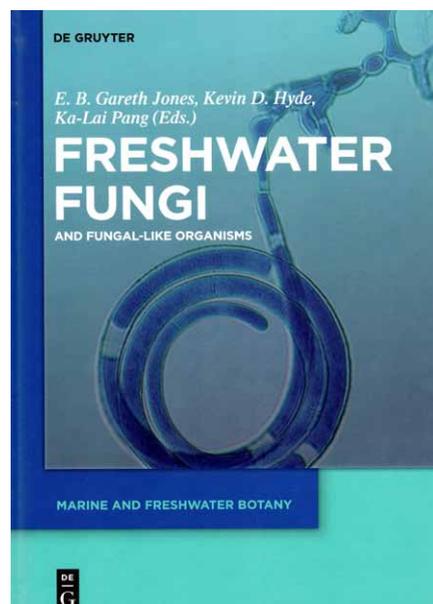


Freshwater Fungi and Fungal-Like Organisms. Edited by E. B. Gareth Jones, Kevin D. Hyde, and Ka-Lai Pang. 2014. ISBN 978-3-11-033345-9. Pp. xxi + 496. Göttingen: Walter de Gruyter. Price: 149.95 €.



This work complements the earlier comprehensive overview of our knowledge of diverse aspects of marine fungi and similar organisms issued in 2012 (Jones & Pang 2012; see *IMA Fungus* 3(2): (59), 2012). The volume is timely as there has been such enormous progress in our understanding of this ecological group of fungi in the 11 years since the overview of 2003 (Tsui & Hyde 2003). The editors have marshalled 53 authors from 16 countries to produce an updated overview of which they can be proud.

Freshwater fungi, nevertheless, remain little-explored, and in the introductory chapter the editors point out that it has been predicted there may be as many as 20,000 species on the assumption only 5 % have yet been named. That figure may be an overestimate, but they feel that the number is likely to be equal or greater than

the number of marine species, estimated at 12,500. Most of the fungi involved have terrestrial close relatives, but a few genera appear to be exclusively confined to freshwater habitats, such as *Jahnula*.

Following from an overview of the ecological groupings of these fungi, a series of chapters presents the current state of knowledge of different groups of fungi, all in a phylogenetic context: *Dothideomycetes*; *Sordariomycetes*; *Basidiomycota*; asexual fungi and links; *Chytridiomycota*; *Microsporidia*; and pleasingly also *Oomycetes*. Sadly the *Glomeromycota* only have a passing reference to occurrences on aquatic macrophytes with no detailed information to compare with the other treatments in this section. The following chapters cover different biological relationships, primarily of parasites, under the not entirely appropriate header “biodiversity”: mesomycetozoen parasites of fish, pathogenic oomycetes, most typically zoosporic parasites of amphibians, pythiosis, zoosporic parasites and parasitoids of phytoplankton, and also zoosporic parasites of invertebrates.

The last series of contributions is placed under “ecology” and treats lichens in greater depth than I have previously seen, *Trichomycetes*, peat swamps with palms, effects of water pollution, associations with animals in leaf decomposition, yeasts in “hyperacidic” freshwater, and wood decomposition in the tropics. The book concludes with an “Epilogue” by the editors, which at the same time provides a succinct primer for what is known, the knowledge gaps, and what the future challenges are. They point out, for example, that most reports are from immersed wood or leaves,

and that scant attention has yet been given to fungi associated with macrophytes (aquatic plants), *Phragmites australis* being a notable exception with some 600 species of fungi known from just the litter of that plant.

The whole is well produced, but might have benefitted from more illustrations, though I was pleased to see that some of those included were in colour. Drawings and photographs are especially useful to those coming into the field from outside with little familiarity with fungi, not least freshwater ecologists who rarely consider the ecological roles of fungi in lakes and rivers. I would have liked to see more on dispersal, establishment, and biogeography, all areas which are ripe for more experimentation and comparative studies, respectively, and perhaps a contribution on fungi in potable water (which can sometimes be a cause for concern), but those themes could be featured in a third overview in due course. Also, there is no update of the identification keys in the 2003 book provided here, so that will still need to be kept to hand, along with the superbly illustrated keys to about 100 genera compiled by Cai *et al.* (2006). Needless to say, this is a “must” for all who deal with fungi in aquatic systems.

Cai L, Hyde KD, Tsui CKM (2006) *Genera of Freshwater Fungi*. [Fungal Diversity Research Series no. 18.] Hong Kong: Fungal Diversity Press.

Jones EBG, Pang KL (eds) (2012) *Marine Fungi and Fungal-Like Organisms*. Göttingen: Walter de Gruyter.

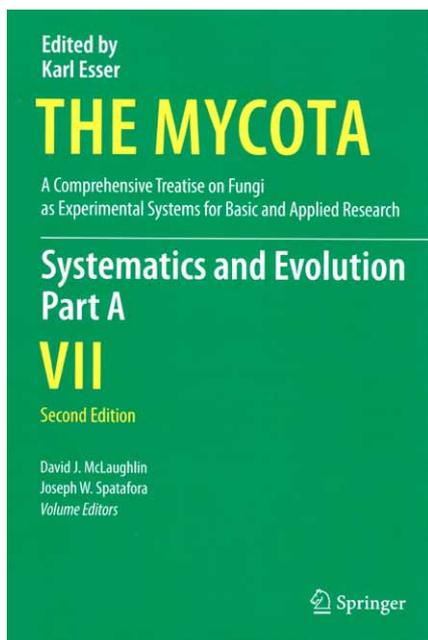
Tsui CKM, Hyde KD (eds) (2003) *Freshwater Mycology*. [Fungal Diversity Research Series no. 10.] Hong Kong: Fungal Diversity Press.

Systematics and Evolution. Part A. Edited by David J. McLaughlin and Joseph W. Spatafora. 2014. Heidelberg: Springer. [The Mycota Vol. 7A, 2nd edn.] Pp. xxv + 461, illustr. ISBN 978-3-642-55317-2 (hdbk), 978-3-642-55318-9 (eBk). Price: £ 180 (hdbk), £ 144, US\$ 209, or 166.59 € (eBk).

The first edition of this number in *The Mycota* appeared in 2001, before the impact of molecular phylogenetics had started to work through the whole of the fungal system. A revision was consequently becoming essential to

reflect the sea-change in the systematics of fungi that has taken place over the last 14–15 years. This is reflected in the first chapter by John W. Taylor and Mary L. Berbee who give a scholarly account of the development of PCR through to genomics

and metagenomics. The remainder of the volume adopts a phylum and(or) class-based approach. I was pleased to see this start with fungal-like organisms that are not members of the kingdom *Fungi*: *Acrasiomucota*, *Dictyosteliomycota*, and *Myxomycota*;



Labyrinthulomyces, *Hyphochytrium*, and *Omyces*; and *Phytomyxa*. This is most important as if these organisms cease to be studied by mycologists, what other community will embrace them?

The first groups covered within the true *Fungi* here are: *Microsporidia* (absent from the first edition); *Chytridiomycota*, *Monoblepharidiomycota*, and

Neocallimastigomycota; *Blastocladiomycota*; *Entomophthoromycota* (including, amongst other subphyla, *Mucoromycotina* and *Zoopagomycotina*); and *Glomeromycota*. These correspond with the coverage in the 2001 edition, but then there is a major difference. The first edition then had seven chapters devoted to different groups of *Ascomycota*, including asexual morphs. In contrast, ascomycetes are dropped and replaced by accounts of various subphyla and classes of *Basidiomycota* which were covered in the companion volume Part B in 2001: *Pucciniomycotina*; *Ustilaginomycotina*; *Tremellomycetes* and related groups; *Dacrymycetes*; and *Agaricomycetes*. The editors explain in their Preface to the new edition, that a new edition of Part B is scheduled and that will have six chapters on the remaining groups of *Fungi* (i.e. *Ascomycota*), as well as ones on more general aspects of fungal systematics, from nomenclature and preservation to fossil fungi and methodologies. No date of publication for Part B is mentioned.

The editors are to be congratulated on again having secured many of the pre-eminent specialists in the systematics of different fungal groups as contributors. In consequence, the chapters are generally

both authoritative and comprehensive as could be expected within the confines of the allotted pages. In most cases the authors have not restricted themselves to the systematic aspects, but also cover aspects of biology, ecology, life-cycles, ultrastructure, and other pertinent topics. While it would be invidious to single out particular chapters when all are of the highest standard, I personally found those on the phyla of *Straminipila* (Gordon W. Beakes *et al.*), *Microsporidia* (Elizabeth S. Didier *et al.*), and zygomycetous fungi (Gerald L. Benny *et al.*) particularly educational. I did, however, feel that that space allotted for *Agaricomycetes* (David S. Hibbett *et al.*) did not enable them fully to do justice to the group down to the ordinal level attempted.

The work is produced to the highest editorial standards, and I was pleased to see some use of colour. The quality of some of the line drawings, and especially some half-tone photographs, was, however, rather disappointing and not to the standard of the first edition; it surely did not do justice to some of the originals. Perhaps that issue could be addressed for Part B, which is not yet announced on the Springer website, if not already too late?

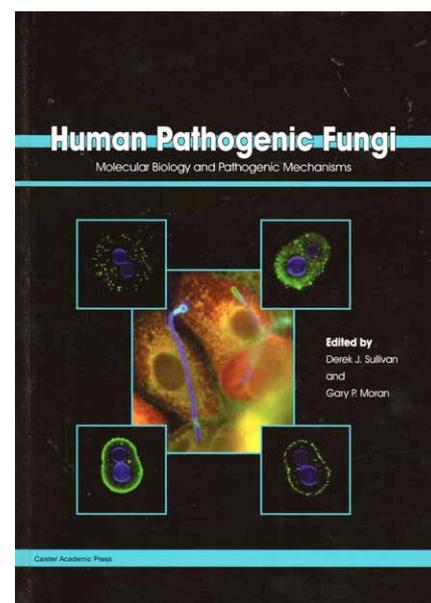
Human Pathogenic Fungi: molecular biology and pathogenic mechanisms. Edited by Derek J. Sullivan and Gary P. Moran. 2014. ISBN 978-1-908230-44-7 (hdbk), 978-1-908230-66-9 (eBk). Pp. x + 341, 10 col. plates. Caister: Caister Academic Press. Price: £ 180 or US\$ 360 (hdbk and eBk).

The investigation of the molecular basis of fungal pathogenesis is one of the most active areas of medical mycology today as it is a prerequisite for the development of effective treatments. It is also a field with an enormous and changing research literature, so that the availability of timely authoritative critical reviews assumes particular importance, not least for clinicians with limited time. The editors, from the School of Dental Science and Dublin Dental University Hospital, have managed to bring together 34 of the most active and leading researchers in the field to produce such a review.

The first six chapters are concerned with recent advances in the pathogenesis of human infections, using the latest techniques of high-throughput sequencing, comparative genomics, high-throughput data, transcriptomic analysis, and animal models; and an overview of responses to

human fungal infections, especially in relation to immunocompromised patients. Each of the remaining eight chapters concerns a particular fungal disease: candidiasis, aspergillosis, *Cryptococcus*, dermatophytes, *Histoplasma capsulata*, *Blastomyces dermatitidis*, *Pneumocystis*, and *Paracoccidioides*. Coloured figures from the chapters are tipped-in after the index and printed on better quality paper, a welcome practice which ensures clarity and resolution when coated paper is not used throughout. Some of the coloured diagrams and photographs are so informative and (or) stunning, that I can imagine that some of these will become much used in teaching medical mycology courses.

There is inevitably some overlap with another recent volume on human fungal pathogens in, *The Mycota* issued earlier in the year (Kurczai 2014; see *IMA Fungus*



5(1): (19), June 2014), but that volume is not confined to molecular biology and

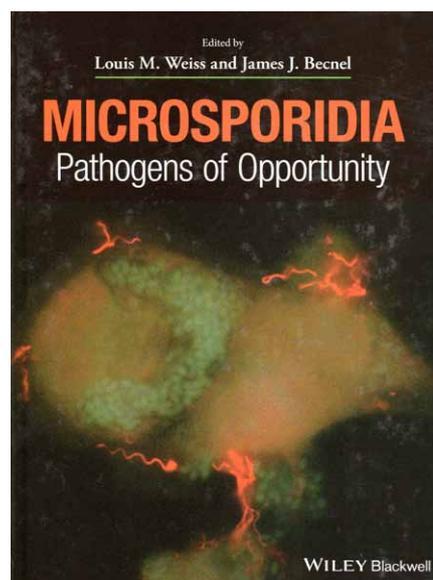
methods of pathogenicity, and does not have detailed treatments of some of the diseases considered here, notably dermatophytes and those caused by species of *Blastomyces* and *Paracoccidioides*. The result is that there is a considerable degree of complementarity between the two works.

This is a carefully edited and well-produced reference work that deserves to be widely available in laboratories exploring the molecular biology and pathogenicity mechanisms of human pathogenic fungi, but I fear that the high price, even for an electronic copy, may sadly limit the

circulation it merits amongst lecturers in medical mycology.

Kurzai O (ed.) (2014) ["2013"] *The Mycota*. Vol. 12. *Human Fungal Pathogens*. 2nd edn. Heidelberg: Springer.

Microsporidia: pathogens of opportunity. Edited by Louis M. Weiss and James J. Becnel. 2014. ISBN 978-1-118-39522-6 (hdbk). Pp. xv + 709. Chichester: Wiley Blackwell. Price: £ 134 or 160.80 € (hdbk), £107.99 or 128.99 € (eBk).



Mycologists have only recently come to realize that *Microsporidia*, long studied by protozoologists, are a part of the kingdom *Fungi*. The phylum has over 1,400 named species, and some are medically important. Now there is no excuse not to get up to speed on this phylum for your next

mycology class. Almost all conceivable aspects of these fungi are covered in this monumental work. There are chapters covering overarching topics including: structure, developmental morphology and life-cycles, epidemiology in humans, epizootiology in invertebrates, phylogeny and phylogenetics, genome structure and function, sex, biochemistry and physiology, ultrastructure, and immunological aspects. Others have a host or ecological focus: infections in nematodes, fish, larger vertebrates, insects (including the collapse of bee populations), aquatic invertebrates, and use as biocontrol agents (e.g. against mosquitoes). The chapter concerned with insects includes a treatment of the known genera, with diagnoses and type species, and that on "primitive *Microsporidia*" includes a systematic revision with numerous new combinations for species in *Mietchnikovella*. These newly introduced names do not have MycoBank numbers, but are nevertheless validly published as the *International Code of Nomenclature for algae, fungi, and plants* rules, pragmatically, that although

acknowledged as fungi, the nomenclature of *Microsporidia* should continue to follow the provisions of the *International Code of Zoological Nomenclature*; any other option would have been extremely disruptive.

An Appendix provides a meticulous checklist of all available (i.e. validly published) 200 generic names of *Microsporidia*, along with references to the original place of publication, the type species, and type hosts; a list of 14 other generic names and the reasons why they are omitted is also provided. Another Appendix introduces Microsporidia DB, a database of genomic resources, with explanations of how it should be used.

This book represents a massive undertaking, involved 47 contributors, is splendidly produced and illustrated, and is surely destined to be the reference on the phylum for the foreseeable future. It really opened my eyes to the enormous diversity and importance of these "newcomers" to kingdom *Fungi*, and I have no doubt that most mycologists will have a similar reaction.

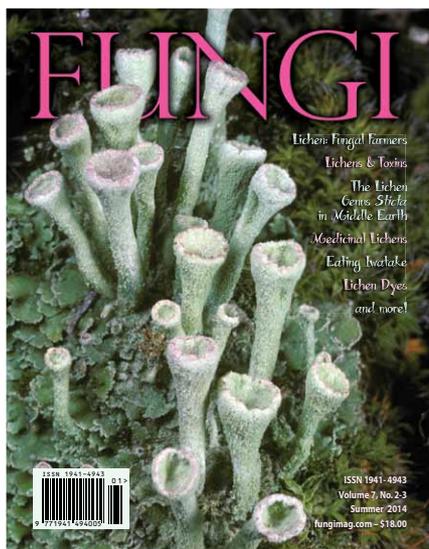
SPECIAL ISSUES

**Lichens [*Fungi* 7 (2–3), Summer 2014]
ISSN 1941-4943. Price: US\$ 18.**

It is the first time I have seen an issue of a journal targeted at naturalists and mushroom hunters devoted to lichens. Robert Lücking has worked with the publisher and editor-in-chief, Britt A. Bunyard, to put together a delightful issue designed to both educate and amuse. It has contributions on lichens as fungal farmers (by Robert and Thorsten Lumbsch), as

staple foods for caribou and reindeer (by Teuvo Ahti), toxin producers, vehiculiculus lichens (a new term for ones living on old cars), lichens in the tropics (with stunning brightly coloured photographs taken at night under UV-light), urban lichens, and a spoof feature on *Sticta* species in Middle Earth (with John R. R. Tolkien and Sméagol Gollum as two of the four authors),

basidiolichens, eating iwatake (rock tripe), lichen dyes, new records, and transcript of a telephone conversation about lichenicolous fungi on *Peltigera*. There is also a poem, a cartoon strip ("A lichen love story"), and reviews of books on lichens. The article on *Sticta* is especially amusing; it is said to be reprinted from *Istaria* (a video-game series) and includes some new combinations, new



species, a key, phylogenetic tree, and super photographs; the new taxa are registered in “Hobbitbank”, not MycoBank, so are not validly published under the Code as Hobbitbank has not been approved as a repository for new fungal names by the Nomenclature Committee for Fungi. The issue is illustrated throughout with stunning colour photographs, many contributed by the renowned lichen photographer Stephen Sharnoff and others by the doyen of mushroom photography Taylor F. Lockwood, and Tim Wheeler.

This special number is sure to amuse, and be enjoyed by, professional and serious amateur lichenologists and other mycologists alike, but is also something

to consider giving as a present to inspire aspiring neolichenologists. I suspect the style of this number will prove especially popular with those in their late teens into their mid-twenties. This is something all lichenologists involved in training should see and could learn from.

Trichoderma [*Mycosystema* 33 (6), 2014] ISSN 1672-6472. Price: Not indicated

Mycosystema, now published bimonthly under the co-auspices of the Chinese Academy of Sciences and the Mycological Society of China, has just released an issue devoted to studies on *Trichoderma*. This celebrates the 13th International Workshop on *Trichoderma* and *Gliocladium*, and comprises an introduction, two reviews and 12 research papers. The reviews provide an overview and list of the species known in China, adopting names in *Trichoderma* rather than *Hypocrea* when the former exist, and the application of *Trichoderma* species in the biocontrol of a range of corn diseases.

The research articles touch on a wide range of topics, from descriptions of new species, accounts of species new to China, biocontrol (against *Phytophthora infestans*),

selection of supplementary barcode markers (*rbp2* and *tef1*), and a transformation system for *T. reesei*, gene expression, to a method of shallow tray fermentation. Of particular value is a compilation of all known species of *Trichoderma* which recognizes 212 species, arranged by sections and clades (not merely alphabetically), and with any corresponding named sexual morphs.

Most articles are in Chinese, but in all cases English abstracts are provided.

Chinese mycologists clearly support the use of the asexually typified generic name *Trichoderma* over the sexually typified *Hypocrea*, in line with the opinions of the ICTF subcommission working towards a list of protected names in *Trichoderma*.

