

Book Reviews

Biology of Floral Scent. Natalia Dudreva (Purdue University) and Eran Pichersky (University of Michigan) (eds.). 2006. CRC Press, Taylor & Francis Group, 6000 Broken Sound Parkway, NW, Suite 300, Boca Raton, FL 33487-2742. 346 p. \$149.95, hardcover. ISBN0-8493-2283-9.

The Biology of Floral Scent will be very appreciated among plant biologists either for teaching activities at the graduate level or as an up-to-date review for researchers. This book can be recommended for the review of the multidisciplinary fields of floral research and should be of interest to horticulturists, plant breeders, plant physiologists, entomologists, and other scientists.

The book is divided into five sections. Each chapter contains a detailed list of references cited and seems to be up to date. Section I, comprised of two chapters, relates to the chemistry of floral scent where the chemical diversity of the floral volatile compounds is presented. The techniques for their detection and identification are detailed.

Section II, comprising three chapters is dedicated to the biochemical and molecular aspects of floral scent. More precisely, regulation processes either at the metabolic or genetic levels are presented in general and more specifically in two distinct chapters for the biosynthesis of volatile terpenes in the flowers of *Arabidopsis thaliana* as well as a genomic approach of floral scent in rose.

A very interesting Section III deals with cellular and physiological aspects of floral scent synthesis and emission in flowers. In this specific section, the floral scent transport and emission are analyzed through flower, mainly petal, cell wall and specific metabolites, osmophores, epidermal tissues, and specialized structures and organs.

Section IV, which is divided into five chapters, provides very useful information for studies relating to plant-insect interaction and pollination ecology. Chapter 8 provides an overview of the pollination systems and how the chemistry of floral scents is linked to the biology of the principal Invertebrate pollinators and some Vertebrate pollinators. The taxonomic presentation enables the reader to seek specific information on bees, flies, or moths and so on. Emphasis is placed on the phylogenetic, ecological, and ethological aspects of floral chemistry in pollination. The information, provided on the main classes of fatty acid derivatives, terpenoids, and benzenoids as well as nitrogen- and sulfur-containing compounds emitted from flowers, should be useful for people involved in plant breeding and integrated pest management. There is a short section dealing with birds, bats, and moths and with their role as mixed-pollinator systems. There are ten color photos providing a view of several pollinators on different flowers, and these same photos are presented in black

and white in subsequent chapters. A short but specific Chapter 9 reviews the interaction of floral scent and butterflies as pollinators. In other words, who does what, and why do plants emit floral scent compounds. An interesting Chapter 10 concerning the sexually deceptive orchids in conjunction with pollinator attraction follows this chapter. Although far from being considered an exhaustive literature survey, emphasis is placed on deceptive orchids occurring in Australia, Europe and the Neotropics. Chapter 11 concerns the coding and detection of flower volatiles in nectar-foraging insects with emphasis on peripheral detection mechanisms of flower molecules and coding of this information. Odors are definite floral attractors, but they also work in conjunction with other cues (color, texture, taste, etc). The purpose of Chapter 12 is to present learning mechanisms that can influence recognition and discrimination of floral odors with examples used by honeybees and moths in particular. In a brief review of insect olfaction, the physiology and mechanisms involved are presented. The final Chapter 13 of Section IV reviews when scent is important, how it works and which subsets of scents are active.

Section V, chapter 14, deals with the commercial aspects of floral scent involving molecular engineering, metabolic pathways, and the implications of metabolic engineering with emphasis on the ecological and physiological effects. This chapter concludes with some potential for challenges to be met in the future.

After reviewing this book, we can no longer look the same way at a honeybee or other insects meticulously visiting each flower time and time again as a haphazard visit. No two flowers are alike. There is definitely more going on within the biology of floral scent.

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Sustainable Aquaculture: Global Perspectives. B.B. Jana and Carl D. Webster (eds.). 2003. Food Products Press, 10 Alice St., Binghamton, NY 13904-1580. 365 p., incl. index., \$42.00, softcover. ISBN 1-56022-104-6.

As the oceans fish supplies are depleted and the world's population continues to grow, more interest is given to the ideas and potential practices of sustainable aquaculture.

This book was co-published simultaneously as *Journal of Applied Aquaculture* 2003, Vol. 13: 1,2 and 3,4. Thus, it is a collection of (mostly) review papers on specific topics relating to aquaculture. Included are discussions of water quality (in shrimp ponds), pond fertilization, nutrition of fish marine fish larvae and freshwater prawns, ecological and behavioral aspects of larval fish feeding, fish breeding programs, hormonal induction of sex-reversal, diseases of fish in the tropics, carp production, freshwater water pearl culture,

waste water-fed aquaculture, and two articles that discuss aquaculture in India. Although the conditions leading to the world's need for sustainable aquaculture practices are addressed in the preface of this volume, the goals or even the definitions of sustainable aquaculture are not discussed.

From the title, I looked forward to a grand tour of the world of sustainable aquaculture. In that respect, I was disappointed. What I found was a collection of well-written papers, but an uneven treatment to the topic of sustainable aquaculture. Two papers discuss aspects of the status of aquaculture in India. India is the second largest aquaculture producer in the world, but in a volume touting "global perspectives," we would hope for a broader outlook. Other articles, also well written and potentially valuable, do not particularly address sustainable aquaculture.

The papers themselves appear to be very complete reviews of the international literature of their specific topics. Some papers take a narrow approach to their topic whereas other papers have broad application, such as the discussions on pond fertilization and the biological principles of larval fish feeding. Because the publication date is given as 2003, few papers beyond the year 2000 are included.

This book is recommended not for the reader in search of a general knowledge of sustainable aquaculture, but for one who seeks a review of the one or more of the topics addressed. Finally, this volume serves as a reminder of the international importance of aquaculture.

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Plant Functional Genomics. Dario Lester (ed.). 2005. Food Products Press. An imprint of the Haworth Press, Inc. 10 Alice Street, Binghamton, NY 13904-1580. p. 677. \$89.95, softcover. www.haworthpress.com/store/product.asp?sku=5311. ISBN: 1-56022-999-3.

Plant Functional Genomics edited by Dario Lester is a notable book covering the gamut of techniques, tools, analyses, and approaches available for plant scientists interested in the fast developing field of plant functional genomics. This book consists of five sections, and each of the sections consists of two to seven chapters. The book begins with a preface that covers the definition and origin of plant functional genomics, followed by a long list of abbreviations for useful common and not-so-common terms that are used throughout the book. The five sections of the book are divided according to the following: Section I—Breakthrough Techniques, covering chapters 1 through 6; Section II—Species Examples, covering chapters 7 through 13; Section III—Organelles, covering chapters 14 and 15; Section IV—Pathways and Processes, covering chapters 16 through 20; and Section V—Protein Families, covering chapters 21 through 23. Each of the chapters is written by

one or more authors that are experts in the field or discipline. Most of the authors have taken the time to provide an exhaustive and thorough review of the tools as well as the advantages and disadvantages of some of the breakthrough techniques available as well as the knowledge generated from ongoing research in the field of plant functional genomics. In Section I, whether discussing full-length cDNAs for discovery and annotation of genes (Chapter 1), T-DNA mutagenesis (Chapter 2), reverse genetics tools (Chapter 3), transcriptomics (Chapter 4), or large-scale yeast two-hybrid analysis (Chapter 6), these chapters provide the reader with a good understanding of the usefulness of these techniques in pursuing different research goals. In Section II, each of the seven chapters covers developments in functional genomics of such organisms as the cyanobacterium *Synechocystis* sp. PCC 6803, the green alga *Chlamydomonas*, and the moss *Physomitrella*, proceeding to the model plant arabidopsis, then followed by rice, maize, and the new model grass species *Brachypodium distachyon*, which has been recently targeted for genome sequencing. The choice of these various organisms and plant species as examples of functional genomic studies is understandable to a certain degree as these have either undergone advanced research, due to their smaller genome size, providing fundamental knowledge of genome organization and fundamental biology of genes or are being targeted as model systems for functional genomics studies. However, it would have been nice to have included one or more higher plant species, such as tomato, as examples as well. In Section III, the two chapters covering proteomics of chloroplasts (Chapter 14) and mitochondria (Chapter 15) offer a good overview of the complexity of these plastid organelles and their diverse roles in the production and intracellular trafficking of complex compounds and secondary metabolites that are critical for myriad metabolic and anabolic biosynthetic functions. In Section IV, five chapters are devoted to various pathways and processes in plant growth and development, such as photosynthesis (Chapter 16), nitrogen metabolism (Chapter 17), salinity (Chapter 18), fatty acid biosynthesis (Chapter 19), and seed development (Chapter 20). Each of these chapters covers our knowledge of the gene products, i.e., proteins, involved in known pathways, and how function prediction of genes can serve as basis for function determi-

nation, particularly when using information gleaned from the analysis of other organisms. These chapters serve to illustrate how genomics technologies can be used in a systems-oriented approach to understand biological processes. In section V, the last three chapters cover plant transporters (Chapter 21), cytochrome P450 (Chapter 22), and protein phosphorylation (Chapter 23). Devoting these three chapters to these critical protein families that play major roles in plant growth and development provides the reader with a solid overview of how the field of genomics has allowed us to look at these complex systems and begin to understand their significance in facilitating distribution of metabolites, primary and secondary metabolism, as well as regulation and coordination of vital metabolic events, including gene expression, signaling networks, and signal transduction pathways.

Overall, I would have to say that this is an excellent book, well written and edited. The illustrations and tables provided in each of the chapters are useful and readily referenced. The index section is quite extensive and should be very useful to look for specific groups of genes or systems that are covered over the different chapters. I highly recommend this book to anyone who is interested in learning more about plant gene function, and how the field of genomics has been able to contribute to our overall knowledge of plant biology. It is indeed a valuable resource on the ever expanding and accelerating field of plant functional genomics.

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Taiwanese Native Medicinal Plants: Phytopharmacology and Therapeutic Values.
Thomas S.C. Li. 2006. CRC Taylor & Francis. 379 p. \$189.95, hardcover. ISBN 0-8493-9249-7.

The publication is educational in its presentation of the medicinal properties of native Taiwanese plants as reported and documented in the literature. It lists over 1000 plant species and tabulates the plant source, the plant parts used, major chemical

constituents, and claimed therapeutic properties from 683 references published worldwide. The author has done a good job in analyzing and organizing information related to the medicinal as well as the toxic properties from these references. The book literally has no text other than a foreword, preface by the author, and a one-page introduction. All of the other information is presented in a table format. The best feature of this book is this table format. From the table, it is easy for a reader to look up a specific plant species of interest by its scientific name and to find the therapeutic claims, the chemical ingredients, and details of their sources including the specific plant part used in Taiwanese medicine. This information also is cross-referenced in detail in three appendices and in an alphabetic index.

As the author points out in his preface, it is only recently that the Western researchers have acknowledged the importance of herbal plants and have taken an ethnobotanical approach in studying their medicinal and toxic properties. This book provides such an outlook in studying the plants used in Taiwanese cultures. In justifying his diligent work, the author argues that although there are numerous publications on the use of Chinese medicinal plants, many Taiwanese medicinal plants of great therapeutic value are not listed in such publications. Such information is often necessary for critical evaluation of the possible benefits and side effects of plant medicines and formulations. This book is a great reference for any medical practitioner or professional herbalists and also is suitable for anyone interested in herbal medicines in general. The book also may be the first of its kind in its content and focus on Taiwanese medicinal plants and examining them in such detail. However, the book itself priced at \$189.95, is very expensive for recommendation as a personal reference text or even for a school library. Due to rapidly shrinking funds allocated for printed material and book purchases and more libraries are looking at subscribing to electronic databases, which are not expensive, easily accessible to multiple users at the same time, and searchable by a keyword index.

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