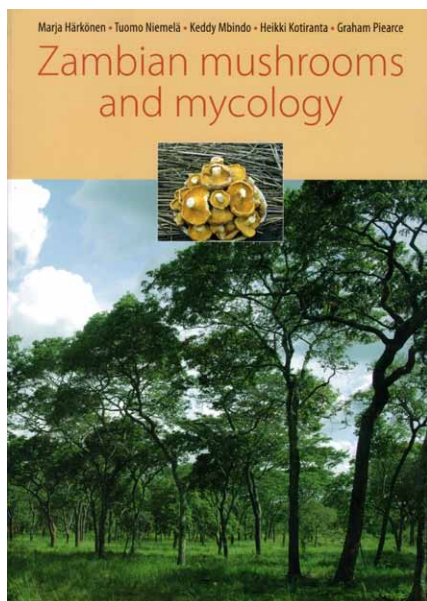


Zambian Mushrooms and Mycology. By Marja Härkönen, Tuomo Niemelä, Heikki Kotiranta, and Graham Pierce. 2015. Finnish Museum of Natural History (Botany), Helsinki. [Norrinia no. 29.] Pp. 207, col. figs 276. ISBN 978-951-51-0852-4. Price: 26 €.



It is pleasing to see the lack of field guides and texts in mycology in Africa is being increasingly addressed. Marja Härkönen is probably the most experienced ethnomycologist and mycophagist active in East Africa, and has already provided a handbook of Tanzanian edible mushrooms (Härkönen *et al.* 2003). She has now collaborated with other specialists and forest pathologists in Zambia to produce this splendid and superbly illustrated guide. This new guide is based on extensive travels in Zambia in 2012–13, which included field work and also visits to local markets, in-depth interviews, and demonstrations by local cooks.

The book is, however, much more than an identification manual. Indeed, almost half is devoted to background material which can serve as a starting point to anyone wishing to learn more about

fungi, and especially macromycetes. It starts with an introductions to the history of mushroom exploration in the country, including handwritten notes made by explorer David Livingstone in 1867, before moving to explanations of what fungi are. Their diverse biology is described, stressing mycorrhizal associations (with a useful list of trees with different mycorrhizal types), but also covering associations with termites, decomposition, wood-rots, and seasonality. The ecological treatment is supplemented by illustrations of different habitats, pointing out the importance of miombo woodland and the issue of introduced species in pine plantations. Methods of collection and examination are detailed, with well-illustrated accounts of characters used in macromycete identification, which while emphasising macroscopic features also includes an introduction to microscopic examination.

The core of the book is the species accounts which cover around 90 species. I was pleased to see these arranged in broad morphological groups rather than in any systematic one, and also the omission of all author citations following scientific names – with a single exception for the new species *Hexagonia culmicola* described in an Appendix. Each species account covers any vernacular names discovered, a succinct summary of key points, a description and information on habitat, edibility, and pertinent notes. The colour photographs can only be described as stupendous! The inclusion of locality details and fungarium reference numbers in each of the legends follows the best-practice often lacking in such guides. Photographs of some of the species have not been available before. Those

of the 12 *Amanita* species, a genus favoured by Zambians, are especially stunning, the bright yellows of several are sure to render dishes made from them appealing to the eye. For mycophagists, 19 recipes obtained from local people are included; several do not specify the species to be used as local practice is evidently to use mixtures. They did not find evidence of recreational uses, but I wonder if inclusion of a more specific question than “other uses” in the list of questions used in interviews (p. 201) might have generated some different responses.

This book has been made possible through funds made available by the Development of Cooperation section of the Ministry for Foreign Affairs of Finland. They are to be congratulated on their foresight in supporting a work which is both educational and will encourage the use of sustainable food resources in Zambia. This parallels the support La Coopération Belge au Développement gave to production of the French guide to edible fungi in dense central African forests (Ndong *et al.* 2011; see *IMA Fungus* 2 (2): (65)–(66), December 2011). It is gratifying to see government development agencies recognizing the importance of mycology in Africa in this way, and hopefully this may stimulate others to emulate such initiatives.

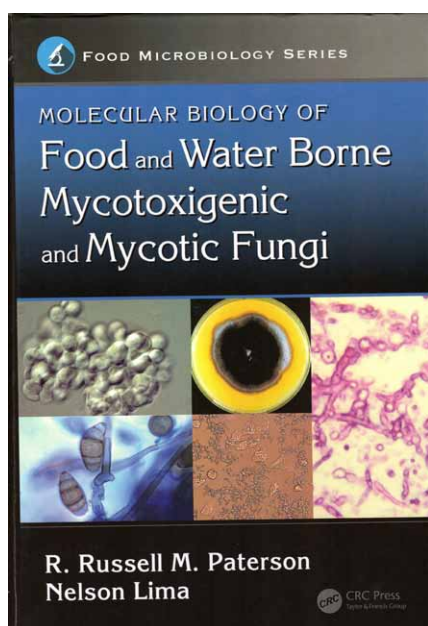
- Härkönen M, Niemelä T, Mwasumbi L (2003)
Edible Mushrooms of Tanzania: edible, harmful and other fungi. [Norrinia no. 10.] Helsinki: Finnish Museum of Natural History.
- Ndong H E, Degreef J, de Kesel A (2011)
Champignons Comestibles des Forêts denses d'Afrique Centrale: taxonomie et identification. [ABC Taxa Vol. 10.] Brussels: Royal Belgian Institute of Natural Sciences.

Molecular Biology of Food and Water Borne Mycotoxigenic and Mycotic Fungi. Edited by R. Russell M. Paterson and Nelson Lima. 2015. Boca Raton: CRC Press. [Food Microbiology Series.] Pp. xx + 618, illustr. ISBN 978-1-4665-5986-8 (hbk) 978-1-4665-5988-2 (ebk). Price: £ 107. 95 (hbk), £ 99.90 (ebk).

This major text is designed to bring together in a single place the latest information on food borne human fungal pathogens, including mycotoxigenic fungi. At the same time it provides background to our knowledge of the fungi involved, especially

in the light of molecular systematic studies. This combination is especially welcome as applied mycologists do not always have ready access to explanations of current methodologies and procedures for the naming and characterization of fungi. The

underpinning chapters address classification and naming, phylogenetic analysis, DNA barcoding, metabolomics, systems biology, and genomics. That on phylogenetic analysis (Muszewska & Ginakski) is particularly understandable and thorough, and can



be commended as background reading to mycologists of all kinds starting to interpret or use such information.

The bulk of the book consists of 25 chapters, each devoted to presenting authoritative up-to-date accounts of particular fungal genera, prepared by a wide range of specialists. The range of fungi covered and the depth of the treatments is impressive, and includes some that often receive scant

attention in texts on either food-borne or clinically important fungi. I found the chapter on “*Acremonium*” (Summerbell & Scott) particularly comprehensive; most of these fungi are now placed in *Sarocladium*, and they caution that all reports of *S. strictum* should be confirmed by sequence data – a problem I can relate to from the years I was responsible for identifying these fungi at the International Mycological Institute. Also treated in detail are *Chaetomium* (Hubka) where species concepts are still far from resolved, *Curvularia* (Guarner), *Microascus* (syn. *Scopulariopsis*) (Abbott), *Pichia* (Passoth) with a valuable summary of the current disposition of species, *Trichoderma* (Kubicek & Druzhinina) with much detail on the extrolites, and *Wallemia* (Zajc *et al.*). This is all in addition to coverage of genera that feature most strongly in many texts, including notably *Alternaria* (two chapters), *Aspergillus* (three chapters), *Candida*, *Fusarium*, mucoraceous fungi, *Paecilomyces*, *Penicillium*, *Phoma*, *Rhodotorula*, *Trichosporon* (Quindos *et al.*) including a synopsis of described species, and various other groups of yeasts.

The book closes with two more wide-ranging chapters, one on the development of antifungal vaccines (Ito), and the other

an overview of the fungi in drinking water (Skaar & Hageskal) – still a study in its infancy and perhaps meriting more attention in relation to water imbibed by immunocompromised patients. I found it surprising how many fungi could be recovered even from chlorinated water

The editors clearly had a vision of producing a particularly comprehensive and authoritative set of reviews. They were determined to get them even when the original invitees failed to deliver, and almost all contributors stepped up to the challenge and delivered chapters of the highest standards. The editors are to be congratulated also on the standard of their editing, the only slightly negative point being the poor quality of reproduction of some of the half-tone photographs and the paucity of coloured ones. This book merits a place in all laboratories dealing with aspects of food spoilage and clinically important fungi, and is also a source of much other information on the genera treated that will be pertinent to those working with them in other areas of applied mycology, especially biodeterioration, food spoilage, and post-harvest losses.

Introduction to Mycology in the Tropics. By Meike Piepenbring. 2015. ISBN 978-0-89054-459-4. Pp. x + 366, illustr. St Paul, MN: American Phytopathological Society Press. Price: US \$ 189.

Introducción a la Micología en los Trópicos. By Meike Piepenbring. 2015. ISBN 978-0-89054-456-3. Pp. x + 366, illustr. St Paul, MN: American Phytopathological Society Press. Price: US \$ 99.

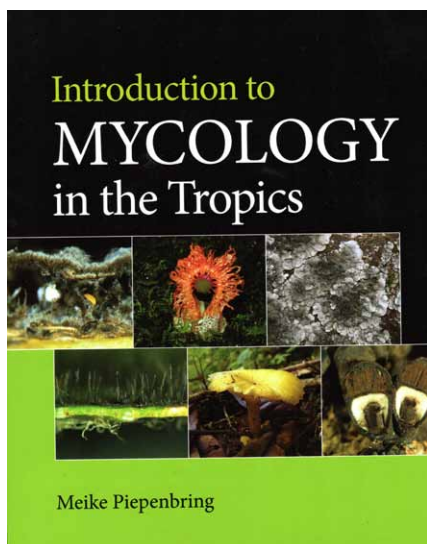
Meike, based at Goethe University Frankfurt am Main, has been teaching mycology in various Central American countries, particularly Panama, since her first assignment there in 2000. She soon found that textbooks produced by European and North American authors that illustrated and used temperate species as examples were far from ideal: “what was needed was a textbook tailored to *their* experience, with examples from *their* back yards” (p. vii). Anxious to address this situation, she secured funding from the German Academic Exchange Service and other sources, and has addressed this need spectacularly in this superbly illustrated book.

The structure is essentially systematic, in many cases down to family, and also with

tables indicating diseases of tropical crops caused by species within particular genera, for example 14 species of *Colletotrichum*. Figures for the number of genera and species within orders are provided, which is most helpful as this will help readers appreciate just how species rich many of these are. For each order, information is provided under the subheadings etymology, systematics, geographical distribution, ecology, morphology, biochemical aspects, and importance for humans – positive and negative. Lucid diagrams and boxes elucidate particular aspects of structure, physiology, life-cycles, and ecology. Some boxes are particularly pertinent to tropical situations, for example that on symbioses with social insects, dealing with leaf-cutting

ants and termites, extends over seven pages. Most of the diagrams are also published on the internet under creative commons licences to make them available as teaching material; a particular welcome gesture which will be a real boom to teachers.

I was pleased to see fruit(ing) body dropped in favour of ascoma and basidiome in the true fungal phyla, but then saddened to see those words re-appear in the chapters on fungi that do not belong in kingdom *Fungi*. Meike does not use the fungal terminations of rank names, such as “-mycota”, for example in *Straminipila* and *Myxomycota* because of an unfortunate misunderstanding; the word “fungi” (deliberately with a lower case) in the *International Code of Nomenclature for*



algae, fungi, and plants (McNeill *et al.* 2012) covers all organisms traditionally treated as such and they are treated together in single alphabetical lists under “Fungi” in the *Code’s* Appendices (Wiersma *et al.* 2015). This matter should be addressed in any future edition.

The most striking thing about the book, however, has to be the stunning full-cover photographs, mostly taken by the author, and combining field-shots with microscopic

ones, disease symptoms (plant and human), habitat views, and in some cases scanning electron micrographs.

The Introduction includes three pages of references to works on tropical fungi, and each section also has an extensive bibliography for those wishing to take their interests in fungi further. It would, however, have been good to see those listings extended to cover more national checklists and guides, but that is a minor point.

The book is offered “as a basic tool for teachers and students of mycology at the bachelor, licenciatura, master, and PhD levels, especially to those living in areas with a tropical or subtropical climate” (p. x). It will, I believe, also be illuminating and stimulating to citizen scientists and naturalists in the tropics and perhaps encourage some of them to take up the study of fungi “in *their* back yards”. This will be especially facilitated by the foresight of the American Phytopathological Society (ASP) Press in publishing a translation in Spanish at almost half the price of the English version. This book is complemented by another Spanish text from APS Press, the monumental illustrated dictionary of mycology of

Ulloa & Hanlin (2006); with these two books on their desks, aspiring mycologists in Spanish-speaking countries now have a sound basis from which to grow their expertise. Meike is to be congratulated on turning her vision into reality, and all who buy and use her book will I am sure treasure it and be indebted to her for the insights it affords.

- McNeill J, Barrie FR, Buck WR, Demoulin V, Greuter W, *et al.* (eds) (2012) *International Code of Nomenclature for algae, fungi, and plants (Melbourne Code) adopted by the Eighteenth International Botanical Congress Melbourne, Australia, July 2011*. [Regnum Vegetabile no. 154.] Königstein: Koeltz Scientific Books.
- Ulloa M, Hanlin RT (2006) *Nuevo Diccionario Ilustrado de Micología*. St Paul, MN: American Phytopathological Society Press.
- Wiersma, JH, McNeill J, Turland NH, Barrie FR, Buck WR, *et al.* (eds) (2015) *International Code of Nomenclature for algae, fungi, and plants (Melbourne Code) adopted by the Eighteenth International Botanical Congress Melbourne, Australia, July 2011: Appendices II-VIII*. [Regnum Vegetabile no. 157.] Königstein: Koeltz Scientific Books.

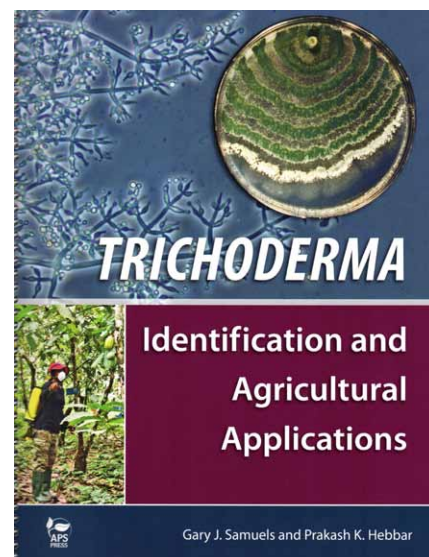
Trichoderma: identification and agricultural applications. By Gary J Samuels and Prakash K Hebbar. 2015. St Paul, MN: American Phytopathological Society Press. Pp. vi + 196, 55 illustr. (some col.). ISBN 978-0-89054-484-6. Price: US\$ 175.

With the explosion in recognition of species in *Trichoderma*, particularly during the last ten years, the need for an authoritative and up-to-date identification manual has become urgent. This welcome new spiral-bound book not only provides “faces” for selected species, but aims to provide an introduction for those wishing to exploit members of the genus in agriculture. It starts with a masterly overview of the genus. The ancestral species were evidently mycoparasitic, something now supported by whole-genome comparisons, with switches to saprobic life-styles and back in some lineages. While most records are as isolates from soil, it is pointed out that this masks their actual niches, many being found as endophytes or being restricted to particular fungi they parasitise. Biogeographical patterns are also becoming clearer, with well-known species names, such as *T. viride*, emerging as Northern Hemisphere taxa. The literature abounds with what prove to be misidentifications under current species

concepts, and there is a helpful table giving the correct names for 15 strains that have been exploited and produce particular products.

The agricultural applications are in disease suppression and biocontrol, and that they generally grow rapidly and are not harmful to humans facilitates their exploitation. A table extending over four pages lists commercial products and their applications, with references to key publications. Plants full colonised by a *Trichoderma* strain can be substantially different from uncolonised ones in responses to the environment and yield. A key factor in this is now known to be a stimulation of the plant’s immune system and increased resistance to other fungi. Genomic studies have increased our understanding of these processes remarkably in the last few years. Finding optimal effects may require matching strains and cultivars.

In order to encourage applications, a wide-ranging hands-on guide is provided



dealing with culture selection, isolation, strain improvement, use of mixtures with other mycoparasites (e.g. *Clonostachys rosea*), tracking cultures using genetic markers, assays of activity and effectiveness, establishment of root colonisation,

formulation methods, and culture preservation (with details of the silica gel method), through to product registration. A separate chapter is devoted to methods of application in field and greenhouse situations, including soil, hydroponics, seed treatments, and sprays.

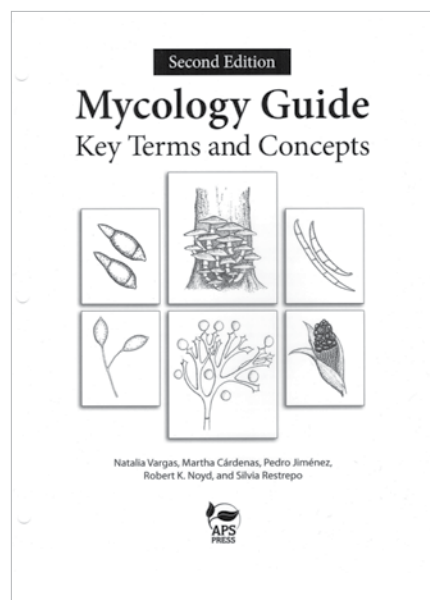
The major part of the work is devoted to systematics and identification. This includes the latest phylograms and a comprehensive listing of species in each clade, identification methods using molecular and chemical methods, media for

isolation and growth, culture characteristics, and micromorphology. Forty-five of the 254 known species are selected for detailed treatment, and a synoptic key to these based on microscopic features precedes the species accounts. Each comprises a page of text with information on synonymy, the type, GenBank references, description, distinguishing characters, habitat, distribution, and selected literature. The facing pages are occupied by composites of half-tone photographs, but the quality of the reproduction can only be described as

disappointing and not to the standard we have come to expect in APS publications.

While the emphasis is on species exploited in agriculture, this authoritative work will be a boon to all who work with and struggle with identifying members of the genus regardless of their fields. That is especially so as the first author is yet to be involved in the production of a comprehensive monograph of this rapidly expanding genus – perhaps that will be the next product of Gary’s “retirement”.

Mycology Guide: key terms and concepts. 2nd edn. By Natalia Vargas, Martha Cardenas, Pedro Jimenez, Robert K. Noyd, and Silvia Restrepo. 2015. St Paul, MN: American Phytopathological Society Press. Pp. iv + 30, illustr. ISBN 978-0-89054-468-6. Price: US\$ 69.



This is essentially a set of 12 glossy loose-leaf cards, printed on each side, with three

holes on one side so they can be placed in a binder. It is intended as a new edition of the eight cards presented by Noyd (2000) under a different title. Although evidently intended as a class teaching aid, I was unclear how they could be used in practice as the copyright statement forbids any reproduction without permission from the publisher. Following two cards on overall phylogeny, the cards are categorized taxonomically, mostly with a dendrogram illustrated by rather thumbnail sketches on one side and a glossary on the other. The first two are on reproductive methods, and are followed by one headed “*Deuteromycota*” which uses family names such as *Stilbaceae* and terms such as “form-order” on the grounds that these are “embedded in the literature” rather than taking the opportunity to make clear these are obsolete and should not be used today. Brave

attempts are made to capture the diversity of *Ascomycota* and *Basidiomycota* on a single page, but these are hardly adequate and there are several explanations that are misleading or inaccurate; far too many to start listing here. Some of the other phyla treated have a disproportionate amount of space featuring taxa of little relevance to plant pathologists (e.g. *Geosiphon*, slime moulds), and including ectomycorrhizas on a sheet headed “*Glomeromycota*” may suggest these belong there. The whole gives the impression of not having been critically reviewed by an experienced mycologist prior to publication, and cannot be commended; it is also very expensive for so few pages. I sadly have to conclude that it is best avoided.

Noyd RK (2000) *Mycology Reference Cards*. St Paul, MN: American Phytopathological Society Press.