

BOOK REVIEWS

Plant Roots, The Hidden Half, 3rd Edition. Edited by Y. WAISEL, A. ESHEL, and U. KAFKAFI. Marcel Dekker, Inc., 270 Madison Ave., New York, NY 10016. 2002. Hardcover, 1120 pp., \$250.00. ISBN 0-8247-0631-5.

This massive volume (in physical weight as well as comprehension) is a critical reference for anyone who is even peripherally interested in roots and root function. The book is an update and revision of the 2nd edition, with numerous author changes and chapter deletions and additions (10 more chapters than the previous edition). Most of the chapters that cover material contained in earlier editions have been extensively updated and extended. The result is a change in the tenor of the volume (for the better; the chapters and sections appear to flow more smoothly) and some changes in points of view, that are sometimes orthogonal to the similar chapters in previous edition(s). Whenever you ask others to write chapters for a book or monograph, there is always the inevitable overlap and even contrary points of view expressed by different authors. The resulting duplication is one of the better aspects of this book: The chapters are often sufficiently comprehensive to provide restatements of the same point from different angles or points of view. For example, the section on regulation of root growth has chapters on each of the five major growth substances, followed by chapters on root signals, environmental sensing, and even two chapters on gravitropism that look at the phenomenon from very different perspectives. These last four chapters of this section necessarily restate, reinforce, and extend some of the material from the first five chapters. On a book-wide basis, the two chapters on gravitropism [30 (Pilet-relative to auxin transport) and 31 (Poovaia, Yang, and Reddy—calcium mediated)] are preceded by an excellent treatment in Chapter 3 (Sievers, Braun, and Monshausen) of the structure and function of the root cap, where much of the physical mechanism of graviperception is discussed in detail. In another example, Barlow (Chapter 4) discusses aerenchyma from the point of view of the anatomist, while in chapter 42, Armstrong and Drew briefly reiterate the developmental aspects and discuss the functionality of aerenchyma in the overall context of roots functioning under anaerobiosis. I was especially pleased to see the chapters by Silk (Kinematics), Stokes (Tree root anchorage), Glass (Ion uptake—A different perspective from that of Nissen in the 2nd edition), and Draye (Laterals of banana), which present important material not in previous editions. Chapter 9 on Functional Diversity by Waisel and Eshel (an update of their similar chapter in the 2nd edition) attempts to provide a wide ranging synthesis of a functional whole from the disparate elements of root structure and function covered by the book. In doing so, they point out some very interesting linkages and identify many areas that are in desperate need of further research.

In my subjective opinion, not everything of importance relative to roots has been adequately covered by the book. For example, Fitter (Chapter 2) provides an excellent description of root architecture, but ignores the developmentally based root classification system in favor of his topologically based classification. The developmentally based classification system is, however, used by many other authors, for example, Lloret and Casero's chapter on lateral root initiation; Waisel and Eshel's chapter on "Functional Diversity . . ."; Feix, Hochholdinger and Park's chapter on "Maize Root System and Genetic Analysis. . .". The lack of a thorough treatment of the developmental classification system leaves a gap in the knowledge provided by the book. This is not a criticism of

Fitter; his approach is in line with his personal scientific philosophy and serves to underscore the points he wishes to make. The developmental system can be elucidated, but it requires close reading of many chapters to get a general sense of what it looks like. This is something the editors should have caught and dealt with. There are other examples of these gaps, for instance, in the section on root genetics, there is no chapter on *Arabidopsis* root genetics, or one that provides an overview of root genetics. Where there is sufficient redundancy to piece together the developmental system, there is insufficient information in the book to acquire a concept of the state of the art for root genetics, especially relative to improvement of root function. A section of Glass's chapter on regulation of nutrient uptake suggests that there may be seven or more distinct high affinity transporters for nitrate in *Arabidopsis*, possibly expressed in different tissues or even different root types. This is clearly related to genetic improvement or manipulation of root functionality, but it exists in a vacuum in this book. From my chair, I cannot tell if the gaps in this book were oversights by the editors, manuscripts contracted for but not submitted, or simply coverage expected from but not presented by the chapter authors. As a postscript to these comments, it would have been useful if the editors had generated a whole book overview that shows where they think everything is inter-linked, and placed it at the end of the book.

Although I take exception to some of the points of view expressed by several of the authors, this does not, in my opinion, decrease the value of this book. This is an excellent book, and careful reading of the chapters of interest and, especially, those chapters that are tangential to a reader's area of interest, will broaden and round out the knowledge base for that reader. An excellent book, a must have for any collegiate library, and a critical reference for a serious root researcher.

Richard W. Zobel
USDA-ARS 1224 Airport Rd.
Beaver, WV 25813
(rzobel@afsrc.ars.usda.gov)

Managing Plant Genetic Diversity. Edited by J.M.M. Engels, V. Ramanatha Rao, A.H.D. Brown, and M.T. Jackson. CABI Publishing, 10 E 40th St., Suite 3203, New York, NY 10016. 2002. Hardcover, 487 pp., \$140.00. ISBN 0-85199-522-5.

With the planet becoming overcrowded and deprived of most of its original resources, scientists, conservationists, and the agrobiodiversity stakeholder community are somehow all concerned with aspects of management. If well managed, plant genetic diversity of this planet will continue to exist and provide environmental services and products, as well as opportunities for economic and human development.

This book includes the proceedings of the International Conference on Science and Technology for Managing Plant Genetic Diversity in the 21st century, convened by the International Plant Genetic Resources Institute and the Malaysian Palm Oil Board, and held in Kuala Lumpur, Malaysia, in June 2000. The 42 contributions, apart from keynote addresses on history and future perspectives, are organized in 11 thematic areas. Theme 1 looks at the use of molecular markers for a better understanding of the structure of genetic diversity in gene pools, with case studies from rambutan, coconut, cotton, and cacao. Technologies and strategies for ex situ conservation are reviewed in Theme 2. Theme 3 introduces the deployment

of genetic diversity and dynamic management of genetic diversity in agroecosystems. The role of bioinformatics and databases in conservation and utilization of germplasm is presented in Theme 4. Under Theme 5, the readership will find a couple of updates about in situ conservation of wild species. Indicators for the sustainable management of genetic resources are presented in Theme 6. Theme 7 offers to the readership a couple of updates in prebreeding, namely of tomato, rice, and sugarcane. Underutilized species and their challenges and opportunities for conservation, management, and use are presented in Theme 8. Finding new allelic variation through genomic and bioinformatic tools is presented in Theme 9. Theme 10 shows the applications of geographical information systems for the exploration, use, and conservation of genetic resources of crops, forages, and forests. The economics and legal aspects of managing genetic resources are dealt with in Theme 11. Finally, a summary analyses the perspectives opened up by the conference and presents some future lines of individual and collective action.

Gathering the proceedings of an international conference, this book presents an impressive diversity of topics, quite expected after 50 yr of continuing development of science, technology, knowledge, and experiences in plant genetic resources at both national and international levels. Although the editors did not explain much about their intentions, they were able to pull together well the contributions into 11 themes. The themes link logically together from a better understanding of genetic diversity at species and population levels down to the realization of the different benefits for the present and future stakeholders. Many contributions will surely continue to serve as valuable references in the future. If several topics illustrated with classic and less-known examples were expected in a book of that scope, this book also opens perspectives about new developments for these coming years, namely about genomics, bioinformatics, indicators, economics of conservation, and collective rights. The conservation and use of plant genetic resources must be interdisciplinary to be effective; it is one merit of this book that it helps build bridges

between genetics, informatics, and the social sciences, namely international law, community values and rights, and prospective economics. Another merit is in stressing the performance and value adding of such interdisciplinarity.

If the management of plant genetic diversity is to be comprehensive, effective, and above all humane, a couple of themes could have been reflected more in the book, as rightly acknowledged in the final summary. First, one would have expected some contributions in inventories of plant genetic resources. Although the first decades of work in plant genetic resources contributed a lot to inventories, it would be incorrect for sound management including in situ to conclude their futility or to postpone them. Similarly, the documentation of wealth of uses of plant diversity could have received more attention; the management of more plant genetic resources shall be possible only through the documentation, enhancement, and valuation of more cultural diversity. Because of the little or erratic investments in these two basic documentation tasks, we have inaccurate information about the rate, magnitude, and location of genetic erosion and modification or extinction of rural knowledge. Second, one could have desired a few more contributions on methodologies and techniques of ex situ conservation, and on the state of current and future linkages between ex situ facilities and the user community. Third, as acknowledged in the final summary, although ex situ and in situ conservation have long been considered as complementary, their dynamic interaction, the criteria for choosing one, and the monitoring in the midterm deserved more attention. But as often noted in the history of sciences synthesis in disciplines, while rapidly evolving and productive, may require a little patience.

In short, this is a book that any stakeholder in plant genetic resources will appreciate consulting, reflecting upon, and coming back to.

Daniel G. Debouck
*Genetic Resources Unit
International Center for Tropical Agriculture
A.A. 6713, Cali, Colombia
(d.debouck@cgiar.org)*