

dip into for references, examples, and the occasional “bon mot” it should prove invaluable. The pity is that with a bit more work on this volume, it could have been much more so.

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ARMILLARIA ROOT ROT: BIOLOGY AND CONTROL OF HONEY FUNGUS

edited by Roland T.V. Fox

Intercept Limited (Scientific, Technical and Medical Publishers), Andover, Hants., U.K.
2000. 222 pages. ISBN 1-898298- 64-5. £47-50 / US\$88-00

This publication is a compact, multi-author compendium of information about an important root disease found throughout much of the world, including New Zealand. The book has a European, particularly British, flavour but its scope is global. The editor, Roland Fox (University of Reading), is a gardening enthusiast, horticulturist, scientist, and plant pathologist, and is clearly captivated by the intriguing but economically damaging group of fungi that cause this disease. As writer of five of the 11 chapters (Chapters 1, 6–8, 11), he is unmistakably the driving force behind the book, but with nine other contributors there is ample diversity of content and opinion.

In structure the book is unremarkable but practical. The chapters are dispersed among five sections, with the first three chapters making up Section 1 (Biology). Chapter 1 (Biology and Life Cycle) thoroughly reviews current knowledge of the feeding behaviour and nutrition of different *Armillaria* species, the nature and growth of rhizomorphs, fruitbodies, and pseudosclerotia, the movement of water and nutrients, the production of antibiotics and enzymes, genetic diversity, and bioluminescence. Chapter 2 (Ecology and Epidemiology, by A.J.Termorshuizen) leads on to an account of population dynamics and disease development. It discusses host range and condition, colony establishment, the formation of disease centres (giving consideration to the separate roles of basidiospores and of vegetative growth), and interaction with other organisms in the environment. In Chapter 3 (Quantitative Aspects of Epidemiology) A.Lamour and M.J.Jeger investigate what is known in quantitative terms about the development of *Armillaria* in space and time, and include discussions of fractal analysis and disease modelling.

Section 2 (Diversity) consists of two chapters that examine the identity, distribution, and recognition of the many species now acknowledged within the genus *Armillaria*. In Chapter 4, D.N.Pegler presents a concise, scholarly outline of the traditional taxonomy and nomenclature of the currently accepted *Armillaria* species throughout the world, supported by detailed drawings of those found in Europe. Complementing this, Chapter 5 (Molecular Methods, by A.Pérez-Sierra, D.Whitehead, and M.Whitehead) provides a careful review of the current knowledge of *Armillaria* species as characterised using protein-based techniques and more recently developed DNA methods.

Section 3 (Pathology) consists of just one chapter (Pathogenicity) which analyses the disease according to the classic triangle: pathogen (pathogenic species, inoculum, and the

infection process), host (reaction to infection, symptoms, and physiological response), and influence of environmental stress.

Section 4 deals with Control and is appropriately the largest, consisting of four chapters. Chapter 7 commences the section by asking what treatment is trying to achieve, and to what extent potential economic gains justify the cost of intervention. In Chapter 8 the benefits and disadvantages of cultural practices are examined, including those of site and host selection, stump removal, planting, pruning, and thinning. In Chapter 9 (Chemical Control) J.S. West reviews attempts to restrain the disease by introducing fungicidal materials into the soil, wood, or living tree. In Chapter 10 (Biological Control) F. Raziq summarises research efforts to find and utilise organisms antagonistic to *Armillaria*. In passing, it should be noted that despite the commercialisation of *Trichoderma* products in New Zealand, it has yet to be rigorously demonstrated that these preparations are effective in providing field control or protection against *Armillaria* in this country.

The last section (Future Possibilities), consisting of just one chapter, probes the directions in which research may proceed, including the possible enhancement of resistance through genetic modification. The prospects for realistic operational disease control are discussed.

Inevitably, one must ask what this book has to offer that is not already available in another comprehensive, international, multi-author publication on *Armillaria* root disease that appeared 9 years earlier (Shaw & Kile 1991). Firstly, with a different assortment of authors, this book provides an alternative perspective. Duplication is unavoidable, particularly when older, classical work is reviewed, but with both books one is able to compare different viewpoints according to the background and interest of each writer. The literature on *Armillaria* is enormous, so it is valuable to have a second work to consult when seeking information on different aspects of the disease. Secondly, much research has been undertaken in the period since the publication of the earlier book. For instance, the output of a surge of molecular and cultural studies, in full swing at the time of the first publication, is brought up to date with the appearance of the new production.

However, it is noticeable that other aspects have not advanced so far since the appearance of the earlier book. Generally speaking, the impact of the disease in forests is not yet effectively quantified (Chapter 3), and reliable modelling is still under development (Chapter 3). DNA diagnostic kits to enable rapid identification of species are not available (Chapter 5), and there is apparently no effective operational disease control procedure used routinely in forests. Some practical suggestions are listed at the end of Chapter 8, but with a scarcity of definitive supporting research, many are based on sensible intuition and logical conjecture. Effective research needs adequate resources and must be sustained. With no immediate, short-term benefits, and additional difficulties in accurately quantifying disease loss, prospects for serious progress in the present global funding environment are not encouraging. New Zealand's contribution has been significant, as demonstrated by frequent references in this book. Recent progress has been made in this country on determining the development, distribution, and impact of the disease in current plantation forests, but greater precision is needed. Disease management trials are in progress, and pilot studies of alternate control methods are under way. However, the development of an integrated protocol for disease management in current and future plantations will require undistracted resolve and focus.

This book is convenient, easy to handle, readable, and well presented. References are plentiful and illustrations ample, informative, and interesting. The content of the chapters is generally consistent and clearly defined, though some repetition does occur (e.g., host range is discussed in both Chapters 2 and 6, rapid diagnostic kits in Chapters 5 and 7, chemical control in Chapters 8 and 9, and there is also some overlap between Chapters 7 and 8). A study by I.A.Hood and C.J.Sandberg is misinterpreted in Chapter 2 (p. 47). These are mostly minor blemishes. This production can be recommended as an up-to-date reference book for plant pathologists, and an absorbing, intelligible, contemporary source of information for foresters, arboriculturists, and other practitioners of tree health and care.

REFERENCE

SHAW III, C.G.; KILE, G.A. Ed. 1991: Armillaria root disease. *USDA Forest Service, Agriculture Handbook No. 691*. 233 p.

I. A. Hood