WOODB DECAY


Mycologists are sometimes asked to advise on trees that have sprouted fungal fruiting bodies – can they be treated, and do they present a risk of falling branches? Although we can usually identify the fungus, questions of risk assessment and prognosis require more than purely mycological knowledge.

The problem of wood decay in specimen urban and parkland trees is different in several ways from that of wood decay fungi in forests and plantations. Such specimen trees are valued as individuals, giving shade and enhancing the landscape. They are likely to be older – in the case of veteran trees, much older – than trees grown as a crop, and are also more likely be a threat to life and property when they fall or shed branches. Advice on decay must therefore include risk assessment and prognosis. There is a need for a book such as this that addresses these particular questions, as distinct from books on forest pathology.

Fungal Strategies of Wood Decay in Trees is by three scientific collaborators from the Institute for Forest Botany and Tree Physiology at the University of Freiburg and the Institute for Materials Research at the Research Centre, Karlsruhe. It is, in the words of its Introduction ‘tailored to the needs of the practitioner’, and it will indeed be very valuable for diagnosing and predicting the effects of fungal decay on trees. However, its usefulness will extend further than this because of the detail and insight in the accounts of the natural history, morphology, physiology and anatomy of fungal decay of wood in the standing tree, which will be of value to researchers and teachers as well as practitioners.

The book is imaginatively put together in just four chapters. The first two give essential information about the biomechanics of wood in relation to its anatomy, and a little basic mycology. An excellent feature is the innovative three dimensional diagrams that accompany photomicrographs of wood showing different decay types. This is the best account I have seen of the relationship between wood structure and strength. Chapter 3, a major part of the book at 79 out of 185 pages, is an account of the characteristics of different fungus-host combinations. Obviously based on very extensive first-hand experience, this describes the effects of 18 common decay fungi on the most commonly planted urban tree species. The pattern of wood decay within the whole tree is described, with differences in the mode of attack on different host species. Each fungus-host interaction is presented in detail with the help of excellent colour plates showing wood anatomy, the characteristic appearance of the fruiting bodies and the decayed wood, and any distinctive effects on the whole tree. The layout of this section is excellent, with plates opposite the relevant text and informative legends, and it will be extremely helpful in diagnosis and practical risk assessment.

The final chapter deals with prognosis – will the decay spread in the tree? Much has been written about the ‘CODIT’ model which describes the interactions between fungus and wood that compartmentalise the decayed wood in living trees, but this is the best account of these processes that I have read. The illustrations are superb, and combine specially-drawn three dimensional interpretative diagrams of wood cellular anatomy with annotated colour micrographs. The science is up to date, with an excellent select bibliography.

I have only minor criticisms. The section on basic mycology is inaccurate in places, and the references to simple mycological identification literature do not include any works in English. The index could also be improved by categorising entries by topic rather than single words – for example there are 34 separate single page numbers listed under the single word ‘vessel’, but nothing under ‘durability’ or ‘resistance’ although these topics are discussed in Chapter 4. This is frustrating in a book intended for easy reference.

However, the authors have produced an excellent and innovative book and I would strongly recommend it for individual purchase by all involved in decisions about urban tree preservation, as well as researchers and teachers in mycology and plant pathology. It would also be suitable for university libraries with a biology section.

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MYCORRHIZAS


Mycorrhizal symbioses are currently recognized as a key area in scientific research: the concept that nutrient acquisition by most plants growing in natural ecosystems is mediated by mycorrhiza-forming fungi (Read 2000) and that mycorrhizal fungi may therefore be used as biofertilizers within the framework of sustainable agriculture has been widely acknowledged by the scientific community. As a consequence of the increasing number of those interested in mycorrhizas, the literature on the topic has increased dramatically over the last few years. There is a massive presence of...

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1 Book Reviews are compiled by David L. Hawksworth, Executive Editor Mycological Research, MycoNova, 114 Finchley Lane, Hendon, London, NW4 1DG, UK (tel/fax: +44(0)20 8203 4282, e-mail: myconova@btinternet.com), to whom copies of books for consideration should be sent. Briefly Noted items are prepared by the Executive Editor.
papers on mycorrhizas in leading journals, in addition to the specialized ones, which often have special issues, comments and editorials on mycorrhizas. Usually, the books fall into two categories: generalist and specialist. The first is excellently represented by Mycorrhizal Symbiosis (Smith & Read 1997), a volume following in the footsteps of Jack Harley’s classic text which provides overviews of current concepts, and tries to interpret the experimental data on the basis of a theoretical framework. In contrast, other books are more specialized, focussing on some particular aspects and involving researchers directly involved as front line players. This second category very often offers a sound summary of current research, and recent examples are Current Advances in Mycorrhizae Research (Podila & Douds 1999; see Mycological Research 104 (12): 1515–1516, December 2000) and Symbiotic Interactions (Hock 2000). While such specialized books sometimes lack a general vision, usually due to the involvement of several authors, they undoubtedly offer an updated and competent view of the state of the art.

What then is the position of Mukerji, Chamo & Singh’s book on the mycorrhizal stage? The volume has a general title and contains 18 chapters; these cover general aspects of mycorrhizal biology (from the evolution of the associations to their classification and general functional characteristics); some aspects of microbial ecology (from the mycorrhizosphere to responses to global change; and technological aspects (mycorrhizas and micropropagation, inoculum production, effects of agrochemicals). The chapters usually deal with both ectomycorrhizal and arbuscular mycorrhizal fungi, but the diversity of mycorrhizas is witnessed by a chapter on those of orchids, and two chapters focus on the use of molecular probes to identify symbiotic fungi. Particular attention is given to the development and use of mycorrhizas in stress conditions. The chapters, the rational succession of which is not always clear, are rich in tables and references which usually cover past knowledge rather than its current status. This does not always detract from their merit; for example, that on the evolution of mycorrhizas (S. Raina et al) is a great source of information which will surely be useful to students and younger researchers. Useful summarizing tables appear in the chapters on the mycorrhizosphere (M. Bansal et al) and mycorrhizal fungi as disease control agents (R. Singh et al.), but others suffer from being outdated – as is the case with the overview of ectomycorrhizas (T. N. Lakhapal) where the current positioning of the ascomycetes involved has changed substantially in the light of molecular phylogenetic studies. Some chapters differ radically from a summarizing approach; R. Dixon tackles the problem of the global carbon cycle and interactions with the mycorrhizosphere in the format of an experimental paper with a Materials and Methods section and new Results from three sites in the USA. Douds et al. clearly explain how the development of axenic co-cultivation of fungi and hairy root cultures may offer a useful tool for developing an arbuscular mycorrhizal inoculum and present the results of a pilot project conducted at the Tata Energy Research Institute in India. The chapter on orchidaceous mycorrhizas also includes new data, and in addition to a review of their biology presents current knowledge on the newly discovered Pirformospora indica.

It is difficult to verify whether these contents meet the aims of the editors. In a long Preface, they offer an interesting vision of the effects of increasing population pressure on a limited land resource and how this is particularly dramatic for developing countries. Figures provided for India, where soil degradation in turn affects the country’s productivity, are particularly impressive. However, only a few chapters respond to such expectations, providing examples from experiments performed in India with a wealth of tables, references, and information on local plants. The intended theme is also reflected in the chapters on micropropagation (Sharmila et al.), the mycotrophic status of Indian weeds (Gupta & Mukerji), and the effects of agrochemicals on mycorrhizas (Vyas & Vyas).

But just who is this book aimed at? It is difficult to define the target audience for such a volume. At least, undergraduates will find the summary tables on different aspects of mycorrhizas useful, while more advanced students will have access to a good collection of data on stressed soils and environments from developing countries.


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