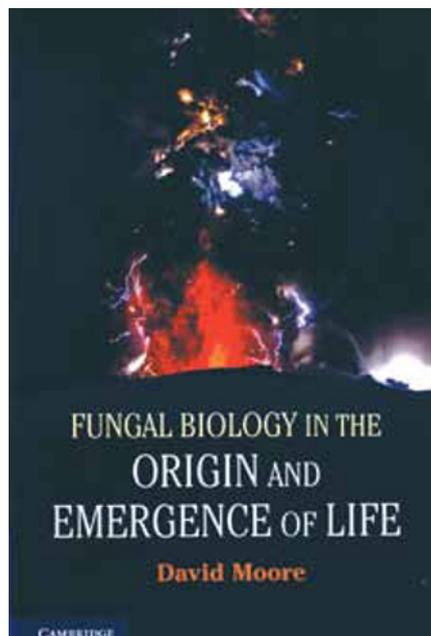


Fungal Biology in the Origin and Emergence of Life. By David Moore. 2013. Cambridge: Cambridge University Press. Pp. vi + 231, illustr. 28, tables 2. ISBN 978-1-107-65277-4. Price £ 27.99.



David Moore has made an immense personal contribution to bringing mycology to the fore, not least in a major textbook (Moore *et al.* 2011; see *IMA Fungus* 2 (2): (62), December 2011) and semi-popular exposé (Moore 2001). In this new and challenging book, David aims to place fungi centre-stage in the origin and evolution of life. Following discussions of earlier theories of the origin of life, he argues that biofilms formed from aerosols, storms, volcanic plumes, and rain in volcanic caves 4 Bya (billion years ago). In a carefully researched and argued series of chapters he explains how these biofilms contributed

to the formation of the first prokaryotic cells, and subsequently to basal eukaryotes around 1.5 Bya, and the features of the Last Universal Common Ancestor (LUCA) of life as we know it. *Tappania*, dating from just under 1.5 billion years, is interpreted as a sclerotial fungus; the structure is compared to sclerotia in *Coprinopsis cinerea*. The enigmatic Ediacarian fossils (630–542 Mya), which some have interpreted as fungal are not discussed. However, the mid-Ordovician 8 m tall columns of *Prototaxites*, which occur from around 460 Mya into the Devonian, are accepted as fungal.

Attention is drawn to evidence that the Eukaryotic Last Common Ancestor (ELCA) emerged through the sequence: free cell formation, filamentous growth, cell fusion, and septum formation – all features of modern fungi. He suggests that ELCA was “very similar to what would today be called a chytrid fungus” (p. 192). It is suggested that present day animals and protozoa developed from such fungal-like organisms after septum formation had arisen, while plants (including red algae) and chromists diverged from the same common line at the earlier free cell formation stage. Endosymbiosis of bacteria and their development as organelles in eukaryote cells is seen as a key phenomenon. David, whose specialism is the developmental biology of fungi, notes that the underlying logic and principles of developmental biology in animals, fungi, and plants are the same. His evolutionary and development-based insights to some extent remind me of the approaches

of Arthur H Church (Mabberley 1981) and Corner (1964) to the origins of Life on land, and I was surprised not to see their works in the extensive list of references cited.

The original and stimulating thesis presented here is sure to occasion considerable debate amongst cell biologists, molecular phylogeneticists, and palaeontologists. There is much to reflect on and to challenge workers in all these fields, who should try and secure a copy to consider, perhaps during a long journey when time can be devoted solely to it. Hopefully, this inspired book will lead to a renewed search for, and new interest in, putative fungal remains in the earliest fossil deposits. Dated fossils are crucial to the ground-truthing of the timing of events in molecular chronologies of the whole tree of Life, and it will be interesting to see whether it becomes generally accepted over the next 5–10 years that ECLA was indeed a fungal-like organism.

Corner EJH (1964) *The Life of Plants*. London: Weidenfeld & Nicolson.

Mabberley DJ (ed.) (1981) *Revolutionary Botany: ‘Thalassiophyta’ and other essays of A. H. Church*. Oxford: Clarendon Press.

Moore D (2001) *Slayers, Saviors, Servants, and Sex: an exposé of Kingdom Fungi*. New York: Springer Verlag.

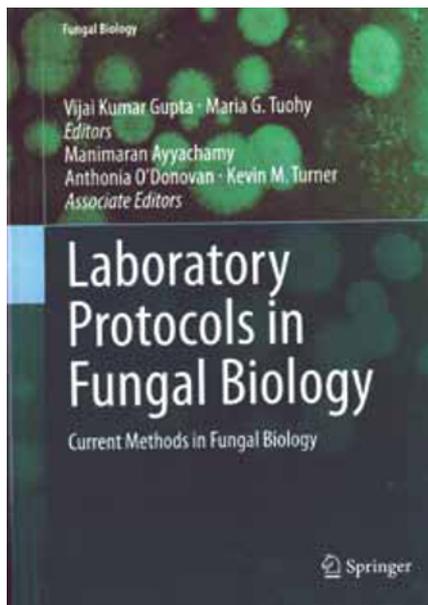
Moore D, Robson GR, Trinci APJ (2011) *21st Century Guidebook to Fungi*. Cambridge: Cambridge University Press.

Laboratory Protocols in Fungal Biology. Edited by Vijai Kumar Gupta, Maria G. Tuohy, Manimaran Ayyachamy, Anthonia O’Donovan & Kevin M. Turner. 2013. [Current Methods in Fungal Biology.] New York: Springer. Pp. xxv + 604, illustr. 117. ISBN 978-1-4614-2355-3 (hdbk), 978-1-4614-2356-0 (e-Bk). Price: £ 180.00 (hdbk). £ 144 (eBk).

Every subject needs a *vademecum*, a sourcebook where everything is to be found. For the laboratory mycologist, this is a major step to that end – and something not attempted in such depth since the classic compendia of Booth (1971) and Stevens (1974)! Such works are especially valuable to mycologists working in isolation with no mentors to hand. In contrast to the discursive overview of experimental methods by

Maheshwari (2005), this new book is very much hands-on, and covers an extraordinarily diverse range of topics. The editors have marshalled 113 authors to produce 57 chapters. The topics covered include safe handling, cryopreservation, mycotoxin detection, microscopic methods, scanning electron microscopy, atomic force spectroscopy, Fourier-transform microscopy, media, screening, staining methods, numerous PCR-based

methods, air sampling, molecular fingerprinting of soils, transformations, microsatellite markers, protoplast fusion, enzyme production, volatile compound detection, microarrays, bioinformatics, data mining, and genome/proteome annotation. Of course everything could not be covered, and there are excellent volumes on methods relating to fungal products (Keller & Turner 2012; see *IMA Fungus* 3 (2): (60)–(61), December 2012),



and lichen-forming fungi (Kranner *et al.* 2002) from the same publishing group. However, and perhaps deliberately, there are no chapters on molecular phylogenetic,

mycorrhizal, experimental ecological, or phytopathological methods; to do justice to those areas would inevitably have increased the size of the volume. Considering the constraints of space, it did surprise me, to find an attempt at a 16-page artificial key to the genera of lichen-forming fungi; that seemed quite out of place as no similar keys were included for other fungi, and might have been better omitted as it is not comprehensive and so might mislead.

The editors have evidently been very strict with their authors as wherever appropriate material and equipment required is enumerated, followed by recipe-format step-wise methods, and often also by data analysis and interpretation – just what someone wishing to try a new technique requires. They are to be congratulated on this achievement! Chapters are well-referenced to primary literature, and there are numerous links to websites. There are numerous illustrations,

most clearly presented, and in some cases using colour.

This is a reference work that deserves to be accessible in all mycology laboratories, but I do wonder why Springer did not issue this as a volume in *The Mycota* . . .

Booth C (ed.) (1971) *Methods in Microbiology*. Vol. 4. London: Academic Press.

Keller NP, Turner G (eds) (2012) *Fungal Secondary Metabolism: methods and protocols*. [Methods in Molecular biology.] New York: Humana Press.

Kranner I, Beckett RP, Varma AK (eds) (2002) *Protocols in Lichenology: culturing, biochemistry, ecophysiology and use in biomonitoring*. [Springer Lab Manuals.] Berlin: Springer.

Maheshwari R (2005) *Fungi*. [Experimental Methods on Biology vol. 24.] Boca Raton: Taylor & Francis.

Stevens RB (ed.) (1974) *Mycology Guidebook*. Seattle: University of Washington Press.

Ophiostomatoid Fungi: expanding frontiers. Edited by Keith A. Seifert, Z. Wilhelm de Beer & Michael J. Wingfield. 2013. Utrecht: CBS-KNAW Fungal Biodiversity Centre. [CBS Biodiversity Series no. 12.] Pp. ii + 337, illustr. ISBN 978-90-70351-94-6. Price: 75 €.

The ophiostomatoid fungi include some particularly virulent tree pathogens and wood-stainers, and so an authoritative systematic treatment is of considerable importance. An international workshop of specialists working with these fungi was held in association with IMC4 (Regensburg) in 1990, and led to the publication of a major wide-ranging review (Wingfield *et al.* 1993). With the advent of molecular phylogenetics, and the accelerating discovery of new species, an up-date was becoming long overdue – and here it is! The basis of this revision was a second international workshop held in association with IMC6 (Cairns) in 2006, with updates since that time made necessary by the ending of dual nomenclature for pleomorphic fungi in 2011. The editors welcome the latter change, and note that “a new era of nomenclatural clarity and stability should emerge” (p. ii).

This volume is only a modest 44 pages (15%) longer than its predecessor, and the number of chapters has reduced from 30 to 21. The contributions are arranged in five sections: Taxonomy and Phylogeny (5 chapters); Biodiversity (6); Ecology and Pathology (4); Economic and Applied Aspects (5); and Frontiers

(1) – plus a Nomenclator as an Appendix. Molecular studies have confirmed the placement of *Ceratocystis* in *Microascales* (*Sordariomycetidae*), and *Ophiostoma* in *Ophiostomatales* (*Hypocreomycetidae*), and also enabled to position of numerous taxa only known as conidial morphs to be resolved. The disposition of all genera referred to these groups in the past is considered, and there are very helpful diagrams of ascospore types and asexual morphs. There is an overview of *Leptographium* and *Grosmannia*, and also the *C. fimbriata* complex which now comprises an astonishing 26 species – many described from different hosts but not necessarily actually host specific. The Biodiversity section is mainly concerned with the associations with beetles in different parts of the world, notably Africa, Bhutan, China, Japan, New Zealand, and North America. Conifer defence mechanisms, pine decline in the south-eastern USA, associations with mites, and those associated with *Protea* infructescences feature in the Ecology & Pathology section. Under Economic & Applied Aspects, there are contributions on international spread and regulation, wood market issues arising



from blue-staining, albino strains that may have applications in biocontrol and pulping, considers. The Frontiers chapter focuses on the new horizons genomics is starting to open up, and the potential that arises from progeny analysis of crosses between *Ophiostoma novo-ulmi* and *O. ulmi*.

The Nomenclator that concludes the volume is vastly expanded from that in the

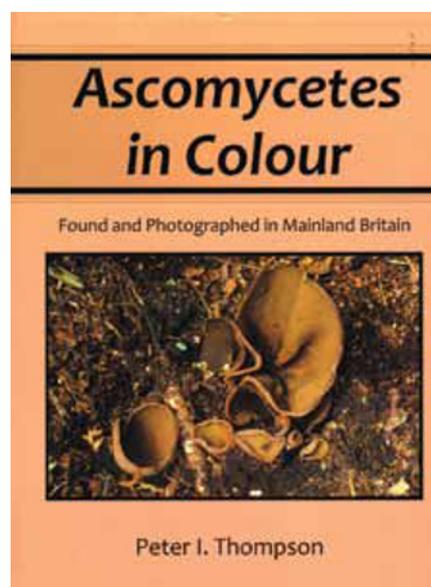
1993 volume, and now covers 646 species names that have been proposed, of which 397 are accepted and dispersed through 12 genera. Full bibliographic details of all names and synonyms are provided, together with references to published descriptions, available phylogenetic data, and pertinent Notes. With the addition of information on the name-bearing types for the accepted species, the data included here could form the basis of lists to be proposed for protection under the Melbourne *Code*.

As we have come to expect of all publications from the CBS-KNAW Fungal Biodiversity Centre, the production is superb, and there are numerous colour illustrations not just of the fungi, but the damage they cause in forests and in wood-staining. There were no coloured photographs in the 1993 volume. The editors have clearly put an immense amount of effort into this work, and are to be congratulated on their thoroughness and attention to detail. However, some topics

in the 1993 work not revisited or updated here, not least the synoptic key to species, but also contributions on volatile products, ultrastructure, and the medical importance of some of these fungi. Those working with these fungi will therefore surely wish to have both works on their shelves.

Wingfield MJ, Seifert KA, Webber JF (1993) *Cearatocystis and Ophiostoma: taxonomy, ecology, and pathogenicity*. St Paul, MN: American Phytopathological Society Press.

Ascomycetes in Colour found and photographed in mainland Britain. By Peter I. Thompson. 2013. Dartford: Xlibris Publishing. Pp. xxxvi + 367, illustr. colour. ISBN 978-1-4797-4756-6, 978-1-4797-4755-9 (pbk). Price: £ 62.99 (hdbk), £ 42.99 (pbk).



Regional identification works are not generally featured in *IMA Fungus*, but an exception is made here because there are so few modern illustrated works on ascomycetes. Peter is a keen forayer who had a long association with the Hampshire Fungus Recording Group before moving to the West Midlands in 2007. Having gradually amassed a target of 700 species, he presents these here to share his enthusiasm for what are amongst the least-studied fungi by field mycologists today. In the Introduction, Peter describes how he collects, examines, and identifies his finds – information that will be valuable to others wishing to engage with these fungi. The scope is limited to ascomycetes with mature ascomata over 0.1 mm diam, as that is “about the size of the smallest fungus which would be visible to the unaided eye” (p. v). Also excluded are those in evidence only through deformaties, or require culturing for

identification. In addition, lichen-forming species are generally excluded, apart from some crustose ones that might be mistaken for non-lichenized fungi, such as species of *Coenogonium* (here as “*Dimerella*”), *Graphis scripta*, and *Micarea prasina*.

The format follows closely that of the ascomycete volume of *Fungi of Switzerland* (Breitenbach & Kränzlin 1984). Each species entry has the accepted name, sometimes selected synonyms, a single colour macroscopic photograph (sadly without a scale or indicated magnification), a line drawing with 1–2(–3) spores (and sometimes excipular hairs), and text covering macroscopic features, substrates, size, microscopic data, and the date and place of the collection illustrated. Asexual morphs are mentioned when figured, but not when they are not which could cause some confusion on occasion, as in *Ascodichaena rugosa* which is rarely found with ascospores. No information as to where vouchers are held is provided. The authorities for scientific names are included, always in full and never abbreviated, but not with either places of publication or dates appended. The arrangement of genera is alphabetical, but within order rather than through all entries; I found this frustrating, especially as no synoptic classification is included meaning that the index has to be referred to to locate a particular genus or species. Keys are provided to species within genera, or groups of genera, in which four or more species are treated, but there is no key to the genera themselves. As in many field guides, there is also no indication of how many species are known in each genus, which can serve to alert users that the fungus they have may not be in the key. There are no literature references in individual entries,

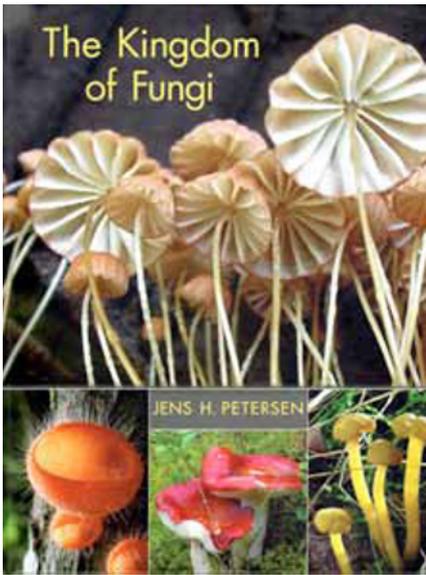
but there is a helpful table giving the page numbers in five selected works where further information can be found.

I was pleasantly surprised to find that while apotheciate species predominated (433 species), a considerable number of perithecioid ones were also treated (267 species). This must be one of the largest sets of colour photographs of pyrenomycetes to have appeared in print in a single place. The range of pyrenomycetes covered is quite diverse, including, for example, some erysiphalean, hypocrealean, xylariacean, and even microthyriacean species. Some of the illustrated species have rarely been collected and never previously presented in colour before, such as *Paradidymella clarkii*. This should do much to stimulate many more field mycologists to search for and endeavour to identify even the smallest visible ascomycetes.

The book is pleasingly presented and a testimony to enthusiasm and dedication, and is all the more remarkable as it has been achieved by a “citizen scientist” rather than a professional mycologist. Fortunately, Peter has been able to draw on the expertise of several other mycologists for identifications, including Martyn Ainsworth, Zotto Baral, Mariko Parslow, and Brian M. Spooner, but many appear to be his own. This is certainly a work all field mycologists working in Europe will find of enormous value, and also an important contribution to the documentation of the diversity of ascomycetes in the region.

Breitenbach J, Kränzlin F (1984) *Fungi of Switzerland*. Vol. 1. *Ascomycetes*. Lucerne: Verlag Mykologia.

The Kingdom of Fungi. By Jens H. Petersen. 2012. Princeton, NJ: Princeton University Press. Pp. 265, illustr. colour. ISBN 978-0-691-15754-2. Price: US \$ 29.95.



Many mycologists will already have marvelled at the superb high-quality full-colour macrophotography of Jens Petersen in the MycoKey CD's, prepared with Thomas Læssøe; the latest version I have to hand is that issued in the back of the first edition of *Funga Nordica* (Læssøe & Petersen 2008) which included over 4000 illustrations of basidiomycetes and discomycetes. Now these have been built on to produce what must surely be the most wonderful celebration of the breadth of fungal diversity yet to appear in print. Jens points out that are “the last great unknown among the multicellular organisms” (p. 4) and that “only one in every fourteen species . . . has yet been described” (p. 254). His aim is to reveal this kingdom and its’ inhabitants¹, which he does superbly.

The introductory sections explain the position of fungi amongst the kingdoms

of Life, and how fungi are built from hyphae, reproduce, and disperse. Parallel evolution of sporocarp shapes such as cups and clubs, and gastroid forms is explained, and the principle fungal phyla are exposed one by one. Although a celebration of fungi rather than an identification guide, there is an intriguing circular wheel-like key to the main “form groups” based on sporocarp form (pp. 44–45). While the tour occupies three-quarters of the volume, the last sections are devoted to a poignant introduction to the roles of fungi in ecological processes and world affairs. While fungi can be found almost anywhere, areas with intensive agrochemical-based agriculture are aptly described as “agricultural deserts” where “fungi have no chance”. Five actions to protect the biodiversity of fungi for future generations are highlighted and merit wide attention (p. 256): (1) Work against rapid climate change; (2) Protect the biodiversity and continuity of forests; (3) Manage grazed and unfertilized grassland; (4) Stop the uninhibited use of fertilisers and fungicides in agriculture and forestry; and (5) Encourage research in fungal taxonomy and biology. The book closes with a telling Postscript figuring the “Amazonian Mystery Tongue”, a fine pink jelly fungus from Ecuador which is “outside any known genus”, and “might be the fungus with the enzyme system that could produce a cheap and efficient transformation of straw into biofuel or an agent against cancer” (p. 259). Fungi of potential major benefit to human well-being may be becoming extinct before they are ever collected, assessed, and named.

Every page is in full-colour with minimal

but extremely pertinent modest or no text areas. The extraordinarily fine photographs are allowed to speak for themselves. Everyone will have their own favourites amongst the illustrations, and selecting even a top-fifty would be an invidious task. Amongst the contenders for a personal top ten have to be those of ascospores of *Acrospermum compressum* in flight, asci of *Ascobolus immersus*, differently coloured exudates of *Lactarius* gills, *Cookeina tricholoma*, an unidentified red-apotheciate *Cladonia* from Ecuador (double-page spread), the bluing flesh and tubes of *Gyroporus cyanescens*, exudates on *Hydnellum ferugineum*, the five pages of calicioid fungi (lichenized and not), *Pilobolus crystallinus* (x70), and *Thamomyces dendroidea*. All but a handful of the 800 or so stunning photographs are by the author.

That such a lavish work can be made available at such a modest price in the 21st century, is clearly an indication of the confidence the publishers have in its success. It is a book with a message about both the beauty and importance of fungi that should be widely available in bookshops worldwide and so help raise the global awareness of kingdom *Fungi*. I cannot commend it too strongly, and if you have not yet seen it you are in for a real treat – perhaps a mycologist’s equivalent of being a kid in a candy store.

Læssøe T, Petersen JH (2008) *MycoKey*. Version 3.1. *Funga Nordica Edition*. Copenhagen: Nordsvamp.

¹See also the interview with the author on pp. (21)–(22) of this issue of *IMA Fungus*.

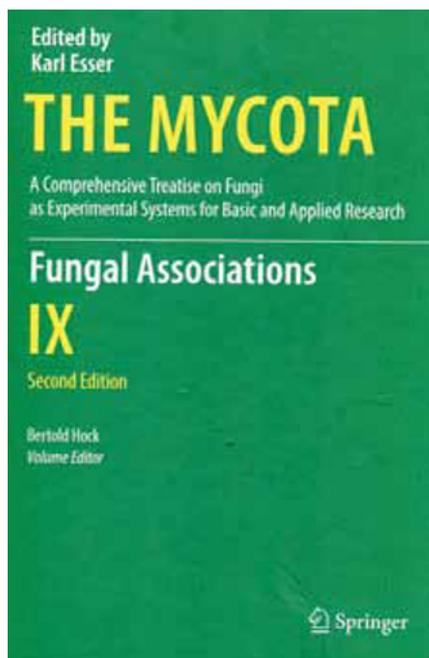
Fungal Associations. Edited by Bertold Hock. 2012. Heidelberg: Springer. [The Mycota Vol. 9, 2nd edn.] Pp. xxvi + 406, illustr. ISBN 978-3-642-30825-3 (hdbk), 978-3-642-30826-0 (eBk). Price: £ 180.00 (hdbk), £ 144 (eBk).

The original edition of this volume, also edited by Bertold Hock, appeared in 2001. That volume comprised 13 chapters: nine on mycorrhizas, three on lichens, and one on fungal/bacterial interactions. This new edition is 156 pages longer and has 18 chapters: 14 on mycorrhizas, three on lichens, and one on fungal/bacterial volatiles. Several chapters involve authors from the first edition, often with different

co-authors, but others are fresh to the volume.

As might be expected in view of the huge amount of recent and most elegant research on arbuscular mycorrhizas, five chapters are devoted to them. These cover aspects from genome exploration, interfaces and signalling, to their importance in sustainable ecosystems. Again there is a chapter on the *Geosiphon/Nostoc* association,

including new information on the transport of sugars and phosphate between the bionts. There are also updates of those concerned with lipids and carbohydrate exchange in ectomycorrhizal fungi. I especially enjoyed the challenge and vision in the contribution of Plett and colleagues based on new genomic analyses, working towards a blueprint that could have predictive value for the maintenance of forest sustainability



through ectomycorrhizal fungi. A term I encountered for the first time here was “stonesphere” (p. 171), for “rock fragments in the rooted zone of the soil that interact with the soil environment physically, chemically, or biologically”.

The chapter on lichen-forming ascomycetes by Rosmarie Honegger has swelled from 23 to 52 pages, and is enhanced by composite colour as well as many fresh superb scanning electron micrographs plates; with 14 pages of

references. Taken with the following contribution by Franz Oberwinkler on basidiomycetous lichens, this is now almost a textbook of lichen biology. The former chapter on the phylogeny of ascomycetous lichens has gone, but much of the key points are now covered in volume 14 (*Evolution of Fungi and Fungal-like Organisms*, 2011). Particularly welcome, however, is the new contribution on bacterial partners in lichen thalli, many of which represent novel lineages; this new area of study promises to become increasingly exciting.

The standard of production is excellent, and I welcome the placing of key points within the text in bold type so they are easily picked out. *The Mycota* is clearly a reference work all major mycological libraries should hold, including revisions of earlier volumes, but as advances move at different rates in diverse aspects of the study of fungi, is this format the best way to generate authoritative topical reviews? As I have pointed out before, conversion to a review journal might better fit the needs of many mycologists who only want a particular topic. There is also the problem of what goes into which volume, and this is a particular problem for the current one. The patchy coverage of the full range of associations in which fungi are involved seen in this volume appears to be partly a consequence of some fungal associations being treated in other volumes of the

series, in particular in *Environmental and Microbial Relationships* (vol. 4, 2nd edn, 2007), *Plant Relationships* (vol. 5, 2nd edn, 2009), *Human and Animal Relationships* (vol. 6, 2nd edn, 2008), *Agricultural Applications* (vol. 11, 2002¹), and *Human Fungal Pathogens* (vol. 12, 2004¹). However, some major and widespread associations seem to have fallen through the cracks, or are treated rather cursorily, such as algicolous fungi, fungicolous fungi (other than some mycoparasites), bryophilous fungi (including mycorrhizas), and the full spectrum of invertebrate-fungal relationships (which get but a few pages in vol. 6). If the book format is the paradigm to be followed, perhaps it would have been better to restrict this volume to mycorrhizas (and adding in bryophyte mycorrhizas on which there is much recent work), and have separate additional volumes on each of lichen associations and invertebrate associations. Interestingly, Geoffrey Ainsworth informed me in the 1980s that an extra volume just on lichens had been planned for inclusion in *The Fungi* (5 vols, 1965–73), on which *The Mycota* was modelled, but the invited editor failed to deliver.

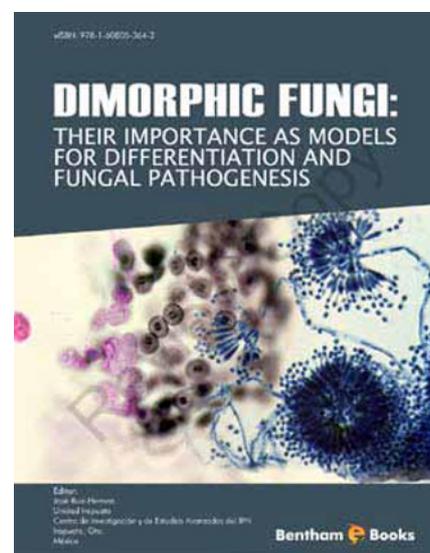
¹New editions of these volumes are advertised to appear in 2013.

Dimorphic Fungi: their importance as models for differentiation and fungal pathogenesis. Edited by Jose Ruiz-Herrera. 2012. Sharjah, UAE: Bentham Science Publishers. Pp. iv + 143, illustr. ISBN 978-1-608050510-4, 978-1-60805-364-3 (e-book). Price: US \$ 83 (print) and US \$ 69 (e-book).

Dimorphic fungi are defined for the purposes of this book as “the property of different fungal species to grow as budding yeasts or mycelium depending on the environmental conditions” (p. ii). As far as I am aware, this issue was last the subject of a major multi-authored book in 2000 (Ernst & Schmidt 2000), which, strangely, seems not to be cited here. Although there have been important advances in our understanding of the yeast/mycelium switching/signalling process since that time. Both works concentrate on human pathogens, where the change in morphology is such a critical part of the infection process and subsequent pathology – and so a target for remedial measures.

The work consists of eight chapters, with 17 contributors drawn from Brazil,

India, Italy, Mexico, and Venezuela). This spectrum reflects the particular problems posed by these fungi in tropical regions, and especially in South America where so much important research on them has been carried out. The book starts with a detailed and wide-ranging overview of the subject area, with much of the history and also an extensive bibliography; that will be of value to all entering these field or requiring an authoritative synopsis. The remaining seven chapters each deal with particular species or species complexes: the human pathogens *Paracoccidioides* (*P. brasiliensis* and *P. lutzii* cryptic species), *Candida albicans*, *Histoplasma capsulatum*, *Yarrowia lipolytica*, *Sporothrix schenckii*, and zygomycetous fungi; and also the plant pathogen *Ustilago*



maydis. It is always somewhat invidious to single out particular chapters, but I did find that on zygomycetous of especial interest as it brings together information on all pertinent genera of these fungi, which are too often misunderstood or misidentified in clinical situations. The inclusion of the chapter on *Ustilago maydis* is justified by its use as a model organism in fungal biology, and a first-rate overview of our knowledge of

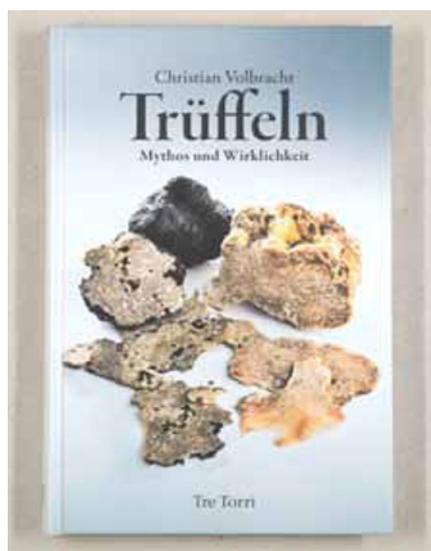
that fungus, but I wonder how much work on a basidiomycete will prove also to apply to the other fungi treated here which are all from other phyla.

The book is well-presented and edited, with some excellent photographs, though some are not for the squeamish, and also the use of colour in many of the line figures is most helpful. It will surely become a benchmark in the synthesis of our understanding

of the dimorphism phenomenon in human pathogenic fungi. It is available as an e-book and also by print-on-demand.

Ernst JF, Schmidt A (eds) (2000) *Dimorphism in Human Pathogens and Apathogenic Yeasts*. [Contributions in Microbiology Vol. 5.] Basel: Karger.

Trüffeln: Mythos und Wirklichkeit. By Christian Volbracht. 2012. Wiesbaden: Tre Torri Verlag. Pp. 183, illustr. ISBN 978-3-941641-85-3. Price: 150 € (limited edn), 24 € (hdbk).



Truffles are traditionally associated with passion, whether exquisite chocolates or underground fungi with reputation as an aphrodisiac. They also fascinate mycologists, and not least amongst these is Christian Volbracht, whose name is irrevocably linked to mycological books and scholarly bibliography through his trading name MycoLibri. He has a personal mycolibrary that would be the envy of any field or macro-mycologist (Volbracht 2006). Christian has drawn on this extensively to produce this delightful text, which includes reproductions of title pages, texts, and illustrations (including cartoons) from many ancient works in his collection. The earliest

descriptive account was evidently by Pliny, printed in 1481, and the first treatise was by Alphonso Ciccarello, the *Opusculum de Tuberibus* of 1564. The reputation as potent aphrodisiacs, however, extends back much further, to at least Leukadia who lived *ca* 435–380 BC. Christian considers this reputation a myth, and while that might be true for most truffles, this could perhaps hold for the most prized, such as *Tuber magnatum*. That truffle, the Piedmont white truffle that has yet to be cultivated, generally sells for around 2000–5000 € kg⁻¹, while the Tar truffle, *T. mesentericum* sells for just 80–150 € kg⁻¹. There have certainly been historic episodes of Trüffelmania, and Gastrochauvinism in relation to truffles is still about. Restaurateurs and gourmets will pay seemingly absurd amounts for single specimens, but anyone who has been in the truffle shops and restaurants of Alba and experienced the pervasive unique odour of *T. magnatum* may well feel the prices justified. There is a fascinating chapter on culture, and I had not appreciated that the earliest attempt was by an Englishman, Richard Bradley, a professor of botany in the University of Cambridge in 1731. There are sections on truffle-hunting pigs and dogs, the Trüffeln *vs.* Tartuffellen distinction, a synopsis of the different kinds of white and black truffles, a glossary, numerous endnotes, and a selected bibliography, but sadly no index. The orientation is purposefully historical, and

this sets this volume apart from, and makes it complementary, to the many other works on truffles which focus on identification, cultivation, or gastronomy (e.g. Dedulle & de Coninck 2008, Hall *et al.* 2007).

The text is in German and the question of whether Germany is overdue in becoming a “Trüffelnation” is raised; this book should address that issue, especially in view of the low price of the regular edition. The limited edition is of 100 copies, available from the author, and has leather black truffle inserts in the front cover, a leaf of paper made from polypores with truffle slices, and the signature of the author in *Coprinus* ink. A really delightful book for anyone fascinated by truffles, associated facts, and the stories that surround them.

Dedulle A, de Coninck A (2009) *Truffles: Earth's black diamonds*. Buffalo, NY: Firefly Books.

Hall IR, Brown GT, Zambonelli A (2007) *Taming the Truffle: the history, love, and science of the ultimate mushroom*. Portland, OR: Timber Press.

Volbracht C (2006) *MykoLibri: Die Bibliothek der Pilzbücher*. Hemburg: Christian Volbracht.

¹The record appears to be one weighing 1.5 kg sold in Macau in 2007, at 130 900 € kg⁻¹. While another of 0.9 kg went for 105 000 €, equivalent to 116 600 € kg⁻¹, to a Master of Wine in Hong Kong in 2010 [Ed.].

Checklist of Fungi of Malaysia. By S. S. Lee, S. A. Alias, E. B. G. Jones, N. Zainudin & H. T. Chan. 2012. Kepong, Selangor: Ministry of Natural Resources and Environment. [Research Pamphlet no. 123.] Pp. ix + 556, CD [inside back cover]. ISBN 978-967-5221-82-8. Price: Not indicated.

This is the first comprehensive checklist of Malaysian fungi to have been compiled since

that of Chipp (1921), though there have been lists of plant pathogens and various

special lists. The number of species recorded has swelled from 861 to around 4000 over



that time. The new list covers all fungal groups and fungal analogues, including myxomycetes and oomycetes, and fungi with all biologies are embraced, including the lichen-forming fungi. The checklist itself is preceded by a series of eight succinct

overviews the exploration and diversity of the various phyla, which also in most cases incorporate a disposition of the accepted species by family, although the asexual fungi were listed separately from sexual ones.

The main body of the work, however is a checklist in which all species are, conveniently, listed alphabetically. For each species the current name is given where that differs from that reported, and there are columns detailing the substrate/host, location, and literature reference. The bibliography comprises 441 publications, and also references to four websites. The authors have clearly been at pains to check the names, with which Paul M. Kirk evidently assisted. There is also a CD slipped into the inside back cover Paul prepared which holds a 410-page PDF with information on the 12 000 Malaysian collections held in the living collections of CABI Bioscience and reference specimens of the former International Mycological Institute (IMI; now housed at the Royal Botanic Gardens, Kew); the collections are arranged systematically with full details of

substrate/host, year of collection, locality, and collector. Many of the IMI collections were made by Anthony P. Johnston who served as a plant pathologist in Malaysia from 1946–64, prior to moving to IMI of which he was the Director from 1968–83.

The authors stress that this is only the starting point to an inventory of the fungi of Malaysia; with some 15 000 recorded vascular plants, the real total could be as much as 90 000 so there is much still to be done. Perhaps to tempt future mycologists to undertake work in the region, there are 12 plates, mostly in colour, showing selected species. This fine compilation is an excellent example of what can be achieved by a dedicated team with appropriate resources and merits emulation more widely in tropical countries to provide a spring-board for future exploration and documentation of the mycobiota.

Chipp TF (1921) A list of fungi of the Malay Peninsula. *Gardens' Bulletin, Straits Settlements* 2: 311–418.

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