Expl. Agric. (2006), volume 42, pp. 505–514 © *2006 Cambridge University Press*
Printed in the United Kingdom

BOOK REVIEWS

Encyclopedia of Soil Science, 2nd edition. Two Volumes. Edited by R. Lal. Boca Raton, Fl, USA: CRC Press (2006), pp. 1923 + 36p Index, £340.00. ISBN 0-8493-3830-1. doi:10.1017/S0014479706214108

Weighing in at 5.2 kg, this two-volume encyclopaedia represents an increase in content, price and weight on the first edition, published in 2002. There are 458 entries, arranged alphabetically, by over four hundred high-quality contributors. Articles are short, a few pages each, well referenced and well illustrated with tables, figures, diagrams and pictures, although none is in colour. The book is clearly produced and the entries are clearly written and organized, demonstrating a good standard of editorial control.

The breadth of coverage is very impressive. I found the inclusion of many articles to cover different aspects of single topics (e.g. twelve articles covering different soil classification systems, and thirty articles on different aspects of erosion) a helpful bonus. Often the view and coverage of a single author cannot do full justice to different parts of such topics and the subdivisions of such topics and their editing were well managed.

The large number of topics covered in the 36-page index is very welcome and it included nearly all of the topics that I would expect (with a few very notable exceptions such as matric potential and geostatistics). Unfortunately the page numbers of the titles of each article are not highlighted in the main index. Looking, for example, for information on soil texture, the first index entry would lead you to an unhelpful subsection in an article on drainage rather than the appropriate article, which is the second entry in the index.

The preface does not indicate for whom this book is intended or how to use it. Partly because the references in the articles tend not to refer to the basic textbooks, I would not buy this book for an undergraduate readership. As a recipient of essays from undergraduates on topics in which they have a limited background, I am painfully aware of the kind of confusion that can be generated by trying to grasp a topic from scanning such encyclopaedia entries without first covering the basics.

This is a pity, and I think a missed opportunity because it narrows the scope to final year undergraduates, postgraduates and postdoctoral researchers who have the experience and background to benefit from these volumes. For such users, the encyclopaedia is very worthwhile and should allow them easy access to a very wide range of topics by providing a basic outline and a useful set of further references. The price of this book will restrict it to institutional and departmental libraries. Whether a further edition can be justified on the grounds of progress in most of the areas covered after only a further four years, I very much doubt.

Chris Mullins

Heavy Metal Contamination of Soil, Problems and Remedies. Edited by I. Ahmad, S. Hayat and J. Pichtel. Enfield, NH, USA: Science Publishers (2005), pp. 252, £47.60. ISBN 1-57808-385-0. doi:10.1017/S0014479706224104

Heavy metal contamination of soil is a serious problem with implications for biological productivity as well as human health. Detailed understanding of the problem requires a multi-disciplinary approach with inputs from physical, chemical and biological sciences. This is essential in order to understand metal speciation and fate in the soil, metal interactions with the biota and the variety of approaches that may be used for treatment of contaminated land. This multi-authored volume presents a series of key topics within what is an extremely diverse subject. Fundamental discussions of metal(loid) bioavailability and microbial transformations accompany applied topics like bioremediation and soil applications of metal-containing wastes. As with many multi-authored books, the chapters vary in style and depth with a number containing apparently unpublished scientific data and even experimental sections. The value of much of this is questionable and detracts from the other overviews which underline main points by reference to published literature. The chapters are adequately referenced and citations are, in the main, reasonably up-to-date. The book is clear and easy to read and may be of use to those in soil, crop or environmental sciences requiring a general selection of topics to introduce them to the field.

G. M. Gadd

Soil Abiotic and Biotic Interactions and the Impact on the Ecosystem and Human Welfare. Edited by P. M. Huang, A. Violante, J.-M. Bollag. and P. Vityakon. Enfield, NH, USA: Science Publishers. (2005), pp. 439, £55. 72. ISBN 1-57808-344-3. doi:10.1017/S0014479706234100

From the title of this book and the text on the back cover, its contents could cover a myriad of subjects. It is, in fact, focused on soil chemistry, particularly the interaction between chemicals and soil mineral particles. The contents are a compendium of 21 papers selected from two symposia at the 2002 World Congress of Soil Science. I attended both symposia and found both those and the book extremely interesting.

The book starts off with three excellent review chapters that cover how soil chemistry interacts with biological and physical processes. What is most striking after reading these reviews is that the complexity of soil presents a massive challenge to understanding the impact and fate of pollutants and organic compounds. The subsequent chapters present original research. Most examine the interaction between specific clay minerals and mixtures of organic and inorganic compounds. A few chapters include an added level of complexity, such as the impact of bacteria on heavy metal retention in soil and the influence of organic compounds on soil physical processes including particle aggregation and the development of water repellency.

This is a useful reference book, particularly for soil chemists and biologists. It is worth having in your library for the review chapters alone. Some of the science chapters may creep into journals (a couple already have), but having all of this information in one source will certainly stimulate research in this area and improve its profile outside the confines of soil chemistry.

Paul Hallett

Microbiological Methods for Assessing Soil Quality. Edited by J. Bloem, D.W. Hopkins and A. Benedetti. Wallingford, UK: CABI Publishing (2006), pp. 307, £65.00. ISBN 0-85199-098-3. doi:10.1017/S0014479706244107

This textbook is a welcome addition to the growing number of books related to soil quality. The first and weakest part of the book discusses soil quality and how to measure it. The main problem with any such approach that focuses on only one aspect of soil is that the soil really is a heterogeneous and complex system that depends on the *linkages* between biology, physics and chemistry. Focusing on one area alone is not that helpful. Yet Chapter 2 (Defining Soil Quality) provides a useful, interesting and well-written overview that sets the scene on what soil quality is. The second, longer part of the book is the most helpful. It details specific methodologies used to assess the microbiology in soil. Whilst the introductory chapters are too short to be of much use, the main chapters provide comprehensive recipes that will enable students and non-specialists to measure a useful range of quantities that together provide a comprehensive quantification of soil microbes. The detail for each method is impressive and well written, accompanied by good figures, where required.

Iain Young

Soil Erosion and Carbon Dynamics (Advances in Soil Science). Edited by E. J. Roose, R. Lal, C. Feller, B. Barthes and D. A. Stewart. Boca Raton, Fl, USA: CRC Press (Taylor and Francis) (2006), pp. 352, £74.99. ISBN 1-56670-688-9. doi:10.1017/S0014479706254103

This text is one of the Advances in Soil Science Series, which aims to bring together a selection of papers on important topical subjects in soil science under the editorship of leading soil scientists in the field. The topic of carbon dynamics in the context of soil erosion is part of the expanding debate on the role soils and soil processes play in the global carbon budget and the linkages to climate change. The editors have gathered together a group of authors from a broad geographical area with experience in both global approaches to these interrelationship and strong regional and practical assessments. Of the four broad sections, Section One briefly provides the background of the basic concepts of the carbon cycle and the links to global climate change, the principles of soil carbon sequestration and the role of soil erosion in overall global carbon dynamics. Section Two focuses on the strong links between land use, land management, soil carbon stocks and soil erosion processes, with particular emphasis on tropical and sub-tropical regions. The third section emphasizes the transfer of carbon from soil to river systems with both a global perspective and selected examples in the Tropics, Sub-tropics and Mediterranean regions. The final section reviews the information presented earlier, highlighting linkages between the observations at the different scales, together with broad conclusions in the light of the data presented. The book is a very timely edition in this field, and whilst the examples are from a limited number of environments, they provide good illustrative material, which may guide interpretations in other regions.

Stephen Nortcliff

Nitrates in Groundwater. Edited by L. Razowska-Jaworek and A. Sadurski. Leiden, The Netherlands: A. A. Balkema (2005), pp. 295, £59.00. ISBN 90-5809-664-5. doi:10.1017/S001447970626410X

This book comprises a selection of papers from a European Meeting organised by the Polish Chapter of the International Association of Hydrogeologists and held at Wisla, Poland in June 2002. It is one of a series of such themed IAH publications, which aim to bring good practical experience presented at such meetings to a wider audience, both within the profession of hydrogeology and in disciplines linked to the specific topic, in this case agricultural researchers and environmental regulators. The book was also supported by UNESCO as a contribution to its International Hydrological Programme.

The 27 papers are grouped logically under five headings, dealing firstly with the origin of nitrate in groundwater, then experimental investigations of nitrate leaching and transport processes, modelling, national and regional studies, and monitoring and protection of groundwater. The first of these five is understandably the weakest, and the reader looking for a comprehensive overview of nitrate sources would be disappointed and should look elsewhere. However, the case studies in the remaining sections are characterized in the main by the strong descriptions of hydrogeological and hydrochemical settings and agricultural background that the reader needs to relate to his/her own experience, and they confirm that nitrate is problematic in groundwater throughout the continent of Europe. The editorial standard is consistently high, and the figures are generally well-drawn and clear. The book will certainly appeal to specialists working on nitrate pollution, and I can recommend it to them as a broad collection of well-written and presented case studies rather than as a major scientific treatise on nitrates.

John Chilton

Land Use Changes in Tropical Watersheds: Evidence, Causes and Remedies. Edited by I. Coxhead and G. E. Shively. Wallingford, UK: CABI Publishing (2005), pp. 191, £49.95. ISBN 0-85199-912-3. doi:10.1017/S0014479706274106

Any case study analysing the socio-economic and biophysical environment of a river basin in an integral way deserves to be read, especially when the study focuses on upstream–downstream interactions and uses the entire basin as the unit of analysis. The first part contains six socio-economic chapters, tackling the effects of economic development, institutional change, policy change, market development, price changes and economic incentives on land use practices. Negative effects may lead to forest clearance and land degradation in the uplands. The second part contains three chapters on soil erosion. Two of these show soil erosion predictions made with the aid of computer models like WEPP and PCARES. The subsequent chapter on alternative farming practices is, unfortunately, rather weak. The authors of this chapter show little comprehension of how trees affect soil erosion. In fact, trees themselves do not control erosion, rather it is the management and spatial arrangement of trees that control erosion. The subsequent analyses in this chapter are therefore not convincing. The third part of the study contains three chapters that link economic policies and biophysical outputs at a basin scale and a discussion on Payment for Environmental Services (PES). Putting a price to environmental degradation and linking it to PES is indeed an important topic. Involving carbon sequestration in the discussion and linking it to the Kyoto Protocol puts the PES in a present day perspective. This study provides valuable information on the economic interrelation of upstream–downstream problems and how communities can benefit from proper regulations. It also shows that although the problems are biophysically clear, they are socially complex and not easy to solve.

Paul Kiepe

Silvopastoralism and Sustainable Land Management. (Proceedings of an International Conference on Silvopastoralism and Sustainable Management held in Lugo, Spain in April 2004.) Edited by M. R. Losada, J. McAdam and A. Riguerio-Rodriguez. Wallingford, UK: CABI International (2005), pp. 432, £75.00. ISBN 1-84593-0010. doi:10.1017/S0014479706284102

The Congress had five sessions on: silvopastoral systems; their productivity and management; ecological implications, biodiversity and sustainable management; economic, social and cultural benefits; and future perspectives in a global context. Some 125 papers are presented; there is a brief introduction, a statement and a short summary and conclusions. No discussion is reported nor are the conclusions of the individual sessions given. Geographic coverage is patchy; while Europe and the Americas are well represented there are few contributions from Asia and none on the savannas of sub-Saharan Africa. Silvopastoralism takes many

forms and no overall definition is given. Systems described are mainly either grazing of natural tree-pasture vegetation with or without various levels of manipulation or those where trees are planted within grazing land; some deal with grazing under tree crops. Several papers are surveys and others on peripheral themes such as plant composition or micropropagation. Silvopastoralism requires long – or medium – term work but many papers report work of a few years; a Canadian contribution on carbon storage in agricultural ecosystems which covers almost twenty years is a welcome exception. Many papers from developed countries indicate that, while silvopastoralism is a desirable land use, traditional systems are falling into desuetude for economic reasons and financial incentives would be necessary to encourage their continued use or spread. Some authors have had difficulty in putting technical terms into English, making parts of the text difficult to understand. Proof reading has been patchy.

J. M. Suttie

Climate Change and Global Food Security. Edited by R. Lal, N. Uphoff, B. A. Stewart and D. O. Hansen. Boca Raton, Fl, USA: CRC Press (2005), pp. 775, £79.99. ISBN 0-8247-2536. doi:10.1017/S0014479706294109

The climate is changing – it always has and always will – but the changes brought about by human activities to atmospheric composition and to terrestrial and maritime environments imperil the quality of our existence and our capacity to adapt to change. The global population is increasing so therefore do the demands on food supplies and environmental goods; the area of arable land steadily shrinks; soil quality declines, particularly in tropical areas; fresh-water supplies are frequently inadequate for the needs of agriculture and modern humans; pests and diseases are adapting and spreading; and sea levels are rising, threatening in turn low-lying agricultural lands and urban communities. Yet agriculture is expected to provide many of the answers to these enormous challenges.

This multi-authored (74) tome of 30 chapters in six sections covering nearly 800 pages attempts through a combination of general overviews in the main, combined with a few case studies, to give strong indicators for the way forward. The titles of the sections reveal the thrust of the book: Global Food Security (5 chapters), Climate Change and Net Primary Productivity (4), Climate Change and Agronomic Production (6), Soil Carbon Dynamics and Farming/Cropping Systems (10), Policy and Economic Issues (4), and Toward Research and Development Priorities (a single chapter by the four editors). The focus is on the soil carbon pool.

It is difficult to envisage a future without modern agriculture providing the necessary food security, sustainable energy and manufacturing feedstocks, and a clean, balanced atmosphere. What a shame current political approaches under-invest in agriculture.

We have the technology! This superb book should be enforced reading for policy-makers; the poor illustrations (all black and white) are merely a distraction.

J. R. Hillman

Drought in Bulgaria: A Contemporary Analog for Climate Change. Edited by C. G. Knight, I. Reav and M. P. Staneva. Aldershot, UK: Ashgate Publishing (2004), pp. 336, £55.00. ISBN 0-7546-4215-1. doi:10.1017/S0014479706304103

In ten parts, this 336-page volume has 32 Chapters involving 35 authors. Parts one to three set the scene by describing the 1982–1994 Bulgarian drought, and how the book sets out to study its impacts in the context of environmental management and possible future climate change in that region. Parts four to seven deal with the impacts of the drought on water resources, natural and managed ecosystems, and society. The book has something for everyone interested in those topics. For this reviewer, however, Part eight 'From Impacts to Crisis' was especially interesting, its chapters including detailed accounts of Bulgarian water resources and supply management, and addressing the issue of whether the 1994–1995 Sofia water supply crisis was caused by drought or mismanagement. Technical and political aspects of the Djerman–Skakavitsa water diversion scheme to improve Sofia's water supply are covered for 'scholars attempting to understand environmental protest and conflict in post-communist countries'. Part nine summarizes what Bulgarian decision-makers can learn from the 1982–1994 drought and its impacts. Part ten gives 50 recommendations for policy-makers. The book has breadth and depth concerning a topic of great importance during the period of Bulgaria's transition from command to demand economy. The chapters are sufficiently short to make the volume a pleasure to read, and a good index ensures that the book will be a useful reference volume. Although close scrutiny reveals some

errors and inconsistencies, there is no question that the authors and editors are to be congratulated on a job well done.

Ian Littlewood

Contribution of Farm Power to Smallholder Livelihoods in Sub-Saharan Africa. By C. Bishop-Sambrook. Rome: FAO (2005), pp. 87, US$26.00. ISSN 1814-1137. doi:10.1017/S001447970631410X

This small book, which can be recommended to the general reader, discusses the sources and utilization of energy which the small- scale farmer in sub-Saharan Africa has available to enable her/him to produce food and cash crops. The power sources include human power, Draught Animal Power (DAP) and tractor power as it applies to 14 sites in West and East Africa.

The decline in profitability of small-scale African agriculture from the early 1970s resulting from competition from synthetic products, alternative sources of supply and agricultural subsidies in the developed countries has inevitably resulted in an inadequate investment in local infrastructure, processing capacity and servicing facilities. Previously attained levels of farm power, DAP and tractor cultivation became no longer sustainable.

The livelihoods of families utilizing different mixtures of hand cultivation, DAP and tractors are analysed. Constraining factors limiting the availability of all sources of farm power input are discussed, as is the devastating effect of HIV-Aids on all rural communities. The family asset base (human, natural, physical, financial and social) determines the amount of farm power available.

The conclusions and recommendations list practical ways in which farm power in its various forms – human power, DAP and mechanical power – may be more profitably used. The role of government and the private sector in promoting these recommendations is considered. However, it is difficult to see how the ground lost in provision of farm power to small-scale African farmers in sub-Saharan Africa can be regained and further progress made, unless profitability can be restored.

Dick Bowers

Valuing Crop Biodiversity: On-Farm Genetic Resources and Economic Change. Edited by M. Smale. Wallingford, UK: CABI Publishing (2006), pp. 318, £60.00. ISBN 0-85199-083-5. doi:10.1017/S0014479706324106

This book is a collection of fifteen case histories involving a range of countries, from Africa to Asia, Central- and Southern America and Europe, and diverse crops. The studies seek to identify and understand the factors that influence farmers to choose the particular crops and varieties they grow and the consequences for biodiversity of changes in those factors. The approach taken is almost entirely based on multiple-regression to quantify the relation between various diversity indices (e.g. Margalef, Shannon, Simpson, Berger-Parker) and a range of explanatory variables, the latter taken either directly from farmers or from secondary sources. After an introductory chapter by the editor, the rest of the chapters are grouped into: Private value, stated preferences of farmers; Private value, revealed preferences of farmers; Public values, villages and institutions. A concluding section contains a chapter on Scope, limitations and future directions, and an annotated bibliography of applied economic studies on crop diversity *in situ*.

I was slightly misled by the title in that I assumed this to be an attempt to put a monetary value on biodiversity, which it is not. Nevertheless, many of the case studies are interesting and informative, although non-economists may find some of them hard going. Many chapters have insights that will reward the effort, although I was surprised how few generic explanations emerge – crop and varietal choices, like agronomy, seem to be 'local'. Disappointingly, there are very few examples of corroboration of results by actually asking the farmers directly why they made these particular choices.

Dave Harris

Currants, Gooseberries, and Jostaberries. A Guide for Growers, Marketers, and Researchers in North America. By D. L. Barney and K. E. Hummer. Binghamton, NY, USA: The Haworth Press (2005), pp. 266, US$34.95. ISBN 1-56022-297-2 (paperback). doi:10.1017/S0014479706334102

In the USA in the late 1920s white pine blister rust harboured by *Ribes* posed a serious threat to the lucrative timber industry's five-needled pines. A subsequent ban on the cultivation of *Ribes* led to the demise of the currant

and gooseberry industry there. Although there are now available rust-resistant cultivars of *Ribes* and pines, and US national restrictions were lifted in 1966, some states still restrict *Ribes* importation and/or production. Nevertheless, fruit growers in the USA and Canada are now expressing greater interest in commercial currant and gooseberry production.

The writing of this pragmatic, informative and easy-to-read book is a timely response to that renewed interest. There are 12 chapters covering the history of currant, gooseberry and jostaberry (blackcurrant × gooseberry hybrids) cultivation; genetics, growth, development, and fruit composition; propagation; selecting a planting site; designing a currant, gooseberry, or jostaberry farm; preparing a site for planting; *Ribes* cultivars; planting and establishing *Ribes*; crop management; pests and diseases of *Ribes*; harvesting, storing, and marketing *Ribes* crops; and breeding currants, gooseberries, and jostaberries. A comprehensive reference list and useful index follow two appendices, one appendix dealing with a site selection checklist, the other with financial/budget matters for *Ribes* enterprises.

This book is essential reading for those involved, or are planning to become involved in the production of these fruits in North America. There is also much in this publication to interest those involved with berry production, research, processing and marketing in other cool regions of the world.

N. L. Innes

Monograph on the Genus Oryza. Edited by J. S. Nanda and S. D. Sharma. Enfield, NH, USA: Science Publishers (2004), pp. 400, US$89.50. ISBN 1-578-273-0. doi:10.1017/S0014479706344109

Rice is the most important food crop of humankind. It provides more dietary energy (20%) and constitutes the staple of more people than any other crop. In keeping with this importance, the United Nations declared 2004 as the International Year of Rice. The present volume on the rice genus *Oryza* appears to have been synchronized with this event.

The book includes 11 chapters and three appendices. The rationale for not including the appendices as regular chapters is not clear. The first two chapters are English translations of two classical papers on *Oryza* taxonomy in Russian by Roschevicz (1928) and in French by Chevalier (1932). In the same vein the editors could also have included Prodoehl (1922, in German), as it is even more difficult to access. Six comprehensive and up-to-date chapters have been contributed by well-known scientists from across the world. They cover Gene Pools, Molecular Approaches on Speciation, Genome Research, Chromosome Studies, Germplasm and Wild Species for Crop Improvement. The editors, both of whom have career-long experience in rice research, contributed the remaining three chapters. The chapter on Antiquity and Spread of rice is a broad overview. The remaining two chapters – on Rice Species and Rice Origins – as also the appendix on Nomenclatural Confusions, are somewhat overlapping and rambling accounts lacking objectivity.

Proper editing would have eliminated the errors in syntax, grammar and literature citations seen in some chapters (notably 3 and 10). Notwithstanding a few small aberrations, this volume is a very welcome addition to the literature on rice.

N. M. Nayar

The Physiology of Flowering Plants. (4th edition). By H. Opik and S. Rolfe. Cambridge: CUP (2005), pp. 392, £30.00. ISBN-10-0-52-66485-3 (paperback). doi:10.1017/S0014479706354105

The new edition of this popular book has been completely updated since the last edition in 1984. The aim of the text, outlined in Chapter 1/Introduction, is to 'give an account of the physiology of flowering plants mainly from the whole plant or organismal point of view'. The book is divided into two sections, Part 1 on nutrition and transport (Chapters 2 to 5) and Part 2 on growth and development (Chapters 6 to 13). Topics covered include: energy flow, water relations, mineral nutrition, translocation, growth, hormones, cell growth and differentiation, vegetative and reproductive development, photomorphogenesis, tropisms and resistance to stress. Chapters are clearly laid out with key words in bold and excellent figures. Each chapter has a selected reference list and some chapters have complementary reading lists as well. There is a short appendix with SI units and units of measurement that could have usefully been more comprehensive. The index is excellent. The authors' updating includes the latest developments in molecular biology (2002 references), but as this field moves so fast it is inevitable that parts become out of date rapidly. It would have been useful to have included some internet sites where the latest developments are recorded. This book will be useful to those with a basic

knowledge of plant physiology and be of value to crop physiologists who are interested in more traditional, and in general less quantitative, whole plant physiological approaches.

P. Q. Craufurd

Physiology of Stressed Crops. Volume II. Nutrient Relations. By U. S. Gupta. Plymouth, UK: Science Publishers. (2005), pp. 253, £44.52 ISBN 1-57808-371-0. doi:10.1017/S0014479706364101

From its title alone, this book should be compulsory and compulsive reading for any ecophysiologist or agronomist interested in factors that constrain crop performance. I was certainly eager to inspect it as soon as it arrived on my desk. Unfortunately, I do not expect to use it beyond the occasional sortie.

In structure, the book is divided into 13 chapters covering nutrient stresses, acidity, salinity, allelochemicals, compaction, drought, waterlogging, humidity, cold, heat, radiation, air pollution and parasitic weeds. So far, so good. There is certainly plenty in the contents pages and preface to whet the appetite. Where the book fails to deliver is the absence of any kind of unifying principles either within or between the various themes that justify the term 'physiology' in the title. We are left with a series of experimental examples of the 'effect of' or 'influence of' a particular constraint on the performance of a particular crop with little mechanism or process to explain underlying principles. Despite the author's considerable effort in collecting, preparing and collating the information that is in this book, the lack of attention to final detail detracts from any impact. There are an enormous number of simple typographical errors and inconsistencies. These are most glaring in the references which are often dated, incorrectly cited or contain misspellings that a spellchecker would have no doubt picked up.

Sayed Azam-Ali

Physiology of Stressed Crops. Volume III. The Stress of Allelochemicals. By U. S. Gupta. Enfield, NH, USA: Science Publishers (2005), pp. 253, £44.52. ISBN 1-57808-371-0. doi:10.1017/S0014479706374108

This book by U. S. Gupta is a comprehensive summary of experimental data from the last 20 years, reviewing current understanding of the broad spectrum of toxic compounds produced by crop, weed and tree species associated with arable systems, and the equally wide range of plant biochemical and physiological processes that are targeted by these allelochemicals. Evidence is presented for autotoxicity in crops and for interspecific interference in crop × crop and crop × weed interactions. Species- or variety-specific inhibitory effects and mechanisms provide a scientific basis for deducing the appropriate management for specific crop systems. In particular, plant allelochemistry has implications for common agricultural practices, such as growing varietal mixtures v. monoculture, intercropping, rotation, ratooning and mulching, and for interaction with other physiological stresses, such as water and nutrient supply, temperature and radiation levels, and pest attack.

Improving crop allelopathic potential is suggested as a future approach to suppressing or managing arable weeds, and for developing more productive and competitive crop genotypes that have a reduced requirement for agrochemical inputs. Specific targets for weed management include common and lesser known allelopathic arable weeds, while potential benefits could be derived by exploiting allelochemicals as bio-herbicides or bio-pesticides. The closing remarks propose *in vitro* and field-based methods for selecting and improving crop allelopathic potential, along with new modelling approaches to predict the environmental impact of introducing allelochemicals to field systems.

While the book does not provide general principles or mechanisms of allelopathy in arable situations, the species-by-species examples that are described should be a useful source of information for readers requiring detailed case studies of the allelochemistry of particular crop or arable weed species.

Alison Karley

Cold Hardiness in Plants – Molecular Genetics, Cell Biology and Physiology. Edited by T. H. H. Chen, M. Uemura and S. Fujikawa. Wallingford, UK: CABI Publishing (2006) pp. 256, £65.00. ISBN 0-85199-059-2. doi:10.1017/S0014479706384104

A must for the expert and useful for the wider reader, *Cold Hardiness in Plants* shows current questions and illustrates key advances, based on the 7th International Plant Cold Hardiness Seminar in Hokkaido in July

2004. The approach is predominantly molecular and genetic. The species include models – the brassica relative *Arabidopsis*, germinating peas and the moss *Physcomitrella*; major cold-hardy annual crop species (barley, wheat, lucerne); less-hardy and non-hardy ones (potato, tomato, rice); and representative woody crops – (silver birch, poplar and mulberry). The questions range from the sub-cellular, damage and protection, through metabolites and quantitative trait loci, to vernalization. CBF is the most commonly mentioned gene. This codes for a transcription factor expressed in response to cold in a wide range of cold-hardy and cold-sensitive species, and regulates the expression of a system of genes and protective mechanisms. Could enhanced expression of this gene enhance the freezing tolerance of species already having some tolerance? Several articles indicate that it can. Could it make a freezing-sensitive species, such as tomato, tolerant? – not so far. Overall, what emerges is that the details of the complex response to cold can be organized and understood, and that species differing in the extent and character of their response to cold, nevertheless have important mechanisms in common. The book is well put-together, the writing is mostly good, the figures and tables are clear, relevant and informative, though sometimes I would have liked more. I recommend it for libraries and personal use.

Rodger Pearce

Seeds Handbook. Biology, Production, Processing and Storage. 2nd Edition. By B. B. Desai, New York: Marcel Dekker (2004), pp. 787, £125.00. ISBN 0-8247-4800-X. doi:10.1017/S0014479706394100

Those expecting this book to live up to the back cover synopsis are going to be bitterly disappointed. Much of the content is old and has not been updated with, for example, the reader being left with the impression that DDT and organomercurials are the main pesticides being used in seed production! The illustrations are of extremely poor quality and it is difficult to decipher many of the figures that appear to be freehand copies of originals appearing in books such as J. R. Thomson's *An Introduction to Seed Technology* (1979). The book fails in any attempt to analyse or interpret information which is drawn heavily from the literature it cites, and this leads to unbalanced treatment of topics with the reader being given many false impressions.

As for the new chapters on modern biotechnology, they do not achieve anything of any real value as they are not up-to-date, comprehensive or focused on the main issues. It seems amazing that so little space is devoted to Bt crops or herbicide tolerance when the spread of this technology is ubiquitous, especially when so much space is given to alternative traits, few of which are currently in use commercially. Moreover, the complete of lack of any information on how to test for transgenic seed is a major omission.

At best this book brings together a wide range of information and is a useful source of references, but there must be more economic and effective means of obtaining this information.

R. Don and G. Saddler

The Ecology of Seeds. By M. Fenner and K. Thompson. Cambridge: Cambridge University Press (2005) pp. 260, £28.00. ISBN: 0-521-65368-1. doi:10.1017/S0014479706404105

A concise synthesis of seed ecology, this book makes an excellent undergraduate text. Extensive referencing and evaluation of current debates also makes it valuable for postgraduates and a welcome refresher for seasoned practitioners. Wisely, the authors have kept the book short: it is not a comprehensive source of facts and figures. Instead, they establish principles and provide detailed examples of how traits and behaviour may increase fitness in the environment. Interestingly, some traits decrease adaptation to climate change.

Phenology gives the book a helpful structure, starting with the mother plant, continuing with seed production, dispersal, longevity, dormancy, germination and seedling growth. This sequence works well except that the last chapter on gaps is out of place – it ought to precede seedling establishment. The authors isolate eight 'digressions' in boxes. The idea is good, but they are too long and few of the topics needed isolation. Surprisingly, the book lacks a conclusion – leaving the future to the imagination of the readers. I would have liked to see some case histories in which the overall life cycles were put together in a quantitative framework.

Some interpretations are debatable! Wesson and Wareing's simplistic interpretation that buried seeds become light-sensitive is perpetuated: their treatment exposed seeds to light *and* greater temperature fluctuations. The account of temperature and seed germination ignores base temperatures and thermal time. On dormancy, the argument that nitrate and light are germination stimulators rather than dormancy breakers is dubious; both modify induction of primary and secondary dormancy and also the chilling process.

Alistair J. Murdoch

Crop Ferality and Volunteerism. Edited by J Gressel. Boca Raton, Fl, USA: CRC Press (2005), pp. 422, £97.00. ISBN 0-8493-2895-0. doi:10.1017/S0014479706414101

This book – a collection of chapters arising from a workshop – adds needed scientific weight to a subject that has risen in practical importance and public perception. Volunteers are weeds derived from crops and living in fields, perhaps causing an economic burden, or bringing impurities to a later crop of the same species. Feral plants are here taken to be crop-derived plants that have adapted genetically (by one reason or another) to allow them to live independently of the cropping cycle. In much of Europe, ferals are given the more general definition of plants that are self-sustaining outside cropped fields. By whatever definition, ferals and volunteers are components of many of the world's cropping systems, indicative perhaps of how little attention is paid in selection programmes to physiological traits, such as inducible seed dormancy, which encourages the phenomena. For anyone new to this topic, the ideal place to begin is Chapter 2 by S. I. Warwick and N. Stewart. Then if you want to gauge the importance of volunteers and ferals to production of crops and seed, move to Chapter 23 on environmental risk by A. Raybould. In between, there are fascinating and informative chapters dealing with various species, including maize, oilseed rape, beet, rice, sorghum, millet, sunflower and others, and on mechanisms for containment. The book provides scientific rigour and disinterested opinion in a politically contentious area and will likely remain a library reference for many years. It is recommended to geneticists and plant breeders, crop ecologists and weed scientists and anyone with a wide interest in the evolution of crops and weeds.

Geoff Squire

Genetic Resources, Chromosome Engineering, and Crop Improvement. Volume 2: Cereals. Edited by R. J. Singh and P. P. Jauhar. Boca Raton, Fl, USA: CRC Press: Taylor & Francis Group (2006), pp. 442. £92.00. ISBN 10: 0-8493-1432-1. doi:10.1017/S0014479706424108

A basic expectation in a book of this nature is a sound treatment of classic, background work and the introduction of new approaches. The book fails on both counts. There is a strong emphasis on cytogenetics throughout; whilst this is certainly important in polyploid cereals, its role in diploids is over-played. The importance of cytogenetics is set out in the opening chapter and its role in polyploid wheats described in subsequent chapters, 2, 3 and 4. Readers with a background in this area will be astounded that there is not a single reference to the work of C. N. Law, who was a pioneer in analytical procedures in wheat cytogenetics; instead, we are faced with excessive citations of the authors. Confidence in the book is rocked at this point. There is scant attention to new methods, e.g. mutation induction for forward and reverse genetics, systematic dissection of chromosomes and high through-put genotyping. Moreover, there are some inconsistencies between chapters, e.g. different chromosome nomenclatures are used in the two chapters on barley.

There are however, some redeeming features. The chapters focus on individual crops, each can be read separately and provide a useful introduction to: origins, evolution, accessible gene pools, genetics, breeding objectives and related biotechnologies. Some are very well written and give due recognition to technical innovations that have enabled scientific progress. There are good examples of major achievements in crop improvement worldwide and much of this is presented in the context of global food security concerns.

A more appropriate title to the book, which is a useful introduction to cereal crops, would be 'Genetic Resources and Crop Improvement of Cereals'.

Brian Forster

Researching the Culture in Agri-Culture: Social Research for International Development. Edited by M. M. Cernea and A. H. Kassam. Wallingford: CABI Publishing (2006), pp. 497, £75.00. ISBN 0-85199-003-7. doi:10.1017/S0014479706434104

For the first two decades of their existence, the major centres of the Consultative Group on International Agricultural Research (CGIAR) focused almost all of their attention on increasing productivity. The agenda of high quality biophysical research was driven by natural scientists, as illustrated most vividly by the research underpinning the Green Revolution.

Despite the remarkable impact of these technological advances, a significant proportion of the rural poor in many parts of the developing world failed to benefit from them – for reasons that were often not technological,

but social, cultural and economic. Recognition of this has led to centres adopting research agendas that focus increasingly on people and their livelihoods rather than solely on technologies. This well-presented and very readable book is the first publication to draw together and critically analyse social research at the CGIAR centres. It includes contributions from a 'Who's Who' of over 50 socio-economists and anthropologists from 30 countries, and some natural scientists, two-thirds of whom work at CGIAR centres. The remaining third come from institutions in the 'south' and 'north', and provide perspectives on social science research in national research systems and elsewhere, outside of the CGIAR.

The intellectual and institutional challenges of integrating social sciences into predominantly science and technology-driven organizations are addressed in the first part of the book, while the second describes centre-specific examples, and the final part, written by 'outsiders' to the CGIAR system, draws out key messages for the future. This publication will undoubtedly be of interest to a wide audience in the field of research and development.

George Rothschild

Books currently under review.

Ecological Responses and Adaptations of Crops to Rising Atmospheric Carbon Dioxide. Edited by Z. Tuba. Binghamton, NY, USA: The Haworth Press (2005), pp. 414, US49.95 (paperback). ISBN 1-56022-121-6.

Genetic and Production Innovations in Field Crop Technology. Edited by M. S. Kang. Binghamton, NY, USA: The Haworth Press (2005), pp. 384, US$49.95 (paperback). ISBN 1-56022-123-2.

Biological Approaches to Sustainable Soil Systems. Edited by N. Uphoff, A. S. Ball, E. Fernandes, H. Herren, O. Husson, M. Laing, C. Palm, J. Pretty, P. Sanchez, N. Sanginga and J. Thies. Boca Raton, Fl, USA: CRC Press (2006), pp. 764, £85.00. ISBN 1-57444-583-9.

Environmental Risk Assessment of Genetically Modified Organisms, Volume 2: Methodologies for Assessing Bt Cotton in Brazil. Edited by A. Hillbeck, D. A. Andow and E. M. G. Fontes. Wallingford, UK: CABI Publishing (2006), pp. 373, £75.00. ISBN 1-84593-000-2.

Gene Flow from GM Plants. Edited by G. Poppy and M. Wilkinson. Oxford: Blackwell Publishing (2005), pp. 241, £89.95. ISBN 1-4051-2237-4.

Sugar Beet. Edited by A. P. Draycott. Oxford: Blackwell Publishing (2006), pp. 474, £125.00. ISBN 1-4051-1911-X.

Handbook of Microbial Biofertilizers. Edited by M. K. Rai. Binghamton, NY, USA: The Haworth Press (2006), pp. 579, US$69.95 (paperback). ISBN 1-56022-270-2.

Plant Roots. Growth, Function and Interaction with the Soil. By P. Gregory. Oxford: Blackwell Publishing (2006), pp. 328, £99.00. ISBN 1-4051-1906-3.

Development with Identity. Community, Culture and Sustainability in the Andes. Edited by R. E. Rhoades. Wallingford, UK: CABI Publishing (2006), pp. 325, £65.00. ISBN 0-85199-949-2.

Water. Global Common and Global Problems. Edited by V. I. Grover. Enfield, NH, USA: Science Publishers (2006), pp. 533, £47.60. ISBN 1-57808-409-1.

Better Land Husbandry. From Soil Conservation to Holistic Land Management. By J. Hellin. Enfield, NH, USA: Science Publishers (2006), pp. 315, £33.30 (paperback). ISBN 1-57808-244-7.

Readers may be interested to know about the following publications received but not reviewed because of their limited relevance to the majority of readers of *Experimental Agriculture*.

Cereal Genetic Resources in Europe. Report of a Cereals Network First Meeting. 3–5 July, Yerevan, Armenia. Report of a Working Group on Wheat Second Meeting, 22–24 September 2005, La Rochelle, France. Compiled by E. Lipman, L. Maggioni, H. Knupffer, R. Ellis, J. M. Leggett, G. Kleijer, I. Faberova and A. Le Blanc. Rome: IPGRI (2006), pp. 318, no price quoted, ISBN 13: 978-92-9043-697-3. ISBN 10: 92-9043-697-2.

Molecular Markers for Genebank Management. IPGRI Technical Bulletin No. 10. By D. Spooner, R. van Treuren and M. C. de Vicente. Rome: IPGRI (2005), pp. 126, no price quoted. ISBN 10-92-9043-684-0. ISBN 13-978-92-9043-684-3.

In situ Conservation of Wild Plant Species. A Critical Global Review of Good Practices. By V. H. Heywood and M. E. Dulloo. Rome: IPGRI (2005), pp. 174, no price quoted. ISBN 13: 978-92-9043-698-0.