Book reviews

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An Introduction to Arthropod Pest Control, by J. R. M. THACKER. xv + 343 pp. Cambridge: Cambridge University Press (2002). £19.95/£50.00. Paperback, ISBN 0 521 56874. Hardback, ISBN 0 521 56106X.

Arthropods can be very important pests and the subject of their control is certainly non-trivial. Thacker has produced a clear and readable account of the approaches involved. He begins by recounting the history of pest problems and counter-measures, dating back at least 4000 years, and ends with a discussion of biotechnological advances and future possibilities. The majority of the book, however, takes a techniques oriented approach, with chapters on botanical and synthetic insecticides (i.e. chemical structures plus notes on their properties and usages), plus their formulation and application, biocontrol, microbial pest control, the use of pheromones, growth regulators, genetic manipulation (mainly sterile male release) and cultural techniques and organic farming. Each of these is clearly explained and discussed. There follows a chapter on integrated pest management (IPM) in which, not surprisingly, the building blocks explained in the techniques chapters fall into a more holistic context. Thacker makes the interesting observation that IPM in the 'first world' these days attempts to minimize economic damage while also minimizing environmental cost while in the recent past IPM aimed at pest eradication, with environmental concerns being only of minor interest. The latter view is apparently still dominant in many developing countries. There is enough information on environmental effects of pesticides in this book to at least sow the seeds of change where they may be needed.

I teach applied entomology to first-year undergraduates and I will certainly be recommending this text to them. I also teach population biology and biocontrol to third years and environmental issues in pest control on a crop science masters course: this book will also provide a useful primer for these students. Because Thacker has deliberately limited the amount of primary literature he cites (this does not mean the book is not well researched) more advanced students will need additional material. This is, however, also a work of reference as there is a 30 page glossary, although I consider it would have been more sensible to organize the whole glossary alphabetically rather on a chapter-by-chapter basis. The index is also split, with separate lists for 'pests', 'beneficials' and 'subject'.

In summary, the book does exactly what it says on the cover, and does it well: it provides a solid introduction to arthropod pest control that will be of great use to those starting out in this field. Pests beware!

I. C. W. HARDY

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Biology of Apples and Pears, by J. E. JACKSON. xii + 488 pp. Cambridge: Cambridge University Press (2003). £95.00 (US $130.00). ISBN 0 521 38018 9 (Hardback).

It is good to see a new scientifically based text that considers the biology of apples and pears for, while they are important world crops, their complexity makes a review of recent research a daunting task. John Jackson is a world-renowned researcher into fruit growing and has produced an excellent book. The chapters are arranged in a conventional manner starting with some aspects of the history and taxonomy of these fruits. The section covering pears is relatively brief but it is good to see Asian pears described here.

The growth and development of roots, grafting, shoots, leaves, flowers and fruits are then described. Chapter 5 reviews the mechanisms of rootstocks and interstocks on scion vigour and is extensive in describing 17 possible mechanisms for the influence of rootstocks on scion vigour. The influence of canopy light interception on plant efficiency is examined in great detail with excellent discussions covering net CO_2 exchange and source sink relationships. These are explained well and consider the complexities that arise when dealing with a tree structure that can be manipulated to create different canopy shapes and sizes.

Later chapters are concerned with fruit eating quality, especially the influence of calcium nutrition. There are chapters reviewing plant mineral nutrition and plant water relations. Pests and diseases including

viruses are considered. The inclusion of such a chapter in such a book is always difficult. Inevitably it is relatively short although these topics could form a book in their own right. It is probably correct to include this section especially as it is well referenced. Finally the influence of biotechnology is considered. The use of tissue culture is described and its importance for rapid multiplication of new material discussed. Some of the more recent genetic transformations are described. However, as the author points out, no commercial cultivars have been developed and when they are, their use will depend upon consumer acceptance as well as commercial advantage.

One strength of the book is the inclusion of data from apple cultivation in the tropics of which the author has first-hand experience. This allows, for example, a novel consideration of dormancy which needs to be manipulated in such areas. A second strength of the text is the extensive reference list at the conclusion of each chapter giving the reader easy access to further information.

This book will provide useful information for research and extension workers, plant breeders and teachers and students as well as interested fruit growers.

C. WRIGHT

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Efficient Conservation of Crop Genetic Diversity, ed. DETLEF VIRCHOW. xiii + 246 pp. Berlin: Springer (2003).
(Hardback) ISBN 3 540 00006 2.

The International Treaty on Plant Genetic Resources for Food and Agriculture, adopted by the FAO, supports the use of genetics for research and breeding while ensuring conservation in line with the Convention on Biological Diversity. Genetic resources are in constant danger of being eroded both *in situ*, due to management changes in traditional farmers' fields and natural habitats, and *ex situ*, due to gene banks suffering from a lack of adequate facilities and planning. The Leipzig Declaration commits countries to implement a Global Plan of Action for the Conservation and Sustainable Utilisation of Plant Genetic Resources for Food and Agriculture. However, while the need for Crop Genetic Resource (CGR) conservation is generally appreciated, little attention has been paid to the costs and cost effectiveness of conservation methods. This book seeks to rectify this in a collection of articles based on theoretical and applied studies across a range of species and locations. The book's editor, Detlef Virchow from the Centre for Development Research, University of Bonn, has an input into 4 of the 11 chapters where he usefully sets the context of other chapters and links specific issues such as approaches to estimating expenditure on CGR activities. Other authors come from a range of backgrounds including IPGRI, FAO and research centres in India, Kenya and the USA and the book contains a good range of useful economic information on genetic resources presented in quite a readable way. Problems in estimating CGR expenditure are raised in a comparison of CIMMYT and ICARDA gene bank costs and in detailed analyses of national conservation costs in Colombia, India and Kenya. The cost effectiveness of CGR conservation is considered in terms of investment in labour and capital; the nature and quality of conserved material; economies of scale; and complementarities of conservation strategies. Policy implications of costs are discussed in relation to possible financing mechanisms. Stakeholders that benefit from CGR conservation are classified as upstream users (breeders, the biotechnology industry and seed producers), downstream users (farmers and agricultural-based industries) and consumers of final products. It is clear that assigning economic values to CGR utilization by various stakeholders is extremely complex and difficult although an attempt is made to identify benefit-sharing indicators. Few general conclusions are drawn or recommendations made although the point is well-made that a sustainable benefit-sharing system requires elements of incentive and competition both on the supply and demand side of CGR utilization. The book's intention is to broaden knowledge of conservation costs and undoubtedly this is achieved. However, the further research needs, deemed necessary before general conclusions and recommendations can be formed, are not well defined. It is also a pity that the book has no index to make navigation easier for casual readers.

M. HUMPHREYS

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Mathematical Modeling for System Analysis in Agricultural Research, ed. K. D. VOHNOUT. xii + 437 pp. Elsevier Science (2003). US $ 149.00, EUR 149.00 (Hardback).
ISBN 0 444 51268 3.

This book provides a theoretical background and a suggested framework for constructing mathematical models of agricultural systems. The theory sections comprise solving linear equations, differential and difference equations, transformations and curve fitting with a chapter on each. The framework section categorizes systems as stochastic, deterministic-discrete

and deterministic-continuous, again with a chapter on each. There is also a chapter on experimental design and testing. The emphasis throughout is on constructing and fitting empirical functions to observed or experimental data. There is no discussion of a more mechanistic approach. Each chapter introduces some theory followed by a series of incompletely worked examples. As the author acknowledges, there is a bias in the examples towards animal feed systems although other aspects of agriculture and forestry are included. The examples are illustrated with figures and tables. While these illustrations are useful, there are often an unnecessary number of decimal places in the tables. Unfortunately, the print quality, especially of some of the figures is poor in places. While the author admirably emphasizes the importance of parsimony in models I would have liked to see more discussion on selecting a model where several plausible alternatives exist and an acknowledgement that not all agricultural models are empirical. With these provisos, the book is a useful primer and introduction for readers with a sufficient mathematical background and interest in developing models.

J. GIBBONS

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Water Dynamics in Plant Production, by W. EHLERS & M. GOSS. 304 pp. Wallingford: CABI Publishing (2003). £65
ISBN 0 85199 694 9

The textbook on *Water Dynamics in Plant Production* by Wilfred Ehlers and Michael Goss could hardly be on a more important subject. This book is targeted at university and college students starting their postgraduate studies. The authors do not intend their books to be an exhaustive treatment of the subject area and they specifically intended it to be a text that raises questions in the mind of the reader. This book covers the broad remit of the title extremely well and it succeeds in meeting the aims of the authors. It is the breadth of topics that the book deals with that distinguishes it from many other textbooks. Because of this it also makes a useful reference book. The organization of the book into short self-contained chapters helps in this respect.

The first nine chapters introduce the basic concepts needed to understand the water dynamics in plant production in a logical sequence. These chapters deal with clearly defined issues and they are short and well organized. The book utilizes 'text boxes' to examine important aspects in more depth than is given in the general text. Examples of such 'text boxes' describe the principles of the hydraulic tensiometer, the explanation of sap ascent, the measurement of water flow through plants and the signalling between roots and shoots. These 'text boxes' are very useful and add to the value of the book. Not only do they describe some of the important measurement concepts, but they also give us an insight into the developments that the authors see as milestones.

The last 10 chapters of the book deal with more complex issues that tend to be determined by the interaction between complex variables. The book succeeds at presenting factual information in a clear and concise manner. Much of the text in these latter chapters is thought-provoking. Although the book does not deal with topics in great depth, the breadth of the coverage is excellent.

The reference list is comprehensive, although perhaps biased towards those with an interest in soil–plant interactions or agronomy. Some important work on the response of plants to water stress and current thinking on turgor driven root elongation are not included. I was a little disappointed that there was not more coverage of the effect of the interaction between stresses on the growth of the root system. However, these are minor niggles. The book will be a very valuable text for all agronomy students and an excellent introduction to 'Water Dynamics in Plant Production' for postgraduate students. It will also be a very useful addition to my library.

W. R. WHALLEY

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Poisonous Plants and Related Toxins, ed. by T. ACAMOVIC, C. S. STEWART & T. W. PENNYCOTT. xiii + 586 pp. Wallingford: CABI Publishing (2004). £75.00 (US $140.00)
ISBN 0 85199 614 0

The scope of this text is substantial. From the early travels through Montana in 1900 of Victor King Chesnut, the first person fully employed by the USDA on research of poisonous plants, through retrospective analysis of major poisoning events in the 1940s to 1960s, to the modern techniques of analytical laboratories, this book is a major resource for those interested in plant toxins. The editors have presented 86 refereed papers from the 6th International Symposium on poisonous plants held in Scotland in 2001, covering the evolution of antinutrients and toxins in plants, biomedical applications, isolation, identification and effects of plant and toxins, and the effect of plant toxins on aversion to plants in animal diets.

The broad nature of the text means that its use as a reference should be widespread, which leads to the

only criticism. The arrangement of the papers is not obvious, and a contents section that requires full examination of every title to find a particular subject does not help the reader. That said, the index is capable of guiding the reader to subjects of particular interest. Any presentation that contains more than 90 pages of references is a valuable tool, especially as the papers represent work from around the world.

The most notable plant species are covered, and *Ipomoea carnea*, *Pteridium aquilinum*, *Panicum virgatum*, *Senna occidentalis*, *Astragalus*, *Delphinium* and *Oxytropis* species, are all covered in multiple papers, as are the corynetoxins produced by the bacterium *Rathayibacter toxicus* which colonize galls. The anti-nutritive properties of lupins are addressed in a number of papers, and cover the impact of soluble polysaccharides in the dietary fibre, perhaps leading to a greater use of exogenous enzymes to negate the toxic effects. The identification of stages of plant growth that contain the higher concentrations of toxins provides improved guidance towards livestock management strategies that reduce risk of exposure.

Whilst there is inevitable overlap in the detail, the papers demonstrate the devastating effect that the secondary metabolites (SM) of numerous plant species can have on animal and human health and productivity. A number of papers address the impact and biochemical activity of mycotoxins, which are estimated to affect 25% of world grain production, although there is obviously still further research required to elucidate rapid and cost-effective analytical techniques. The positive attributes of SM are covered to a lesser extent but there are a number of suggestions that may attract resources to this research area, for example polyamines as a possible chemotherapeutic against HIV, or the use of plant xenobiotics as anti-insect materials.

Analytical techniques covered include NMR, GC-MS, HPLC and indirect competitive ELISAs, and electromyograms on live animals. The importance of the materials and methods pages are especially valuable where new techniques are presented and where current techniques are expensive or slow, and where rapid diagnosis of causal agents would facilitate management of the toxic effects. Similarly the papers that investigate dose/response relationships will help to provide management strategies for those pastoral areas where livestock are extensively grazed at times when risk of exposure to SM is increased. Intermittent exposure to swainsonine or continuous exposure to aversive mixtures can be sustainable, leading to management strategies for infested pastures. The papers that explore cohabitation of toxic plants and managed livestock are particularly relevant, and the descriptions of the various toxic effects of the SM serve as a reminder of the substantial damage that is done, but which can be mitigated by an improved understanding of the background mechanisms. This book most definitely contributes to the goal of improved understanding.

J. F. ROBERTSON

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The Oil Palm, 4th edition, by R. H. V. CORLEY & P. B. TINKER. xxviii + 562 pp. Oxford: Blackwell Science (2003). £115.00 (US $142.99) ISBN 0 632 05212 0

Since the original publication of *The Oil Palm* in 1967 it has become one of the key reference books for researchers working on this tropical tree crop. The fourth edition – now written by R. H. V. Corley and P. B. Tinker after the death of C. W. S. Hartley – is the latest update in this series. Given the esteem that the Hartley editions have been held in, the authors of the fourth edition had a major task on their hands to meet expectations.

The fourth edition contains 15 chapters covering the whole range of oil palm usage, from basic biology, through identifying suitable sites and establishing plantations, to practical management and generation of oil palm products. Roughly the first half of *The Oil Palm* concentrates on the oil palm itself, containing chapters on the history (Chapter 1), botany (Chapter 2), climate and soils (Chapter 3), growth and yield (Chapter 4), selection and breeding (Chapter 5) and biotechnology (Chapter 6). The remaining chapters deal mainly with the management side of oil palm plantations, containing chapters on seed germination and nurseries (Chapter 7), site selection (Chapter 8), establishment of oil palm (chapter 9), maintenance (Chapter 10), mineral nutrition (chapter 11), pest and diseases (chapter 12), products of oil palm (Chapter 13) and uses of oil products (Chapter 14).

The Hartley editions were comprehensive and the new edition also has the broad sweep across all things oil palm, without any major loss in depth. Where Hartley (1988) contains additional information the current authors have referenced the third edition, to provide continuity. The authors have also made a welcome effort to place the oil palm information into the broader context of agriculture in general, both in terms of comparing practices and also in terms of the comparative contribution palm oil makes to the vegetable oil sector, historically and projected into the future.

The statistics have been thoroughly updated for the 15 years that have passed since the third edition, during what has been a period of major development for the oil palm industry. New sections have been

added on the development of molecular genetics, recent developments in clonal propagation and the potential for genetic modifications in this crop. The authors have also tried to address a number of strategic issues that relate to the development of the oil palm industry and some of these issues are specifically raised in Chapter 15. While the inclusion of a section on the current and future environmental impact of the oil palm industry in this chapter is to be welcomed, the discussion is limited.

The Oil Palm is presented in relatively small print, double columned and has nearly 500 pages of well-written, highly relevant information, before a very extensive reference list that includes many of the conference proceedings and specialist publications which often cannot be found in on-line reference collections. This may seem a relatively minor point, but (as the authors point out) the oil palm literature often appears in some very obscure, often 'in-house', publications and a number of the references in the molecular genetics section are new to me.

The illustrations are excellent, with almost every page containing at least one figure or picture and there are also 16 pages of colour plates at the centre of the book, illustrating details from the chapters. The writing style is concise, without being impenetrable. For example, the developments over the last two decades in the application of molecular genetics to oil palm breeding is covered in only 5 pages and represents one of the best summaries of the subject I have seen for the initial progress in this field.

Both authors have long experience and expertise in oil palm and this comes through clearly in the fourth edition. Combine this with matching Hartley's broad sweep in previous editions and the fourth edition is a worthy successor to Hartley's first three editions.

As a reference and source book for oil palm, the new edition meets expectations and will undoubtedly be the pre-eminent oil palm book for many years to come.

As the adverts say, if you're only going to buy one book this year (and it's on oil palm) this is the one!

S. MAYES

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