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Book reviews

Sink, K.C. (ed.): Petunia. Monographs on Theoretical and Applied Genetics, Vol. 9. Berlin, Heidelberg, New York, Tokyo: Springer 1984. xii/290 pp., 61 figs. Hard bound $ 38.50.

Petunia was probably the first plant species to be grown and sold on a large scale as a flowering hanging basket plant. It is still an important economic plant species, accounting for approximately 30% of the quantity of seeds sold. Last but not least, Petunia figures prominently in experimental plant research.

Do the above-mentioned characteristics justify the publication of a book consisting of approximately 290 pages. Yes, but only if the editor succeeds in compiling almost everything that has been done so far in horticultural and biological research. To the best of my knowledge this monograph on Petunia contains everything scientists could want to know about Petunia.

This book on Petunia does not only deal with the classical but also with the modern aspects of Petunia biology: taxonomy, anatomy and morphology, cytology, genetics, inheritance and biochemistry of pigments, male sterility, self-incompatibility, cell-tissue and organ-culture, protoplast-regeneration/fusion, anther and pollen culture, haploidy, molecular biology, plant breeding, seed physiology and plant physiology.

This book is highly recommended as a reference for anyone interested in Petunia and in a good survey of the techniques available in plant research in general.

M.M.A. van Herpen, Nijmegen

Gregorius, H.-R. (ed.): Lecture Notes in Biomathematics. Vol. 60. Population Genetics in Forestry. Proceedings of the Meeting of the IUFRO Working Party "Ecological and Population Genetics" held in Göttingen, August 21–24, 1984. Berlin, Heidelberg, New York, Tokyo: Springer 1985. vi-287 pp., several figs. and tabs. Soft bound DM 43,–.

Forest trees are in the middle of the domestication process at the present time. This has triggered a lot of basic research on the population parameters of forest trees both in natural stands and in such breeding populations as seed orchards.

This volume is an important contribution to the quickly increasing information we have on forest tree populations. The symposium proceedings are dealt with in three relevant parts, namely I. Tree breeding, II. Mating systems and III. Genetic differentiation within and between populations. All parts must be considered to be of central importance in man's efforts to domesticate the forest tree.

Our ever increasing data-base on isozyme variation in plants provides a strong background to any study of this kind and the enzyme-story runs through this whole volume. It is quite obvious that forest genetics is now contributing a mass of information about the structure of plant populations. Trees are unique to study as they often live for hundreds of years and produce seeds and progeny at longer or shorter intervals. The volume is a fairly well balanced study on mating systems and on genetic differentiation but somehow it seems a little strange that the most important part, that of tree breeding proper, is dealt with in only one basic article and one specific example. However, such an imbalance is always a nuisance when producing volumes after symposium sessions.

The book is, therefore, an excellent presentation of our present knowledge on tree populations and some of the more general presentations on plant population structures places the forest tree in a proper theoretical context.

P.M.A. Tigerstedt, Helsinki

Linskens, H.F.; Jackson, J.F. (eds.): Nuclear Magnetic Resonance. Modern Methods Plant Analysis – New Series, Vol. 2. Berlin, Heidelberg, New York, Tokyo: Springer 1986. 196 pp., 69 figs. Hard bound DM 139,–.

The New Series of Modern Methods of Plant Analysis has begun well with good co-operation from selected experts as authors for the chosen topics. The series does not depend on specialized conferences for its material, rather the editors have chosen the topics for relevance to recent trends and developments in plant analysis and then sought out the experts from around the world to cover them. Already four volumes have reached publication, dealing with Cell Components, Gas Chromatography/Mass Spectrometry, Immunology in Plant Sciences, and this, the second volume on Nuclear Magnetic Resonance or NMR spectroscopy. Publication of this work is timely, as the powerful NMR technique is beginning to be applied to plant cells in a major way. We believe this volume to be the first devoted entirely to the use of NMR for plant analysis.

The first chapter by T.J. Simpson covers the use of ^{13}C-NMR in metabolic studies. Essentially it deals with secondary metabolism in both fungi and higher plants, covers the field very widely and is extremely well illustrated with NMR spectra, numerous labelling schemes and more than 110 structural formulae showing labelling patterns. Surely a good introductory chapter for gauging what can be done with the technique. The chapters contributed by J.K. Roberts deal with ^{31}P-NMR spectroscopy, one describing methods for determining the energy status of the plant cell and another on intracellular pH determination. Suggestions are given for spectrometer modification for ATP measurement and variations of the technique for Mg^{2+} binding, AMP and ADP estimation and so on while intracellular pH determination is dealt with in detail by way of ^{31}P chemical shifts. Indications are given for the use of ^{1}H, ^{13}C, ^{15}N and ^{19}F NMR ssignals as well for this purpose, bboth for cytoplasmic and vacuole pH estimation. A chapter by C.A. Bell deals predominantly with deuterium NMR, showing the advantages of this isotope for metabolic studies. Proton NMR is dealt with by P. Bendel with a chapter on DNA structure, and another on the orientation of chloroplasts in leaves by D. McCain. The latter is similar to zeugmatography, as information about the physical structure of a leaf is encoded in the shape of the spectrum. Practical details are supplied about the method, and future directions in which it can be used are given. The use of ^{13}C-NMR for determining rubber content of guayule bushes is described in a chapter which gives a very practical application of NMR spectroscopy for commercial reasons. The volume is concluded with an interesting chapter on pollen quality through NMR.

This book is recommended to all those research scientists, with either or both academic and commercial interests, as a practical and theoretical guide to the use of NMR in plant analysis.

J. F. Jackson, Glen Osmond

Therman, E.: Human Chromosomes. Structure, Behavior, Effects, 2nd edn. New York, Berlin, Heidelberg, Tokyo: Springer 1985. xvi + 313 pp., 87 figs.

The original scheme of the favourably received first edition of Therman's book has been maintained. The dramatic and extensive advances in the field of cytogenetics during the last years necessitated a thorough adaptation of the text. So large pars of the book have been amended in the light of increased knowledge and nine new chapters have been added.

One can find in this book the classical topics in cytogenetics, e.g. the structure of the chromosomes, the numerical and structural chromosome anomalies. In addition, a good analysis is made of the present knowledge of the human sex chromosomes, chromosome breakage disorders and chromosome anomalies in malignancies. The book also provides a critical insight into the contribution of cytogenetics to the fields of mutagenesis and gene mapping. It is not a textbook on human cytogenetics, nor a book with extensive descriptions of clinical anomalies in correlation with unbalanced chromosome patterns. It mainly focuses on basic cytogenetic phenomena. The author's personal experience in both human and general cytogenetics is manifest throughout the book, making it also very attractive for the non human-cytogeneticist. Each chapter is followed by an extensive list of selected references, partly reviews. The figures are of a high standard and the book is well indexed.

The book can be warmly recommended for use in courses on cytogenetics for medical and biological students. It has also special merits for practising human-cytogeneticists, who, I am sure, will appreciate this concise book covering their field.

T. Hustinx, Nijmegen

Reeck, G. R.; Goodwin, G. H.; Puigdomènech, P. (eds.): Chromosomal Proteins and Gene Expression. NATO ASI Series. Series A, Life Science, Vol. 101. New York, London: Plenum Press 1985. 360 pp. Hard bound $ 59.50.

Chromosomal proteins and gene expression is the last volume of the NATO Life Sciences series and is the result of an advanced study course on chromosomal proteins and gene expression held in 1984. As stated in the introduction, the book is meant not as a conference proceedings but rather as a set of reviews and is presumably written for the non-expert in the field or for advanced students. The volume is divided into four sections. The first deals with histones, nucleosome and chromosome structures; the second with transcriptional regulation and chromatin structure; the third with the structure and function of chromosomal proteins; and the last section concerns protamines and spermiogenesis.

As in any joint effort, the quality of the individual contributions is variable, although in general the various chapters are well written and informative. The first section, the one dealing with nucleosome and chromosome structure, could have been better illustrated. It is rather difficult to visualize the various higher order nucleosome structures without at least a schematic diagram. The main weakness of the book lies, however, in the second section or at least the part there of which deals with gene regulation. A book designed to review the relation between chromosomal proteins and gene expression must, in these days, include a discussion of transcription factors. Extensive information is available about the transcription initiation complex formed during transcription of the 5S RNA gene and about some of the factors which are required for transcription by RNA polymerase II in in vitro extracts. A review of these studies would have been very relevant within the framework of this book.

This volume, therefore, should not be seen as a comprehensive review of the present knowledge about chromosomal proteins and gene regulation but does offer some excellent reviews of topics within this field. It is recommended as such.

N. H. Lubsen, Nijmegen

Austin, R. B.; with Flavell, R. B.; Henson, I. E.; Lowe, H. J. B.: Molecular Biology and Crop Improvement. A Case Study of Wheat, Oilseed Rape and Faba Beans. Cambridge: Cambridge University Press 1986. ix + 114 pp., several figs. and tabs. Hard bound £ 17.50.

This is one of the few books that a reviewer will always be happy to comment on: simply and clearly written, reflecting deep personal interests of the authors on the subject and, best of all, short. The central theme of the book is easily summarized: can molecular biology help crop improvement? Austin et al. give a positive answer, and there is no doubt that they are right.

Today it is, however, less clear how and what genetic engineering and advanced methodologies can do for agricultural crops. It is exactly this tissue that the authors try to illustrate in a case study covering wheat, oilseed rape and Faba beans. The approach utilized is typical for plant breeders. Starting from the agronomic relevance of a crop, the major drawbacks to its production are outlined, together with the feasibility of eliminating them through the intervention of plant breeding techniques. Molecular biology is then considered as a supplement to breeding techniques at present available to increase yield, pest and disease resistance and the quality of crops. From this point of view the discussions of advanced approaches are of particular interest for solving problems of photosynthesis, drought resistance, resistance to rusts, mildew and take all diseases in wheat, incompatibility, photorespiration, resistance to stem canker in oilseed rape, resistance to Ascochyta, Botrytis and aphids in Faba beans.

I think that reading this book should be essential for molecular biologists desperately searching for good ideas to convince peer reviewers. Also those of them who have no funding problems may appreciate the suggestions of these four PBI scientists on how to do good basic science having in mind future applications.

What about plant breeders? I strongly also suggest the book to them: it may help them understanding that plant breeding does not only correspond to theoretical and field aspects of plant selection.

F. Salamini, Köln