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Book reviews

Han, H.; Yang, H. (eds.): Haploids of Higher Plants in Vitro. Beijing: China Academic Publishers/Berlin, Heidelberg, New York, Tokyo: Springer 1986. xi + 211 pp., 60 figs. Hard bound DM 248,–.

Springer Verlag together with China Academic Publishers Beijing has published a book which reflects the Chinese view of breeding work with haploids. Emphasis is placed by the 16 Chinese authors upon the cereals: rice, wheat and maize (9 chapters out of 12). In addition androgenesis in woody plants: poplar, rubber tree, fruit trees and grape is described in a relatively long part (25 pages). Nine chapters concentrate on several aspects of androgenesis, such as technical and developmental details and descriptions of variability; the other articles report on ovary culture of rice, ovule culture of *Helianthus* and on enzymatic embryo sac isolation of several dicots. Aspects of application are extensively dealt with.

The preface accurately states that Chinese developments on haploidy are summarized; it also states that recent progress is reported – this is not so true, as most citations of Chinese and international literature are earlier than 1980. The articles are sometimes written in a historical manner describing the development of a research area where China had a pioneering position in the seventies: central techniques, as for example the potato medium for anther culture of cereals. Today the field has broadened and not all results are so clear and positive as the Chinese ones. Critical discussions are, however, rare and trials to exact general findings from the worldwide knowledge on haploid research are missing, although a number of non-Chinese citations are quoted.

All chapters are written in a paper-like manner with very loose or no connection at all. Only limited amounts of information are given which have not already been published at least as English summaries of Chinese papers, or increasingly in Chinese conference books and other international reports and reviews. Nevertheless, someone who likes to gather rapid information on this specialized field, can find here a handy synopsis in a neat shape. The price he has to pay for this gain is, however, extremely high.

G. Wenzel, Grünbach

Linskens, H.F.; Jackson, J.F. (eds.): Modern Methods of Plant Analysis, New Series, Vol. 3. Gas Chromatography/Mass Spectrometry. Berlin, Heidelberg, New York, Tokyo: Springer 1986. xvi + 304 pp., several figs. and tabs.

This book is of major importance, not merely because it is the first to bring together current research in the field of gas chromatography coupled with mass spectrometry (GC/MS) as applied to plant material, but because it illustrates the wide-ranging applications of this technique.

The GC/MS has recently been developed and offers certain advantages over the system of gas chromatography: it combines the separation power of the former (GC) with the selective detection properties of the latter (MS). The result is thus a more complex and sensitive analysis of the sample.

The papers collected together in this volume suggest some applications of GC/MS. The volume includes the determination of cytokinins, cyclic nucleotides, gibberellins, auxins and other biological active compounds. Also discussed are the methods of determination of essential oils, fatty acids, volatile flower compounds, phospholipids, polysaccharides and terpenoids.

This volume should encourage the use and the development of the technique of GC/MS amongst scientists working with plant material

M. Cresti, Siena

Brodsky, V.Ya.; Uryvaea, I.V.: Genome Multiplication in Growth and Development. Biology of Polyploid and Polytene Cells. Cambridge, London, New York, New Rochelle, Melbourne, Sydney: Cambridge University Press 1985. viii + 305 pp., several Figs. and Tabs. Hard bound £ 39.50.

This book deals with a present day view on somatic polyploidy. In Part I the occurrence of polyploidy and polyteny is reviewed, and structural aspects of polyploid nuclei are discussed. It is shown that polyploidy and polyteny are phenomena of normal development in a high number of animals and plants, although emphasis is given to vertebrates. This may be the reason for defining DNA underreplication as a rare variant of polyploidization. In Part II, the mechanisms and reasons for somatic polyploidy are summarized. The authors use the terms "endocycle" for events leading to the polyploid state without chromatin condensation, and "polyploidizing mitosis" for those including mitosis-like phenomena (usually called restitution mitosis). The significance of polyploidy is seen in enhanced growth, resistance to injury and mutation, and functional, i.e. transcriptional, advantage. A separate chapter specificly deals with polyploidy in tumors. The authors give a representative overview about what is known on somatic DNA multiplication, especially in animals, and are aware of the unsolved problems. A number of these aspects are carefully discussed. Every chapter is completed by some conclusions that show the opinion of the authors, and which help to reach a deeper understanding of somatic polyploidy and polyteny. The main conclusions drawn by the authors are that these events have an adaptive value in differentiated cells. The book is extremely valuable in order to understand somatic polyploidization as a normal phenomenon of many organisms in relation to differentiation, growth, function and adaptation. It is also a source book, particularly for Russian literature.

W. Nagl, Kaiserslautern

Ptashne, Mark: A Genetic Switch, Gene Control and Phage λ. Cambridge (Mass.): Cell Press/Palo Alto, Oxford, Edinburgh, Boston, Victoria: Blackwell 1986. x + 128 pp., several figs. and tabs. Soft bound £ 14.50.

In using the bacteriophage lambda as an example, the present knowledge concerning the expression of genetic infor-

mation is presented. After describing the basics about genes (chapter 1), following chapters present the protein DNA interactions and gene control (chapter 2), the control circuits-setting the switch (chapter 3) and the key experiments which lead to the above-mentioned knowledge (chapter 4). This is followed by appendixes describing: the design of an efficient DNA binding protein, strong and weak interactions, and control of transcription in eukaryotes and in prokaryotes, with respect to a common mechanism. It is a very original approach, that of using one of the most simple self-replicating genetic units, the bacteriophage lambda, as an example to inform the reader about molecular mechanisms of gene expression.

This book is not only very comprehensive but facts are presented and explained by excellent self-reading drawings which ease the understanding of the very complicated subjects. This book certainly will find its readership within both groups, students and scholars.

K. Esser, Bochum

Darnell, J.; Lodish, H.; Baltimore, D.: Molecular Cell Biology. New York: Freeman 1986. 1,187 pp., 1,248 figs. Hard bound $ 42.95.

In a beautiful and well-produced book with very illustrative photographs and drawing, the authors have integrated classical areas in biology – genetics, biochemistry, cell biology, molecular biology – into one discipline: Molecular Cell Biology.

In Part I basic biological principles of molecular cell biology are provided, such as history, fundamentals of biochemical structure, function and energetics, polymer synthesis, and especially the tools of experimental biology-cell cultures and molecular technology.

Part II deals with gene expression, structure and replication, RNA biosynthesis, and chromosomal organization. The authors concentrate on genes as transcription units and deal extensively with the problem of how genes are controlled as well as how they are replicated and repaired.

How the ultimate gene products, i.e. proteins, work together to make a living cell, is explained in Part III. The authors show the relation between fundamental properties of cells and the properties of specific membrane proteins, transport across cell membranes, transmission of signals between cells, electrical properties of membranes, cell shape and cellular movements, and the generation of ATP. Also considered is how a cell is assembled from its components and how proteins are "targeted" to their appropriate destination of the cell.

Advances in molecular cell biology have led to significant discoveries about such changes in cell function and behavior as the development of higher organisms, the immunological response, cancer, and cell evolution. These are treated in Part IV.

The book is an excellent follow-up to *The Molecular Biology of the Cell* by Bruce Alberts et al. which appeared three years ago. Both books are composed using the same framework: all chapters are divided in small sections headed by a statement and all problems are visualized by simple, schematic and colourful drawings. The main difference between both books is that the latter one pays more attention to molecular genetics and focusses more on genetic manipulation.

In principle the book is intended as a basic textbook at the undergraduate and graduate level, but for all who are involved in aspects of molecular biology – either in teaching or in research – it will be a worthful addition and/or an excellent brush-up of the memory.

H. J. Lubberding, Nijmegen

Wricke, G.; Weber, W. E.: Quantitative Genetics and Selection in Plant Breeding. Berlin, New York: de Gruyter 1986. xii +406 pp., with numerous figs. and tabs. DM 198,–/$ 79.50.

The objective of this book is to present the principles of selection in plant breeding. The authors' intention is to aim the book not only at plant breeders and applied geneticists but also at students who are interested in this branch of science. Therefore, this book must be considered as a textbook and not a scholarly monograph.

Selection in plant breeding is closely associated with quantitative genetics. Most of the characters of economic interest are not inherited simply by one or two Mendelian genes. The rules of inheritance of traits which are controlled by many genes are not different, however, in order to understand and predict the effects of these genes, it is necessary to use different mathematical formulae. Therefore, the first part of the book deals mainly with the problems of quantitative genetics; the subject of the second part is selection. But these two topics can not be studied successfully without a basic knowledge of population genetics. As a consequence, the first chapter gives a short but comprehensive account of this field of genetics for those who are not very familiar with it. The following three chapters belong to the first main section and deal with quantitative genetics, as already mentioned. Vegetatively propagated species, cross-fertilizing species, self-fertilizing species, and autotetraploids are separately discussed. In the authors' opinion, autotetraploids are mostly neglected although they play an important role in natural as well as artificial selection. Therefore, a more or less intensive description of the behaviour of autotetraploids can be found throughout the book wherever polyploids are involved. While in the first two chapters the theory of quantitative genetics are treated, the reader will find in the third one how to estimate genetic variances and covariances from experiments.

The following 9 chapters are entirely devoted to the principles of selection beginning with basic concepts, selection between clones and homozygous lines, and selection in cross-fertilizing crops including a comparison of selection methods and recurrent selection. The importance of selection of parents is discussed in the chapters dealing with breeding for synthetic and hybrid varieties. Selection in segregating generations, selection in autotetraploids, and index selection are other important topics.

Though the book can be read very easily, one cannot escape the impression that some students may experience difficulty at times. There is a helpful Appendix for those who can remember what they have learnt earlier. However, this Appendix cannot substitute as a textbook for those who are confronted for the first time with statistical distributions, matrices etc. The book itself demands a knowledge of statistics and fundamental genetics. Otherwise, a serious study of this book will be difficult. On the other hand, the advantage is that the reader is informed quickly and, as far as possible, completely.

At the risk of being pedantic, one cannot conceive the idea of changing the mathematical symbols most people are accustomed to. Can it be justified for instance to use the symbol *Bb* for a single gene, while all others use the letters *Aa*? Three loci are symbolized with *B*, *G*, and *H* (page 13) when cross-fertilizing species are treated. But, for the self-fertilizing species, *B*, *C*, and *D* are used (page 25). Some formulae are elucidated by numerical examples. Sometimes a bit more information about the data obtained could be helpful in facilitating an easy understanding of the subject. In summary, it can be said that this book is a very useful one and it promises to become a standard textbook. The production of the book is excellent, and the references, though numerous, have evidently been chosen with care.

G. Kobabe, Göttingen