objectives, preparing specimens on slides, reagents and stains to use, and what microscopic features to look for. Two of our more experienced members were also on hand to impart tips and help us with our techniques.The fungal structures we saw through the microscope lenses were amazing and, when identified using the information in various keys, enabled us to confirm the fungus to species. How satisfying was that?!

Our thanks to the BMS who awarded the group a small grant to help pay for the tutor, room and microscope hire, supply of reagents, stains, slides, tweezers etc, so attendees could make the most of their day. The Shropshire Fungus Group were particularly keen to give our newer members this experience as we are hoping that they may become the mycologists of the future! Thanks to all who participated and made it a great learning experience.



Small Grant Report

THE X BRAZILIAN MYCOLOGY CONGRESS

Caio A. Leal-Dutra

From February 19th to 23rd, the X Brazilian Mycology Congress took place at the Federal University of Minas Gerais (UFMG) in Belo Horizonte, Brazil, and it marked a significant milestone for South American mycology. This prestigious event brought together over 1,000 participants from 24 out of 27 Brazilian states and 14 different countries, underscoring its importance and global reach within the scientific community.

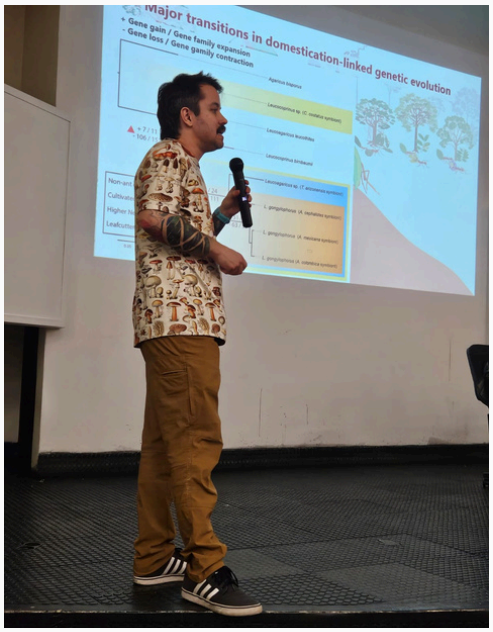
The congress focused on seven main areas of mycology, showcasing the diversity and interdisciplinary nature of the field:

- Fungal Diversity, Conservation, and Systematics
- Fungal Ecology, Evolution, and Ethnomycology
- Physiology, Cell Biology, and Genetics of Fungi
- Molecular Biology and Bioinformatics applied to Mycology (Fungal Omics/Metagenomics)
- Agricultural Mycology
- Medical and Veterinary Mycology
- Industrial, Biotechnological, and Food Mycology

These areas were explored through an impressive line-up of 195 speakers across 50 main lectures and 34 symposia, and more than 700 posters, highlighting the latest research, technological advances, and applications of mycology in various fields. Additionally, the congress featured 19 workshops and celebrated the launch of 13 books, further contributing to the academic and practical knowledge exchange.

My participation in the congress was made possible with the support of a BMS Small Grant. As a member of the scientific committee for Molecular Biology and Bioinformatics applied to Mycology, I had the privilege of contributing to the congress scientific rigor and breadth. My role involved organizing a symposium on fungus-farming insects, my main topic of interest. This symposium brought together leading researchers and sparked engaging discussions on the intricate interactions between insects and fungi. The symposium featured talks on fungus-farming ants by Mariana Barcoto and Quimi Montoya (Sao Paulo State University - Brazil), fungus-farming termites by Michael Poulsen (University of Copenhagen - Denmark), and fungus-farming beetles by Romina Gazis (University of Florida - USA).

I also presented one of the main lectures on the genomics of the fungus cultivated by leafcutter ants (*Leucoagaricus gongylophorus*), sharing our latest findings from the analysis of the first high-quality genome assembly of this fungus. This presentation was particularly meaningful to me, as it took place in the very auditorium where I attended my first undergraduate classes. Returning to my alma mater as



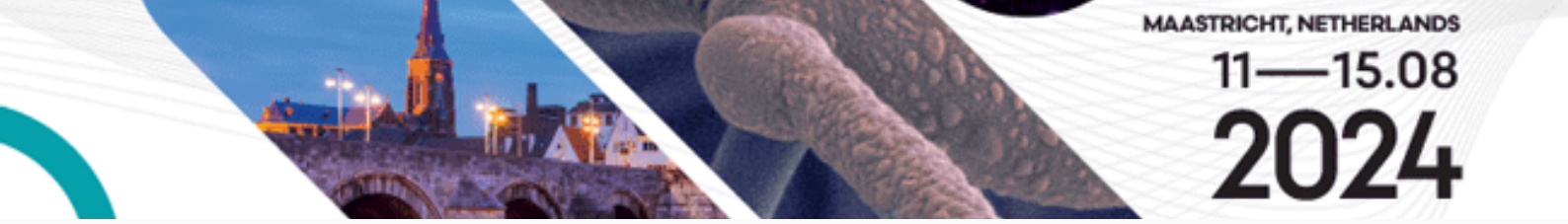
a speaker felt like a full-circle moment, deeply connecting my academic journey's beginning to my current accomplishments. In the talk I aimed to shed light on the genetic underpinnings of fungal cultivation by leafcutter ants, offering insights into fungal genetics, ant-fungal symbiosis, and potential applications biotechnology.

I had a great time at the X Brazilian Mycology Congress. The event not only fostered new connections for future collaborations, but the friendly environment of Brazilian mycology allowed me to meet with old friends acquired during my career. I am grateful for the opportunity to contribute to this event and look forward to the advancements in South American mycology. I hope to see a similar environment in Campinas (2027).

This beautiful photo of a *Chlatrus aff. cristatus* by PhD student Paula von Randow Cardoso was selected for the Maria Eneyda P.K. Fidalgo Best Photo Award.

Past and present members of Micolab-UFSC, the lab where I did my Masters.

Caio A. Leal-Dutra *is Assistant Professor of Ecology and Evolution in the Department of Biology, University of Copenhagen.*



What's On

UPCOMING BMS TALKS

APRIL 24th, 7:30pm, online
Exploiting fungal sex for food production and food security
Alex Pate, Lisa Humbert and Jonathan Heale share their research on fungi important in mycoprotein production, disease of oilseed rape and brassica crops, and better blue cheese.

MAY 22nd, 7:30pm, online
Lukas Large - fungi in the West-Midlands
Lukas is the curator of natural science at Birmingham Museums Trust. Previously he worked at the Royal Botanic Gardens, Kew on the 'lost and found fungi project'. Lukas regularly leads forays with the West Midlands Fungus Group.

JUNE 13th, 7:30pm, online
Henry Beker
Henry J Beker is a professor and Honorary Fellow at Royal Holloway, University of London. He started his career as a mathematician and later became involved in informatics and information security. Henry's interest in mycology began in the 1990s and, since 2005, his mycological research has focused solely on *Hebeloma*.

Upcoming BMS Talks are advertised on the BMS website. Also see the website to access recordings of past talks: www.britmycolsoc.org.uk/resources/events/bms-talks

IMC12 EARLY CAREER MYCOLOGISTS SYMPOSIUM

Are you a student or a scientist within 10 years of your last degree (BSc, MSc, PhD)? Keen to showcase your research on fungi and connect with peers and potential collaborators? This symposium is tailor-made for you! The IMC12 Early Career Mycologists Symposium is a unique gathering designed by and for emerging talents in mycology.

- Engage with a vibrant community of young mycologists and renowned experts.
- Enjoy insightful talks on a wide array of mycological topics.
- Learn from educational sessions led by Prof Neil Gow and Dr Adriana Corrales
- Compete for one of the two prestigious "Best Presentation Prizes".

> Register by May 21 and save!

What's On

INTERNATIONAL MEETINGS & CONFERENCES

FEBS Advanced Lecture Course - Molecular mechanisms of host–pathogen interactions and virulence in human fungal pathogens (HFP2024)
18 - 24 May, La Colle-sur-Loup, France

The aim of this course is to share the latest knowledge on biochemical, molecular, and genetic mechanisms of fungal pathogenesis with early-career scientists. Offering valuable networking opportunities with renowned experts in the field, the meeting will play a significant role in enhancing the training of PhD students and post-doctoral fellows engaged in the investigation of fungal pathogens and the control of fungal infections. **> Event website**

Gordon Research Conference - Cellular and Molecular Fungal Biology. Understanding Complex Fungal Communication: Mechanisms, Interactions, and Consequences
16 - 21 June, Holderness, New Hampshire, USA

Fungal communication is fundamental to the ability of fungi to colonize substrates, compete for resources, interact with one another for sexual or parasexual reproduction, infect host organisms to cause disease, and for all forms of mutualistic symbioses and commensal interactions. This meeting will focus on the exquisite and diverse examples of how fungi communicate and interact with other microbes, hosts, and the environment. **>Event website**

International Conference on Mycorrhiza (ICOM12)
4 - 9 August, Manchester, UK

The theme of ICOM12 is "Bridging gaps in form, function and diversity". Alongside showcasing some of the most exciting and cutting-edge mycorrhizal research, this conference aims to address its theme through conversation, culture, gastronomy and fun. **> Event website**

Small Meeting on Yeast Transport and Energetics (SMYTE 2024)
28 August - 1 September, York, UK

Talks will cover structure, function and regulation of transport across different fungal membranes, including various pathogenic and non-pathogenic species. An array of cellular processes regulated by transport and bioenergetic mechanisms will be discussed, including homeostatic control, physiology under normal and stress conditions, and contributors to drug resistance. **> Event website**

Workshop Summary

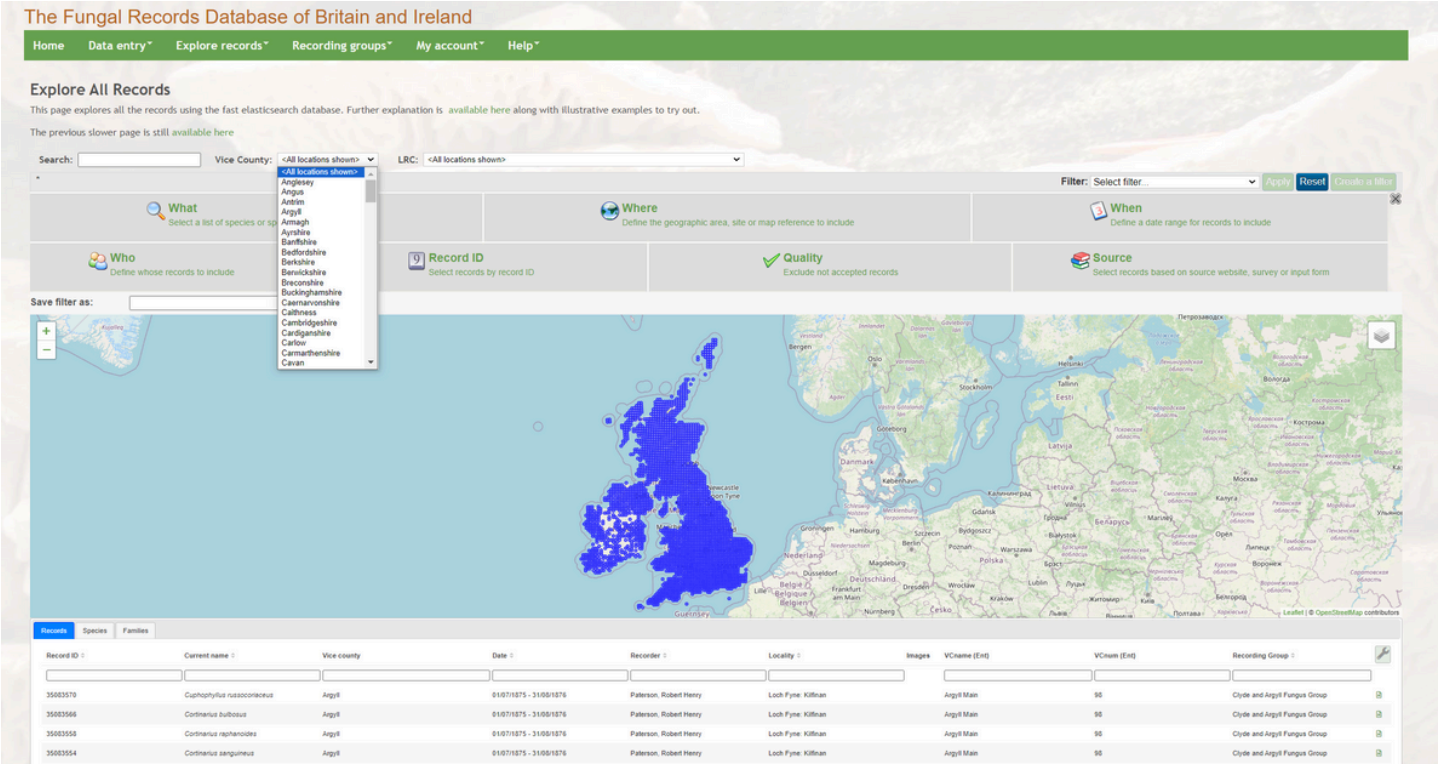
COMING TO GRIPS WITH THE FRDBI

Linda Seward

As a newly fledged mycologist, I had taken the plunge into recording my fungal finds on the FRDBI but found it a bit daunting. Recently our local group contacted the FRDBI manager, Stuart Skeates, to request some training on how to come to grips with this important tool. Stuart delivered an online workshop for us and we came away feeling much more confident about recording our finds. The BMS hosted our meeting on their Zoom account which has no time restrictions - this was fortuitous as, much to our surprise, the session lasted 3 hours!

One of the first things we covered was the fact that there is a "Training mode" for beginners to practice entering records that will not be seen by anyone else. This is a good idea if you are uploading data for the first time.

We learned that all the records are stored by the Biological Records Centre data centre (which includes iRecord) and the site is maintained professionally. There is a huge amount of storage space, so adding photos to confirm identifications and support your records is encouraged - four photos can be added for each entry and if possible, these should include important characteristics such as gills, stipe, cap, etc.



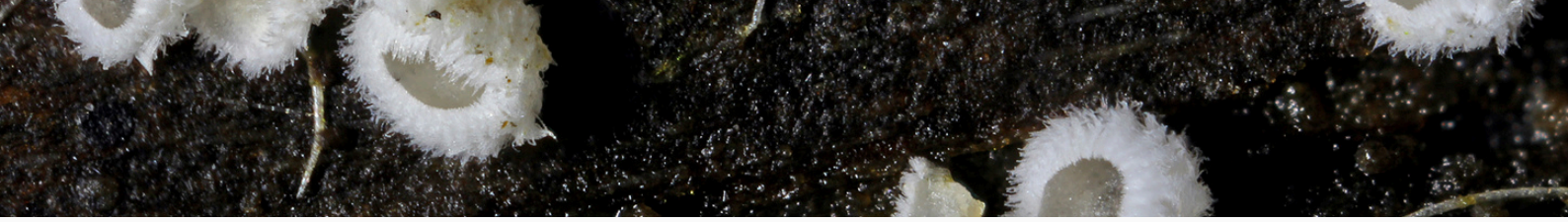
Determining the correct Vice County is an important consideration. Vice-County boundaries were originally defined by H.C. Watson in 1852 and many biological recording schemes still use these boundaries, which have remained unchanged since then. Some modern county boundaries have been revised, so you need to put both on the page. To find out the correct Vice County for your survey before you begin uploading records, go to: www.brc.ac.uk/article/british-vice-counties. (The system will calculate the VC from the entered Grid Reference as well.) It is also possible to map your own boundaries for specific sites on the FRDBI; Stuart demonstrated this during the talk.

We learned how to edit and/or delete records, which is not a difficult process once you know how. There was considerable discussion about the substrates and qualifiers, which was most helpful. Stuart also talked about how to search for records and use filters.

I won't go into further technical details here because these are all explained on the FRDBI itself. However, it is always easier to watch someone uploading records and have the opportunity to ask questions, so do contact Stuart if you would like some excellent instruction – he is more than willing to help other groups in the same way. We recorded our session and are now able to watch it to refresh memories when required!

One final note: the underlying software for the FRDBI is being upgraded and 50-60 pages are being rebuilt by Stuart. He will write an article for this newsletter with details once this has been formalised. To contact him, send an email to: stuart@frdbi.org.uk. I can be contacted at: lindaquilter@icloud.com

Linda Seward *is a member of the BMS Council. Linda first joined the BMS in February 2021. Until the pandemic, she had spent her career in magazine and book publishing, and is an internationally recognised quilt judge, lecturer, teacher and the author of 13 books on quilt making. The lockdown changed her life when she began to study the natural world in earnest, photographing and researching everything she found on daily walks. She discovered fungi in November 2020 and is now totally immersed in mycology. She runs the website and Facebook page for her local fungus group and writes articles for regional newspapers and magazines, hoping to interest newcomers to the world of fungi.*



Small Grant Report

STUDIES OF THE CYPHELLOID FUNGI - USING THE BENTO LAB DNA EXTRACTION EQUIPMENT

Peter R. Smith

I first took an interest in cyphelloid fungi in 2011 when I collected *Schizophyllum amplum* at my local park. I struggled to get an ID, because it was not included in the books available at the time. When I finally managed to get the collection identified, I found that there were only about thirty British records, and when I started locally searching for this species, another five sites were found within half an hour drive from my home. This inspired me to start searching for other cyphelloid genera, but I found that suitable literature was in short supply. Also it appeared no one else was looking at this group of fungi. Therefore I started collecting as many papers that I could obtain, having to translate many into English. I now believe I have descriptions for all the currently described species of cyphelloid fungi. My interest was further accelerated on collecting a new genus and species to Britain and Europe, with *Incrustocalyptella columbiana,* previously only known from the type collection in Columbia. (Smith 2021, *Field Mycology* 22 (2) p61-36).

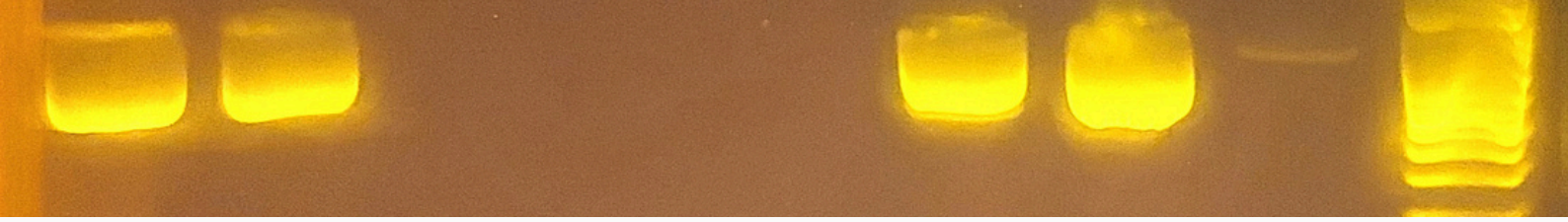
To date it appears that there is still no one else systematically studying this group of fungi. Rheinhard Agerer's last paper was published in 2005, and Philomenia Bodensteiner's last paper was in 2007. More recent papers are usually just to describe a single newly found species, or the inclusion of a few cyphelloid species in phylogenetic tree for other groups. However, more recently Heinrich Lehmann studied cyphelloid taxa in northern Germany for ten years and published a book on the German species in 2020, but has now moved on to other groups.

Advantages and limitations of DNA sequencing for cyphelloid taxa

Most mycologists initially use DNA sequencing to get a match from the Genbank database to their own collection, to help with identification. However, there are only a small percentage of cyphelloid taxa that have been sequenced, so in most case you cannot use DNA in this way. Therefore, it is of more use to confirm differences rather than similarities, and to confirm similar collections are actually the same. I will not be able to appreciate the full benefits of DNA sequencing until I have acquired a lot of sequences to compare. Eventually I am hoping to be able to construct a comprehensive phylogenetic tree from all my collections and to include all the cyphelloid sequences from Genbank.

DNA extraction

As the majority of cyphelloid fungi are around 0.3 mm in diameter and more often than not you only find a small number of basidiocarps, I needed an extraction protocol that would work consistently well for tiny samples. For the last six months I have been experimenting by tweaking existing protocols such as the HotShot and Dipstick methods supported by Bento Lab. I have tried using much reduced volumes of reagents to match the reduced size of the fungal samples and replacing heating steps with microwave radiation. I am slowly getting better results but they are certainly not yet consistent. As my



samples are usually extremely small, all the preparation - including mechanical damage to the cells - has to be done under the dissecting microscope.

Gel electrophoresis test

Fig. 1 shows the results of a typical gel electrophoresis test for one of my extractions. For anyone who is not familiar with this type of result, it is just a quality check to see if the DNA extractions (amplicons) are good enough to pay to have them sequenced. When you extract the DNA, you amplify a small section (ITS) that is around 600 base pairs long, so all the amplified DNA fragments from each fungi sample should be more or less the same size. A very small amount of solution containing the extracted and amplified DNA fragments is introduced into a row of small wells at the top of the plate and an electric current is applied to the gel. This drags the fragments down the plate; the smaller the fragments, the further they travel through the gel. A commercially produced mixture of DNA fragments of known sizes, with a separation of 100 base pairs and called a 'DNA ladder' is introduced in one well to act as a size grade comparison. In my example it is in lane 9. A florescent dye allows visual inspection of how far the fragments have travelled. As all amplified ITS fragments should be about the same size (600 base pairs) all the different fungi samples (one per lane) should form into a single narrow horizontal band level with the 6th row on the DNA ladder. Two separate bands for any sample indicate contamination. In my example, lanes 1, 2, 6 & 7 are very good, lane 8 is very weak and lanes 3, 4 & 5 have failed completely. The second lower band of smaller fragments is quite normal. It is the small DNA fragments left over from the amplification (PCR) process and can be easily discounted at the sequencing stage.

DNA sequencing

My first batch of eight amplicons was sent for sequencing at the end of February 2024. This resulted in three good results, two reasonable and three very poor. A big problem is that I have some collections where my herbarium material only consists of very few or even just a single specimen, so I need to by confident that I will get a positive result before I commit my last basidiocarp from such collections. One such example is a collection from a local nature reserve of an undescribed species of *Glabrocyphella*. This is a genus of thirteen species mostly known from single type collections only. Interestingly, when I made my collection, the basidiocarps on initial inspection appeared to be very gelatinous, until I realised that although appearing to grow on wood, they were actually sitting on or in a transparent gelatinous slime of unknown origin. I was able to extract one basidiocarp with a trailing rhizomorph with branching hyphae, complete to the extreme tip, indicating it had not penetrated into the underlying wood. (See Fig. 2) Another *Glabroscyphella* species collected from animal dung in Spain was noted to be in close proximity to algal slime. It is now thought that it was most likely associated with the slime rather than the dung. Such a specialised substrate requirement might help to explain why they are seldom collected.

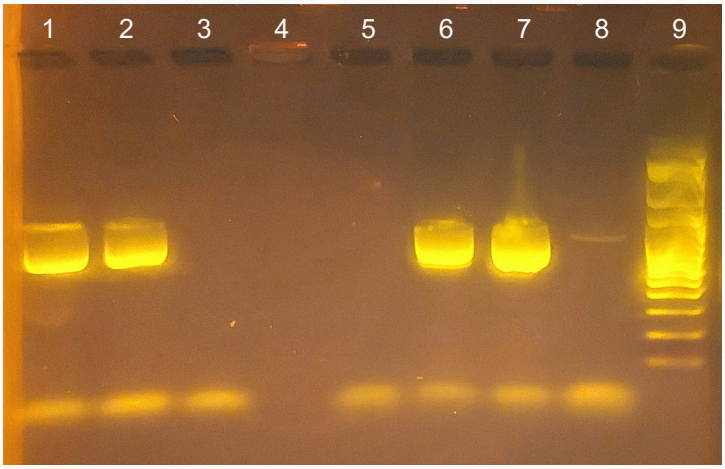


Figure 1. Results of a typical gel electrophoresis test

Why are the cyphelloid fungi not studied by many mycologists?

I suspect that most species are a bit too small for most mycologists who have particular interests in the basidiomycete fungi. I also suspect that they are frequently collected by mycologists interested primarily with ascomycetes but are often binned when no asci are found. Or perhaps they might be binned after failed identification attempts, due to the absence of comprehensive literature. If there are mycologists finding cyphelloid species, I am always happy to receive material providing that: a) There are at least twenty basidiocarps, b) They are sent fresh, kept moist and protected from damage. This is important so that I can take a photograph and also, so that I can make a spore print. To have a good chance of success with many cyphelloid determinations, you need to make a spore print in order to see and measure the full range of the spore shapes and sizes. If you do find suitable material that you wish to send to me, please contact me.

The group of cyphelloids with white spores and white crystal encrusted hairs are especially problematic. The group contains the genera *Flagelloscypha* (37 sp.), *Lachnella* (14 sp.), *Nochascypha* (4 sp.), *Calathella* (5 sp.), *Cephaloscypha* (1 sp.), *Seticyphella* (3 sp.), *Heterosypha* (2 sp.), *Pseudolasiobolus* (1 sp.) and *Incrustocalyptella* (2 sp.). For convenience, I will call this group 'The Lachnelloscypha Group' - morphologically they are all very similar-looking and so they all require careful microscopical study.

Figure 2. Basidiocarp from *Glabroscyphella* sp.

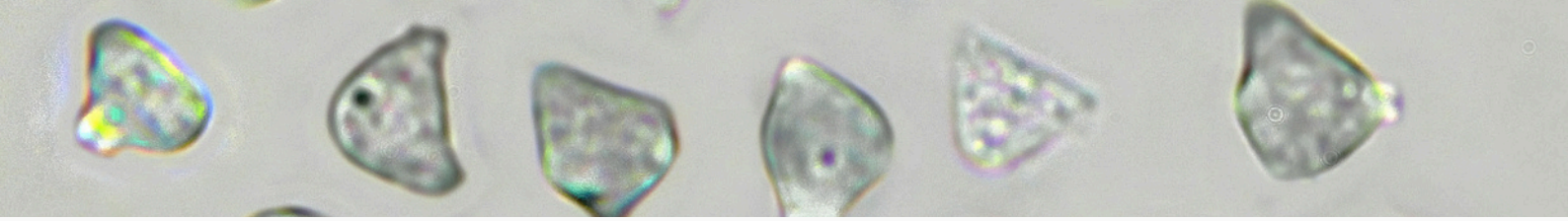
The potential scope for finding new species – an example

Following the suggestion in Heinrich Lehmann's book to search in tall herb meadows, especially for the 'Lachnelloscypha Group', I made my first visit to a local site with lots of tall herbs in the spring of 2023. During a single two-hour collecting session, I made twelve separate cyphelloid collections, consisting of four species: *Lachnella villosa*, *Flagelloscypha abruptiflagellata* (new to Britain), *Flagelloscypha fusispora* (a new species to Europe that I have now also found at three other sites) and a *Flagelloscypha* species which may be undescribed!

The genus *Flagelloscypha* - as an example of some current difficulties and lack of previous collections

In the genera *Flagelloscypha,* the book *Funga Nordica*, lists just eight species, excluding species now moved to other genera. In Genbank there are several sequences for un-named species, but out of the 37 known species worldwide, there is only one named species represented. This is the most commonly recorded one, *Flagelloscypha minutissima* (see Fig. 3). However, these Genbank sequences appear to represent several different species, with none having a link to any type or reference collections. Historically, the taxonomy of this species is problematic. The currently-used descriptions appear to describe a different taxon than the type description. Agerer (1975) lumped three species under the name *F. minutissima* and a fourth species was included later. In Denmark, mycologists are collecting at least two different forms and are considering splitting this species into two separate species.

To date, I have found nine named *Flagelloscypha* species (some awaiting DNA confirmation), and five of these are not included in *Funga Nordica;* this is along with another six collections that do not appear



to match existing named species and require DNA sequencing to confirm they are different from the described species. For some of these collections I have already got a good sequence but, for others, frustratingly I have exhausted all my material on failed DNA extractions. However, one of the undescribed species has particularly well-defined and unique features. It occurs in great quantity each year at one of my local sites and I have now also found it at three other British sites. I am calling it *Flagelloscypha dacryspora nom. prov.* I am looking for a professional mycologist to help me get this new species published. I can obtain plenty of fresh material so if anyone would like to help, please contact me!

Figure 3. *Flagelloscypha minutissima*

Interestingly, along with my collection of *Incrustocalyptella columbiana*, I have now collected two *Flagelloscypha* species that were previously also only known from collections in Columbia; these are *F. fusispora*, which I now also found at two other British sites. It has very long naviculate spores (see Fig 4). The last of the Columbian species is *F. tetraedrispora* with its amazing pyramid shaped spores (see Fig. 5). The reason these and many other cyphelloid species have been collected in Columbia is that Reinhardt Agerer and his professor Franz Oberwinkler have made collecting trips there, along with their students.

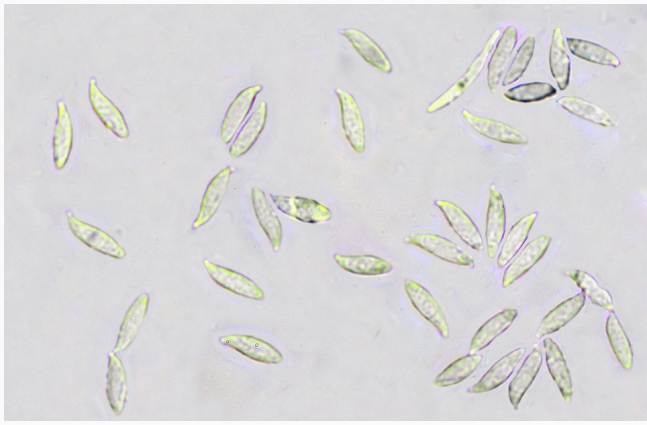


Figure 4. Spores of *Flagelloscypha fusispora*

In conclusion, I feel that I am just scratching the surface with this exciting - and very much under-recorded - group of fascinating little fungi, and there will be much more to discover and lots of DNA work to keep me busy. Hopefully in a couple of years time, I will be able to publish a book on the European species to help and encourage further study by others.

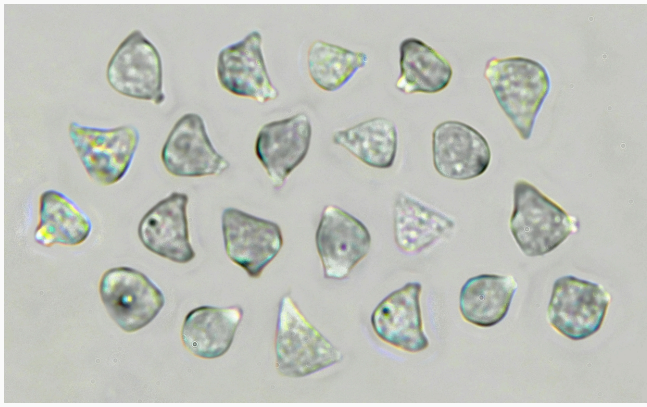
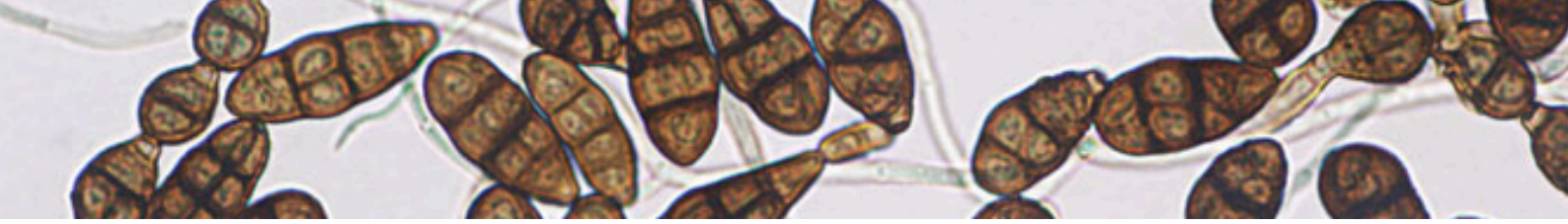


Figure 5. Spores of *Flagelloscypha tetraedrispora*

Thanks to: The BMS; for financial help with equipment and sequencing. Alick Henrici; for his continuing help with taxonomic problems and keeping me on the straight and narrow. Martyn Ainsworth, Thomas Laessoe, Jens Peterson, Brian Douglas and David Harries, and many others for their help and support.

Peter Smith can be contacted by email: psmith840@gmail.com



Research Focus

IN THE BMS JOURNALS

Turmeric treatment reduces black rot in cherry tomatoes

Turmeric, or curcumin, a natural bioactive compound derived from *Curcuma longa*, has been widely recognised for its antifungal properties. In this paper, the authors report on the effects of curcumin on the phytopathogenic fungus *Alternaria alternata*, which causes black rot in cherry tomato fruit. Results demonstrated that curcumin treatment significantly inhibited mycelial growth and spore germination in a dose-dependent manner. Scanning electron microscopy revealed alterations in the morphology of the mycelia treated with curcumin, and curcumin treatment also led to an increase in malondialdehyde and hydrogen peroxide, indicating cell membrane damage in the fungus. The paper reports that curcumin exhibited a remarkable inhibitory effect on the incidence and lesion diameters of black rot in the cherry tomato fruit.
Chenchen Qi et al. Fungal Biology April 2024
doi.org/10.1016/j.funbio.2024.02.005

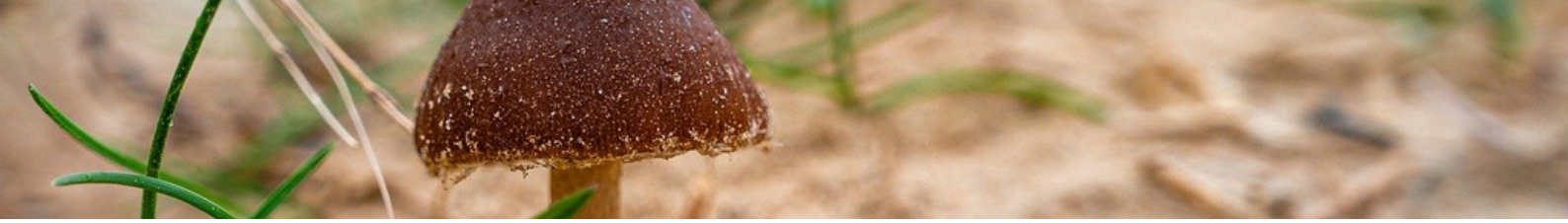
Targeting sphingolipids in antifungal drug resistance

Sphingolipids are major constituents of the plasma membrane that can act as structural and signalling molecules in diverse organisms such as animals, plants, and fungi. The metabolism of fungal sphingolipids has gained increasing attention due to its relevance in the context of pathogenicity and therapeutic intervention for fungal infections. This review addresses the impact of sphingolipid metabolism and its regulators on antifungal drug resistance, as well as how these molecules can be effectively targeted to improve the efficacy of currently available antifungal drugs.
Kalra et al. Fungal Biology Reviews March 2024
doi.org/10.1016/j.fbr.2023.100342

Fungal language?

All cells generate electrical energy derived from the movements of ions across membranes and although fungal hyphae exhibit electrical fluctuations, their regulatory role(s), if any, is still unknown. In the paper "Language of fungi derived from their electrical spiking activity" Andrew Adamatzky concludes that the patterns of electrical fluctuations he detects can be grouped into "words" analogous to those found in human languages. Adamatzky also speculates that this "fungal language" is used "to communicate and process information" between different parts of the mycelium. In this review paper, the authors argue that the presumption of a fungal language is premature and unsupported by the evidence presented.
Blatt et al. Fungal Ecology April 2024
doi.org/10.1016/j.funeco.2023.101326

Image at top: Alternaria alternata spores. Credit: Abdulghafour via Wikimedia Commons.



News in Brief

FUNGI AT WESTMINSTER

On 7th February 2024, a panel of six expert fungal biologists was invited to address an Inquiry of the House of Commons Science, Innovation and Technology Committee (SITC) on the theme of "Harnessing the Power of Fungi" . The panel included BMS members Professor Paul Dyer (University of Nottingham) and Professor Marc Stadler (Helmholtz Centre for Infection Research, Germany), alongside Professor Irina Druzhinina (Royal Botanic Gardens, Kew), Professor Matthew Fisher (Imperial College London), Dr Merlin Sheldrake (Biologist and Author) and Professor Katie J Field (Professor of Plant-Soil Processes, University of Sheffield).

The session explored how the remarkable and diverse properties of fungi can be harnessed to improve human health, tackle environmental and engineering challenges and increase food security. See: "Zombie apocalypse or environmental saviours? SITC holds a one-off session on the incredible world of fungi" The session was recorded and broadcast live on Parliament TV: watch the recording.

WATCH TALKS ON FUNGI AROUND THE WORLD

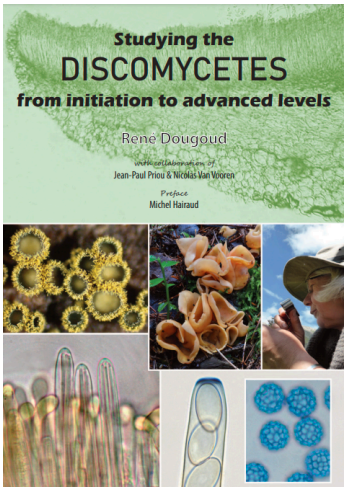
Last autumn, the BMS hosted a seminar of twelve international speakers talking about fungi from all continents. The seminar was created and chaired by Prof Lynne Boddy, University of Cardiff. You can now watch recordings of the talks at your leisure:

- Aquatic fungi - Sally Fryar, **Australia**
- What is the world distribution of wood decay by fungi? Implications for climate change - Yu Fukasawa, **Japan**
- Two decades of lichen research in Thailand - Ek Sangvichien, **Thailand**
- Fungi diversity and importance in Benin Republic - Bernice Bancole, **Republic of Benin**
- Africa's mushrooms: their cultural and socioeconomic significance towards the continent's sustainable development - Nailoke Kadhila, **Namibia**
- Mapping underground mycorrhizal networks - Bethan Manley, **UK** and **USA**
- Home is where the heart rot is - Lynne Boddy, **UK**
- Polar mycology - Kevin Newsham, **UK**
- Tropical mycology: good, bad and beautiful - D Jean Lodge, **USA**
- The biology behind the Zombie-ant fungi - Joâo Araújo, **USA**
- Don't forget about the single cells: Yeast ecology in forest environments - Primrose Boynton, **USA**
- Fungal diseases of food plants - Silvia Restrepo, **Colombia**

> Access all recordings via the BMS website

News in brief

STUDYING THE DISCOMYCETES, FROM INITIATION TO ADVANCED LEVELS - RENÉ DOUGOUD



This richly illustrated manual is aimed at beginners and more experienced mycologists alike, covering all levels of study of the ascomycetes known as "Discomycetes", mainly the Helotiales, Pezizales and Orbiliales. Where and how to collect them, what to look out for, what literature to consult? The explanations, advice, photos and drawings will help you to approach and describe these fascinating mushrooms.

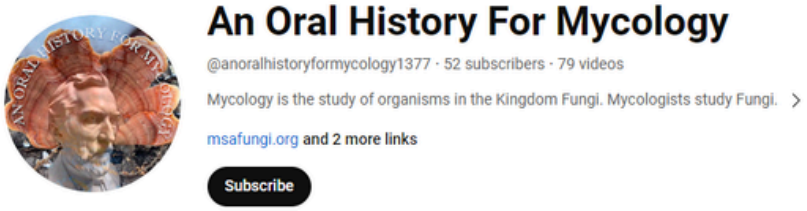
"After the large success of the French version in 2023, we've been asked many times for an English version. We do thank our late friend Chris Yeates and Caroline Hobart from the British Mycological Society for their most valuable help in the translation!"
Michel Hairaud, President of Ascomycete.org

> More about the book

AN ORAL HISTORY FOR MYCOLOGY

At the International Mycological Congress of 2018, Dr Meredith Blackwell recorded interviews with 32 mycologists from more than 20 countries to hear about changes that occurred over their careers, and to learn about the experiences of those at the very beginning of their careers. Since then, Meredith has continued the 'Oral History for Mycology' project, and there are now 79 recorded interviews available to watch.

> Visit the YouTube channel



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