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BOOK REVIEWS

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Genomics and Bioinformatics. An Introduction to Programming Tools for Life Scientists. By T. Samuelsson. Cambridge, UK: Cambridge University Press (2012), pp. 338, £29.99. ISBN 9781107401242.

This book is subtitled as *An Introduction to Programming Tools for Life Scientists* and this describes well its intent and content. It assumes background knowledge of basic principles in molecular biology and cell biology and access to a computer running a Unix operating system with Perl installed.

The first three substantive chapters deal with some of the basic tools of molecular biology: restriction enzymes, RNAi and PCR. A distinctive feature of the book is the way in which discussion of these concepts is interspersed with practical examples of the use of Perl in addressing relevant problems. Three chapters look at different aspects of human disease while introducing bioinformatic techniques such as BLAST analysis. Examples from evolutionary studies are used to introduce sequencing alignments, molecular phylogeny and bootstrapping. Subsequently, gene function is approached from a consideration of metagenomics and protein domains. An important chapter deals with information resources, including those of the National Centre for Biotechnology Information and European Bioinformatics Institute. Subsequent chapters describe finding genes, with a strong focus on the 'RNA world' and finally 'personal genomes', single nucleotide polymorphisms and the study of human variation.

Each chapter ends with a small number of exercises and there are four very useful appendices on UNIX, sequence analysis software, Perl and an introduction to R.

The author's stated aim is to convince us that relatively simple programming skills can be used to tackle many common biological problems. He succeeds in this, and both the detail of the book and the attitude it conveys are to be welcomed.

Michael Abberton

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Plant Breeding for Biotic Stress Resistance. Edited by R. Fritsche-Neto and A. Borém. Heidelberg: Springer (2012), pp. 173, £126.00. ISBN 978-3642330865.

Biotic stresses severely reduce the yield of food crops worldwide. In the last few decades, breakthroughs in biotechnology and molecular biology have provided new tools in the form of marker assisted selection and genetic engineering. These new technological advances coupled with conventional plant breeding procedures have opened new avenues for developing crops with resistance to various biotic stresses. Editors of *Plant Breeding for Biotic Stress Resistance* have done an admirable job of assembling a wealth of information to breed crops with improved resistance to biotic stresses. The book is divided into eight chapters each highlighting a specific biotic stress. The introductory chapter provides lucid information regarding overall challenges associated with breeding cultivars for biotic resistance. The most important drivers of biotic stress, i.e. fungi, bacteria, viruses, nematodes and insects/pests are discussed in chapters two to six, respectively along with various breeding strategies to minimize their effect and identify the sources of resistance/germplasm with reference to a specific crop. Chapter seven focuses on the mechanisms of plant resistance to the insect pests of stored grains that cause huge pre- and post-harvest losses. The authors depict that practical knowledge regarding types and severity of store grain insect pests is direly needed to establish breeding programs to mitigate losses. The relative importance of weed management via crop breeding is discussed in the last chapter to determine the theoretical and physiological basis of stress induced by competition between crop plants and weeds. Various strategies are

portrayed to breed cultivars with improved competitive abilities. The book is an excellent source of information for agricultural scientists and students.

Muhammad Asif

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Seeds of Sustainability: Lessons from the Birthplace of the Green Revolution in Agriculture. Edited by P. A. Matson. Washington, DC: Island Press (2011), pp. 312, US$45.00 (pb). ISBN 9781597265256.

This book is a story of a region in the early stages of transition to sustainability. It provides ample evidence that moving towards sustainability requires the successful identification, assessment and management of risk and uncertainty. It is knowledge-intensive and requires changes in technologies, policies and incentives, and new partnerships and alliances. It requires knowledge to be translated into action and better links between researchers and policy makers.

The book describes the results and findings from 17 years of interdisciplinary research in the Yaqui Valley in Mexico against a background of social, political and environmental changes and financial crises. It charts the transition from increasing use of higher yielding wheat varieties, inputs and water, through eight years of drought, to systems using conservation agricultural practices and making more efficient use of inputs and water.

The research programme evolved under the influence of its partners and events. The chapters on the management of nitrogen inputs and water resources are particularly well documented. Areas are identified where further research is needed.

The authors acknowledge that their research is inevitably location-specific, but argue that the approaches and metrics used, tools developed and models constructed have much wider relevance and have been highly influential on their teaching and research students.

Andrew Bennett

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Peppers: Vegetable and Spice Capsicums, 2nd edn. By P. Boseland and E. J. Votava. Wallingford, UK: CABI (2012), pp. 230, £35.00. ISBN 978-1-84593-825-3.

The stated aim of this book is to provide an introduction and overview of peppers, and the result is a comprehensive reference for the serious horticulturalist or grower, and an excellent source of essential background information for the scientist. This new second edition provides an important update to the first edition of 10 years ago, incorporating a very significant body of work and new technology that has been developed in the intervening period. The diversity of peppers – from vegetable to spice to ornamental and their wild and domesticated speciation – is addressed. The first half of the book focuses on the essential background to an understanding of the crop and the tools for its development – taxonomy and genetic resources; botany and seed; genetics, plant breeding and biotechnology and chemical composition. The second half of the book provides a clear presentation of the state of the art of commercial production, harvesting, post-harvest handling and key diseases and disorders. The chapter, 'Taxonomy, Pod Types and Genetic Resources', lays out clearly and informatively the extent of the diversity within the genus. In this part the spice credentials of the genus come to the fore. Elsewhere, although the spice aspect of the crop is covered, the crop as a vegetable dominates. For those interested in the spice capsicums – chillies and paprika – this book is just a first door onto a world of great diversity, far more than is found in most other spice crops.

Steve Caiger