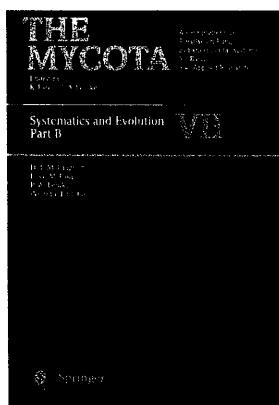




Book Review

doi:10.1006/anbo.2001.1474

McLaughlin DJ, McLaughlin EG, Lemke PA, eds. 2001. *The Mycota. Vol 7B. Systematics and Evolution*. Heidelberg: Springer Verlag. £96 (hardback).



The classification of fungi is in a state of flux. Molecular data are undermining many traditional categories, and major realignments are becoming routine. This volume comes long before the completion of the re-evaluation, so the categories recognized are not necessarily permanent, as is noted in the volume preface (wherein the only really unfortunate choice is the recognition of the artificial group Pseudomycota, comprising phyla from two different Kingdoms).

Perhaps the most serious deficiencies in this book are: (1) the interim state of the fungal classification presented; and (2) the paucity of good illustrations (though this varies from chapter to chapter—a stronger editorial hand would have helped tremendously). The first could not have been avoided except by delaying publication of the volume even further. The second could and should have been remedied.

Chapter 1 presents a succinct summary of the extremely polyphyletic basidiomycetous yeasts. Yeast morphology has arisen time and time again in basidiomycetes—in the rust fungi, the smut fungi, and the Hymenomycetes. ‘*Sporobolomyces*’ is represented in all four major clades of urediniomycetous yeasts. ‘*Cryptococcus*’ is represented in all four clades of hymenomycetous yeasts. Such conclusions essentially make mincemeat of the extant classification. Chapter 1 (along with several others) has minor problems with typos and misspellings such as ‘heterogenous’, ‘flaired’, ‘similarly’, and ‘Sakaquchia’. A few binomials are not italicized and Microbotryales is used instead of *Microbotryum*. Otherwise, this chapter is a stimulating contribution.

Chapter 2 covers the Urediniomycetes. Urediniomycetes was introduced afresh in 1995 as a monophyletic taxon containing rust fungi (Uredinales), Auriculariales, Septobasidiales, Platyglloeales, some smut fungi, jelly fungi and even a few former hypomycetes and an ‘ascomycete’. This chapter is inevitably a pot pourri of information. The sheer diversity of morphology, methods of sporulation and habitat is dizzying. The current classification is chaotic. So what holds the group together? DNA sequence data,

wall carbohydrates, simple septa, absence of Woronin bodies and of membranous septal pore caps. Microscopic characters seen through the light microscope are no longer helpful—including basidium and basidioma morphology. (Other chapters show such statements to be true of several major fungal groups.) It is very disappointing that in this chapter, as in many others, there are not more illustrations showing the range of morphology and reproduction of the several component groups. How, in their absence, are students of mycology going to come to grips with the new paradigm? *It appears that morphology will remain important in the discovery and description of new species, but will not suffice to place them in higher taxa.* This statement is becoming a generalization applicable throughout wide swathes of fungal classification and has tremendous ramifications.

Chapter 3 covers the Ustilaginomycetes. Not all smuts belong here, since some are now placed in the Urediniomycetes (!), but the Exobasidiales have a new home here. As now constituted, the class may have phragmobasidia or holobasidia, with spores discharged or not. This is a good chapter, which explores most of the angles.

Chapter 4, like many others, uses ultrastructural characters to redefine Heterobasidiomycetes, recognizing two subclasses, the Heterobasidiomycetidae—Ceratobasidiales, Tulasnellales, Dacrymycetales and (most) Auriculariales, and the Tremellomycetidae—Tremellales and Christianeniiales. There are fine illustrations of basidial and some ultrastructural characters.

Chapter 5 recognizes eight major clades of Homobasidiomycetes—Polyporoid, Euagaricoid, Boletoid, Thelephoroid, Russuloid, Hymenochaetoid, Cantharelloid and Gomphoid-Phalloid. Just to exemplify the radical classificatory changes proposed, I will note that (1) the Agaricoid clade includes (in addition to many agarics) some Aphyllophorales (Clavariaceae, Fistulinaceae, Polyporaceae and Schizophyllaceae), plus Lycoperdaceae, Nidulariaceae and Tulostomataceae, and a few Paxillaceae; (2) the boletoid clade includes forms which are poroid, gilled, resupinate, sequestrate, hypogeous, and even some puffballs; and (3) the Thelephoroid clade includes forms which are corticoid, clavarioid, pileate pored, pileate toothed, pileate smooth/wrinkled, and pileate gilled. These examples show how thoroughly the fungal spectrum has been dismembered and reassembled. It will be a while before the full impact and implications of this reorganization can be assimilated and adopted by the mycological public and the popular literature (e.g. field guides). This chapter is particularly disappointing in terms of illustrations, with only one plate showing a range of basidiomata with which all mycologists, including amateurs, are already familiar. However, the authors do discuss a number of interesting

aspects, such as anamorphs and biological associations, that are not dealt with in other chapters.

Chapter 6 presents a logical survey of the problems and practices involved in the naming of fungi, and broaches changes, some of which may have radical effects, while chapter 7 is a routine discussion of the culturing and preservation of fungi. Useful mathematical methods for planning and optimizing taxonomic projects are presented in chapter 8, with recommendations for appropriate software and chapter 9 gives a rather theoretical discussion of mechanisms of speciation in fungi.

Chapter 10 presents a really useful assessment of the relative merits of different molecular characters in establishing both phylogenies and the timing of the divergence of major groups. Some of the conclusions are rather counter-intuitive, and it will be interesting to see if future fossil discoveries and additional molecular data support these ideas. As the authors conclude 'sequences from more genes and characters of all other types will be welcome'. This may be—in retrospect—the understatement of the year.

All of this leaves me wondering about the target readership of this volume. Specialists in each group will already have seen most of the ideas aired in the literature. Non-specialists will search in vain in several chapters for illustrations to illuminate the often extremely confusing changes being proposed. Students (especially those with a bit of mycology under their belts) may be excused for throwing up their hands in dismay. Those new to the discipline won't have a clue what the fuss is all about.

Given the rather alarming number of typos, egregious errors and peculiar English usage in some chapters, the general paucity of expository illustrations (and the often inappropriate use of SEMs, which frequently present information in a form not readily assimilable unless accompanied by interpretive diagrams), and the extremely uneven quality of the chapters, I am reluctant to recommend the book to the general mycological public, unless they insist on having a precis of an interim, and often confusing, stage in the development of mycological systematics.

Michael Ondaatje recently remarked that 'As a writer, I find that the last two years of any book I work on [are] given over to editing it'. After considering the taxonomic confusion that suffuses Volumes 7A and B, I feel that the editors should have taken this advice to heart. I suppose that, since the publishers do not pay their authors, they must, to some degree, take what is provided. But many aspects of these volumes could have been improved greatly by firm editorial hands. Volumes 7A and B provide only an interim snapshot of an evolving intellectual process—the development of a renewed phylogenetic and classificatory system for the fungi. Given that this kind of compilation is carried out only every two or three decades, it might have been better to wait another 5–10 years until more data were available on which to build the new scheme, and to produce more comprehensive and profusely illustrated accounts of the major groups.

Bryce Kendrick

© 2001 Annals of Botany Company