

*Expl Agric.* (2012), volume 48 (4), © Cambridge University Press 2012  
doi:10.1017/S0014479712000518

*Plant Biotechnology and Agriculture. Prospects for the 21st Century.* Edited by A. Altman and P. Hasagawa. Waltham, MA and London: Elsevier/Academic Press (2012), pp. 586, US\$199.95. ISBN 978-0-12-381466-1.

This authoritative and wide-ranging book is a first-class contribution to the literature in the important area of biotechnology. It draws on the collective knowledge of a wide range of contributors to bring together a wide-ranging and detailed review of biotechnology in the 21st century. The book is aimed at a wide range of readers from graduate level students to a range of plant and agricultural scientists. Biotechnology is a key tool in the armoury to feed the world's rapidly growing population with food of the right quality and quantity and to allow crops to grow more efficiently in harsh environments with lower input costs.

The opening sections provide a useful review of the advances relevant to the science of biotechnology in a number of fields such as genomics, tissue culture and genetic transformation, as well as breeding and germplasm technologies. This is followed by a useful section on plants' response to the environment and abiotic and biotic stresses, such as salinity and drought, and pests and diseases, as well as phytoremediation. The area of yield and quality traits is well covered, as are developments in post-harvest and storage quality management and use of plants as 'factories' for production of bioenergy and pharma and other biomaterials. The book is completed by a review and discussion in the crucially important areas of transgene flow, Intellectual Property Rights (IPR), regulatory issues and biotechnology in developing countries. This is a comprehensive and highly useful overview of a crucial area of technology for human survival as we move forward into the new millennium.

Keith Dawson

*Expl Agric.* (2012), volume 48 (4), © Cambridge University Press 2012  
doi:10.1017/S001447971200052X

*Genetics, Genomics and Breeding of Bananas.* Edited by M. Pillay, G. Ude and C Kole. Enfield, NH: Science Publishers (2012), pp. 350, £76.99. ISBN 978-1578-0878-84.

The editors have assembled contributions from several specialists with contemporary skills in plant genetics and molecular biology and who are linked to the Global *Musa* Genetics Consortium, a forum providing for the free exchange of data relating to the genetics of the crop. For many, a polyploid, vegetatively propagated crop like banana is an interesting model for studying genomic evolution in relation to different stresses.

Historically, relatively few organisations have supported sustained research on genetic improvement of *Musa*. The breeders' objectives were driven by the needs of the export trade in dessert fruit, which continues to be dependent on just one genotype (formerly Gros Michel and now Cavendish). Only in the last two decades the need to improve the cooking and other dessert varieties has been addressed.

Genetic improvement of bananas by conventional methods is difficult. Overcoming the problem of sterility in the economically useful cultivars and the fundamental requirement for seedless progeny has been the breeders' major challenge. Conventional breeding is possible and promising clones have been developed, but the process is long and tedious, and insufficient progeny have been produced to readily locate and identify useful genes. Through the new technologies described in this book, information on the genes controlling desirable characteristics (disease and pest resistance, yield, flavour and cooking characteristics, plant stature, harvest interval, stress tolerance) is being accumulated. All the contributions give optimistic forecasts of the opportunities for banana improvement, but it is not clear how long we have to wait for the appearance of such new varieties.

S. R. Gowen

*Expl Agric.* (2012), volume 48 (4), © Cambridge University Press 2012  
doi:10.1017/S0014479712000531

*Transgenic Plants. Methods and Protocols.* Edited by J. M. Dunwell and A. C. Wetten. Methods in Molecular Biology Series, Volume 847. Heidelberg, Germany: Springer (2012), pp. 512, £112.50. ISBN 978-1-61779-557-2.

This is a comprehensive methods book packed with detailed protocols on methods in plant transformation. There are a total of 37 chapters organised into eight sections, including four sections with detailed transformation

methodologies for specific plant types (lower plants, rice, other monocots and dicots, respectively). The transformation protocols cover a range of organisms, including *Chlamydomonas reinhardtii*, the major monocot crops rice, wheat, barley and oil palm and dicots, including plum, grapevine, cotton, *Impatiens* and *Torenia*.

A further four sections encompass a range of associated technologies, approaches and example applications. These include protocols for selection of transformants, targeted gene silencing and mutation, molecular pharming (production of biopharmaceuticals) and a curious single chapter section on *Arabidopsis* field trials. It is a pity that a more extensive treatise on field trialling genetically modified crops was not included, as this is an on-going and topical area worthy of an update.

The layout of the chapters follows a well-tested formula for this Methods and Protocols series: a brief introduction, detailed materials and step by step methods sections, and perhaps uniquely, a notes section with hands-on tips, and a list of references which are adequate without being comprehensive. The protocols are easy to follow, usually contain all the critical detail and are therefore an effective laboratory guide.

This volume is a second edition and also follows on from a previous volume in the same series (Methods in Molecular Biology 478) targeted specifically at wheat, barley and oats, edited by H. D. Jones and P. R. Shewry and published in 2009. This current volume represents a useful companion volume with updates in some areas and many unique topics. It is a worthy purchase for any plant biotechnology laboratory.

Malcolm J. Hawkesford

*Expl Agric.* (2012), volume 48 (4), © Cambridge University Press 2012

doi:10.1017/S0014479712000543

*Invasive Alien Plants. An Ecological Appraisal for the Indian Subcontinent.* Edited by J. R. Bhatt, J. S. Singh, S. P. Singh, R. S. Tripathi and R. K. Kohli. Wallingford, UK: CABI (2012), pp. 314, £95.00. ISBN 978-1-84593-907-6.

India is vulnerable to invasive species due to rapid development, the increased transport links and disturbance to the environment in many areas. The focus on India gives readers a chance to access case studies on a wide range of environments and topics.

The book comprises 24 chapters, arranged in five parts with some 41 contributors in total. Part I on Major Invasive Plants, includes *Parthenium*, *Lantana* and the marine algae *Kappaphycus*. These chapters describe the distribution, habitat, biology, ecology and control methods. Some chapters are detailed review articles, while others, such as those on *Anthemis* and *Potamogeton*, are based largely on original data and observation. The possible impact in future climates is considered, using *Chromolaena* as an example. Part II on Status, Mapping and Distribution describes the situation of selected invasive plant species in different regions. Subsequent parts are Environmental Impact and Risk Assessment, and Population, Dynamics and Utilization. Lastly, Part V covers Management and Legislation in case studies on *Lantana* management in Chandigarh and *Prosopis* in Gujarat, and these explore issues related to these alien species and some of the challenges facing management of these areas.

Readers looking for an overarching ecological appraisal of the subcontinent may be a little frustrated as authors took different approaches, some being very descriptive and others more analytical; most chapters are well referenced. Some of the text could have benefitted from more robust editorial attention but the oversights do not detract too greatly from the work. The book is well bound, with a good index, and it is likely to be a valuable resource for practitioners, managers and policy-makers alike.

David E. Johnson

*Expl Agric.* (2012), volume 48 (4), © Cambridge University Press 2012

doi:10.1017/S0014479712000555

*Phytohormones and Abiotic Stress in Plants.* Edited by N. A. Khan, R. Nazar, N. Iqbal and N. A. Anjum. Berlin, Germany: Springer-Verlag (2012), pp. 306, £126.00. ISBN 978-3-642-25828-2.

Phytohormones play a critical role in the complex signalling pathways controlling plant responses to abiotic stresses. Recent research on stress responses has concentrated on molecular signalling mechanisms with rather