

BOOK REVIEWS

Abiotic Stress Tolerance in Plants: towards the improvement of global environment and food. Edited by K. Rai and T. Takabe. Dordrecht, The Netherlands: Springer (2006), pp. 267. £77.00. ISBN 10-1-4020-4388-0. doi:10.1017/S001447970621490X

This textbook aims to present a state of the art description of the physiological, biochemical and molecular status of the understanding of abiotic stress in plants and the application of biotechnology to crop and environmental improvement. The text, which is a collection of monograph papers produced by experts in the field, mainly from Asia, achieves some of its objectives but is left lacking in others. For salt stress and to a lesser extent osmotic stress and photo-induced stress there are several papers that cover the topic in good depth and with plenty of cross-references. For other stresses, notably temperature (both cold and heat), there is little in this textbook to advance the knowledge base. The book concentrates its examples on the application of stress gene modifications to crop improvement and forestry, but it is difficult to see where the references to the ‘improvement of global environment’ are in the text.

Whilst the book is divided into themes (signal transduction, temperature stress, oxidative stress, phytoremediation, osmotic stresses, ion homeostasis, nutrition, structural responses and developments in biotechnology), there is little attempt to overview the individual papers together under each theme. Similarly the whole text lacks an overview to put the book into perspective.

Given the comments above and the price of the text, it is clear that it is unlikely to become an undergraduate text, but could serve postgraduates, academics and researchers alike as a reference to the current state of the art of (some of) the research in the field of abiotic stress of plants.

Mick Fuller

Plant Abiotic Stress. Edited by M. A. Jenks and P. M. Hasegawa. Oxford: Blackwell Publishing (2005), pp. 270, £99.95. ISBN 1-4051-2238-2. doi:10.1017/S0014479706224906

This valuable addition to the Biological Sciences Series focuses on the most interesting current stress research. This precludes a comprehensive account. However, each chapter outlines the wider context, often with admirable lucidity. Researchers will use this book to sharpen their awareness of developments in areas of stress related to their own. Other readers, including more advanced students, will find it can give them a deep understanding. Much of the content is molecular, but the chapters are well organized and well written and non-molecular readers should be able to get much from them. Several chapters have a non-molecular emphasis, e.g. on soil pH and the plant’s response to consequent nutritional problems. The chapter on plant responses to herbicides reminds the reader that stresses can be anthropogenic. Many chapters address molecular responses to a single category of stress, but there is also an important chapter on integration of stress signaling. A chapter on the cuticle exemplifies what is best in the field: the cuticle is important in a number of stresses and the account links information from the structural and physiological to the subcellular and genetic. I have only one criticism of the book: while the use of genetic resources was not ignored, as, for example, evidence from mutant lines figured in many chapters, quantitative locus analysis was ignored. This is surprising, given that the response to stress is quantitative and explicitly depends on contributions from many genes. However, overall, I strongly recommend this book.

Roger S. Pearce

Plant Hormone Signaling: Annual Plant Reviews, Volume 24. Edited by P. Hedden and S. G. Thomas. Oxford: Blackwell Publishing (2006), pp. 348, £110.00. ISBN-13: 978-14051-3887-1. doi:10.1017/S0014479706234902

Huge advances have been made in recent years in the understanding of the molecular mechanisms of plant hormone signaling. This textbook has gathered together up-to-date monographs covering all the known plant

hormones except for a few newcomers about which knowledge is still sketchy. Each chapter is written by experts and they do a comprehensive job. The genetic and molecular evidence for our current understanding of signaling pathways is presented in some detail and most chapters have a minimal number of illustrations to give essential summaries. This is an excellent treatise for advanced students of plant science. In this, it addresses the needs of the series it arises from, *Annual Plant Reviews*. It will help third year undergraduates and be a fine addition to the reading list of all post-graduates working on plant signaling.

For those with less specialized background knowledge, however, or those wishing to see how modern knowledge of plant signaling pathways might translate into agricultural product, this book is not the one to choose. The language is essentially high science and chapters vary in the success with which translation is done for non-specialists. The physiological context of signaling is mostly sidelined until the last two chapters, which are dedicated to signalling in development. The last on seed development and germination tries to simplify abundant information, and this was a refreshing way to end the book after many chapters revelling in complexity.

Richard Napier

Plant Tissue Culture Engineering. Edited by S. Dutta Gupta and Y. Ibaraki. Dordrecht: The Netherlands: Springer (2006), pp. 480, £97.00. ISBN-10 1-4020-3594-2. doi:10.1017/S0014479706244909

There has been a shortage of relevant literature related to the subject of plant tissue culture engineering in recent years, and with increasing sophistication and uptake of process engineering and computer-based technologies a review of this subject is extremely timely. This volume successfully covers a broad remit, bringing together acknowledged experts and consisting of 24 chapters, structured under the headings of Machine Vision, Bioreactor Technology, Mechanised Propagation Systems, Engineering the Cultural Environment and Physical Aspects of Plant Tissue Engineering. Several chapters will be of broad interest to plant tissue culture laboratories, for instance, those on temporary immersion technologies, which have seen significant application recently, and incorporating automation technologies with commercial production. There are also a number of specialist subjects covered, such as artificial neural networks in plant tissue culture. Throughout the volume, there is a great depth of technical detail with underlying physical and mathematical specifics described, and the interface between subject areas given consideration. Unfortunately, the index section is disappointing with only four pages, and the quality of many of the images and illustrations throughout is not up to the high standard of the text, probably due to many being reduced in size from a larger format.

However, this is a very interesting and extensive volume, within which there are chapters of essential reading for anyone involved in either commercial plant tissue culture, or research into understanding fundamental plant developmental processes.

Steve Millam

The Role of Biotechnology in Exploring and Protecting Agricultural Genetic Resources. Edited by J. Ruane and A. Sonnino. Rome: FAO (2006), pp. 187, US \$ 22.00. ISBN 92-5-105480-0. doi:10.1017/S0014479706254905

This publication is number 13 in a series of e-mail conferences organised by the FAO Biotechnology Forum. The conference took as its context the decline in agricultural biodiversity and focused on 'the role of biotechnology for the characterization and conservation of crop, forest, animal and fishery genetic resources in developing countries'. The content of the book covers selected papers delivered in a two-day international workshop and subsequent e-mail-based conference.

The book is usefully divided into four sections. Section I contains status reports on the world's livestock, fishery, crop and forest genetic resources. Each provides an excellent and useful pocket digest of the relevant background, current status and ways ahead and is authored by well-recognized figures from each field. Section II includes two useful contributions on the current use and problem areas associated with cryopreservation and reproductive technologies. Section III includes eight papers dealing with the use of molecular markers in characterization and conservation decision making. While these papers are useful they provide little more than a flavour of the real range of progress in this area. A visit to the conference web-site revealed additional documents from further sessions and posters from the meeting that do not appear in the book.

Section IV entitled 'debating the issues', presents the background document to the e-mail conference and a summary of the discussion. While this promised much, it came as no surprise that researchers in developing countries wanted exactly the same as everyone else.

Mike Ambrose