Book Review


This book provides a unique key for the identification of 100 genera of filamentous ascomycetes. Ascomycetes are fungi, but what are fungi? While this book does not address this issue, a few words about fungi might facilitate placing these organisms in the greater scheme of living things. It is not an easy job. Organisms generally accepted as fungi are so varied in form and reproduction that sometimes it seems that the less one thinks about it, the easier they are to comprehend. To begin with, it can be stated that fungi are a collection of nonphotosynthetic, osmotrophic, cell wall-possessing filamentous, yeast or yeastlike eukaryons with multinucleate cytosol (perforated septa in ascomycotina, basidiomycotina, and deuteromycotina usually delimit inter-connected compartments rather than independent cells) that are united by these and other traits which are believed to reflect evolutionary relationships. When taken as a whole, however, fungi may be polyphyletic and hence may consist of more than one clade. Perhaps some weeding of "atypical" fungi would clarify the concept of a fungus. One has to temper thoughts of slashing away at the group, however, with the realization that nature seldom draws lines without smudging them (3). Perhaps slime molds, which have no cell walls but are multinucleate and produce spores, may not be fungi, but the presence of motile cells in aquatic fungi would not seem of itself to preclude their acceptance as fungi, as Margulis, who removed them from fungi, has no problem in accepting motile cells in the diploid embryo higher plants (4). Various other properties may be of significance. Fungi as a group may possess the glyoxylate bypass, and this, together with the cell wall, would separate them from all principal animalia but not also from all protista or prototista (4). Fungi may possess unique mitochondrion codons and introns (2). Spores and assimilative cells of fungi, and some bacteria, are capable of varying periods of discontinuous respiration and/or growth at reasonable temperatures and probably are capable of "immortality"—with prudent sequential culturing. Growth of assimilative hyphae occurs by elongation of the hyphal tip and budding (many fungi can do both), and this may be a uniting trait. Sexual spores and outgrowing hyphae, or other types of cells, are haploid (except for certain yeasts and probably certain mastigomycotina and zygomycotina [formerly phlycomycetes]) as meiosis typically closely follows karyogamy.

Back to the ascomycetes, or ascomycotina fungi. This book was written for the advanced student of mycology and provides for one approach to the identification of 100 of the known 2,270 genera. The admittedly artificial key employs in the main characteristics of the ascospores and occasionally some aspect of the fruit body (now called ascoma) and stroma. Spore types are divided into 10 categories (Saccardoan) as regards shape, compartmentalization, and color. One enters the analytical-type key with the spore appearance and proceeds until the correct genus is reached—if it is included in the key. All of the fungi are described as they occur on plant structures, dung, or soil. Separate from the key are two pages devoted to each genus, one bearing clear and concise drawings of the ascoma, ascus, and ascospore.

The second page contains a concise description of the genus; the name of the anamorph (asexual stage), if any; habitat; representative species; comments on similar fungi (but no drawings); and some relevant references. The comments are very useful for coverage of synonyms. The authority of this book is evident, but so are two limitations that have nothing to do with the quality of treatment of genera.

First, by necessity, this book suffers from the limitations of some medical mycology books and manuals where only the pathogens, and occasionally a few saprophytes, are covered. How does the user who has not taken a basic course in mycology know how dissimilar a given fungus must be to lie outside the range of characteristics of a taxon? What seemingly trivial but actually fundamentally different trait might signal the presence of another taxon? Does one endeavoring to identify the dangerous Histoplasma sp. need to know about the existence of similar-appearing Chrysosporium, Sepedonium, and Pythium spp. with blunted spiny oogonia? Or the dimorphic test? The similarity between airborne chains of oidium spores from powder mildew on a hospital potted plant and arthropores from Coccioides immitis might cause the uninformed to press the panic button. Advanced students for whom Dr. R. T. Hanlin, an internationally recognized mycologist, wrote this book would have no trouble, but others attracted by its crisp treatment might be lured into a false sense of command of these fungi.

Second, the key is not a concept-building conventional analytical (dichotomous) key, in which one proceeds from the most inclusive sets of traits and works toward specifics (macrotaxonomy to microtaxonomy if one starts high enough up the hierarchy). An example of the advantages lost in using a key such as this one is seen by comparison of an Endothia sp. and Cryptonecctia parasitica (chestnut blight). Recently this pathogen was transferred out of the genus Endothia and into the genus Cryptonecctia, mainly because the former has one-celled ascospores while the latter has two-celled ones. This key places them 52 pages apart in a 263-page book. Distributed between them are truffles, fungi with stroma, fungi without stroma, and discomycetes. As stated, the key does not reveal relationships (see reference 1 for proposed relationships between various genera). Today, cladistics and phenetics are sometimes used to search for relationships within the filamentous fungi (5). Expensive techniques such as DNA probes, lipid analyses, etc., are not likely to be used for fungi such as most of these, which are obscure to the uninterested eye.

Some comments follow.

Some changes in organization would have made the book easier to use. For example, photographs are referred to as figures and are numbered, while line drawings are not numbered. References to figures are not accompanied by page numbers. Figures probably were used in part to occupy the right side when an occasional genus coverage carries over to a third page. Figures therefore can be many pages removed from the relevant genus (e.g., Myriogenospora is discussed on page 186, but when you finally find it, the figure is back on page 134). The index would be easier to use if species names were listed beneath the genus and indented. As it is, a genus is listed once by itself and then again for
every species mentioned. Occasionally, representative species listed are not the same ones illustrated (e.g., Tuber, Cercophora, Venturia, Lembosia, Podospora, and others). Sometimes the same technical term is not used in both the description and the legend (e.g., use of apothecium and hysterothecium for Ploioderma on pages 76 and 77). There are spelling errors on pages 148, 195, 199, 205, 223, and 239, to mention a few. Throughout, the names of plant diseases could be more specific. For example, Exserohilum turcicum does produce leaf spot on maize, but specifically it causes a very important disease known as northern corn leaf blight. Clarification of relationships between identities of fungi listed in the book and in the American Phytopathological Society (APS) Compendium series (these excellent publications are not referenced) would have been helpful for budding plant pathologists, especially since this book is also published by APS Press. In some cases, e.g., pages 20, 78, 130, 131, and 224 to 227, descriptions of the structures are at variance with the illustrations.

In summary, in general this is a very well laid-out book. Open it virtually anywhere and the narration about a genus is on the left and the excellent drawings are on the right. If an ascomycete under examination happened to be covered in the book, use of the key, drawings, comments, and references should reveal its identity. Obviously, it is not a vade mecum of ascomycetology, but then it is not intended to be. It would be very useful as an aid to identification of certain filamentous ascomycetes, particularly members of the Pleosporales and Sphaeriales (in sensu Müller and von Arx).

LITERATURE CITED


Willard A. Taber
College Station, Texas 77840