Theor Appl Genet (1991) 82:526–528

THEORETICAL AND APPLIED GENETICS

Book reviews

De Pomerai, D.: From Gene to Animal – An Introduction to the Molecular Biology of Animal Development. 2nd edn. Cambridge: Press Syndicate of the Univ. Cambridge. XIV + 417 pp., 47 figs., 12 illustrations and tabs. Soft bound £ 14.95.

This book is an updated, expanded and largely re-written version of the first edition (1985) and consists of five comprehensive chapters: (1) Gene organization and control (20 pp); (2) Molecular strategies in development (73 pp); (3) Differentiation in vertebrate systems (46 pp); (4) The nematode *Caenorhabditis elegans* (49 pp); (5) Insect development (137 pp). In addition, there is an extensive (> 1300) and valuable (titles included) reference list. The primary purpose of the author is to show the way in which hierarchies of genes control the different aspects of animal development, thus linking molecular and developmental biology/genetics.

The opening chapter provides a brief overview of the organisation, packaging, transcription and regulation of genes in animal systems and also contains a few key references. The second chapter deals with molecular aspects of development (Is the genome constant? RNA populations, oogenesis, fertilization and cleavage, mosaic versus regulative development . . .). Chapter 2 examines erythroid differentiation, differentiation during myogenesis and hormonal control of gene expression. The nematode *Caenorhabditis* (chapter 4) and the insect *Drosophila* (chapter 5) have matured as excellent and the best-studied experimental model organisms in this research field. Consequently, theses systems are emphasized, though some features of mouse and sea-urchin development are also included.

This book is aimed at all those involved in developmental and genetical research and at students of biology sciences. It would be a valuable addition to the bookshelves in any multidiscipline facility.

L. Bünger, Dummerstorf

Hagemann, R.: Gentechnologische Arbeitsmethoden. Berlin: Akademie-Verlag 1990. 232 pp. Hard bound DM 48,–.

The rapid progress that has been made in molecular biology in recent years has resulted in the increased importance of its practical aspects. In particular, methods of molecular genetics are being practiced in many biological, medical and chemical laboratories, and although the problems treated may vary greatly, the methods applied are often very similar.

The book "Gentechnologische Arbeitsmethoden" by Rudolf Hagemann from the Martin-Luther-Universität in Halle-Wittenberg, is aimed at those students and scientists wanting an introduction to working methods in genetechnology. Basic working methods in gene technology are explained. These include (1) handling and culture of the most common host-organisms for DNA cloning: the bacterium *E. coli*, bacteriophages Lambda and M13; (2) Methods for the isolation of DNA and RNA; the digestion of DNA by restriction endonucleases and exonucleases; (3) Electrophoretic separation of nucleic acids and the recovery of DNA from electrophoresis-gels; (4) Generation of cDNA; (5) Ligation and introduction of in vitro-recombined DNA in *E. coli* hosts by transformation; cloning in bacteriophages Lambda and M13; (6) Detection of specific DNA-, RNA- and protein sequences by inactivation of marker genes or by hybridisation techniques; (7) DNA sequencing by using the dideoxy-chain-termination method according to Sanger or the chemical method developed by Maxam and Gilbert and (8) basic methods of gene expression in bacteria.

In view of the fact that the current need for reference books and laboratory handbooks has already been met by at least some of the numerous publications now available, the practical benefits of "Gentechnologische Arbeitsmethoden" have to be considered. As a laboratory manual it has to compete with the comprehensiveness and topicality of the laboratory manual "Molecular cloning" (Sambrook, Fritsch, Maniatis 1989, 2nd edn Cold Spring Harbour Laboratory Press), which is a standard text-book in most laboratories applying molecular-genetical methods. Also, the fact that essential recent developments like the one-strain-system for preparing packaging extracts for in vitro-packaging or the PCR-technique are missing limits its present value considerably. "Gentechnologische Arbeitsmethoden" is written in German. But as the study of respective technical literature has made scientists and even most students familiar with the necessary. English terminological slang, this potential advantage is of limited value.

It remains only to emphasize, that the price of 48 DM makes this new publication distinctly attractive as it is a less expensive alternative for those who need not yet go for completeness and the latest 'state of the art'. The reviewers can recommend this textbook for practical courses in contrast to more comprehensive laboratory handbooks that students can also afford.

M. Rohe, Münster

Morimoto, R. J.; Tissières, A.; Georgopoulos, C.: Stress Proteins in Biology and Medicine. New York: Cold Spring Harbor Laboratory Press 1990. 540 pp., many tabs and figs. Hard bound $ 97.00. ISBN 0-87969-337-1.

This book contains the papers presented at the Sixth International Congress on Isozymes held in Tokyo in 1989. Forty-seven individual papers by more than 100 authors have been compiled in this book, which covers the latest developments related to the isozyme field. The subjects, mainly from human and animal systems, are based on genetic and biochemical data.

However, there is a great diversity in the level and scientific value of the papers presented due to the individual responsibility of the authors. The part from molecular to systematic biology very often lacks information about the reproducibility of the data. By editing this way the reader can obtain more detailed practical information which would normally be skipped.

In conclusion, the book offers an interdisciplinary view of recent research in isozymes, especially for clinical researchers.

J. A. M. Schrauwen, Nijmegen

Kuckuck, H.: Wandel und Beständigkeit im Leben eines Pflanzenzüchters. Berlin, Hamburg: Paul Parey 1988. 169 pp. Soft bound DM 28,–.

Contained within the autobiography of H. Kuckuck is a fascinating description of a period in the contemporary history of plant breeding which was dominated by extraordinary personalities. Fortunately, Kuckuck wrote their names in capital letters in his book, and we can find all those personalities who, at the close of the present century, contributed both basic knowledge and new ideas to plant breeding.

Of course, the chapters in which Kuckuck describes his scientific career comprise the major part of the book. However, Kuckuck not only gives an account of an impressive career from boyhood, through his growing up in a capital city, up to his tenured professorship in Applied Genetics in Hanover, but we also learn that in those times, although education was broad, the opportunity existed for close contact with academic teachers.

The "unholy" period of national socialism in Germany, one must say inevitably, had its influences on plant breeding in Germany. This reviewer, born after the second world war, gratefully and respectfully takes cognizance of the unopportunistic carriage of H. Kuckuck during this period.

The performance and experience of H. Kuckuck have been appreciated and sought after worldwide. The second and third chapter of this biography are devoted to describing the blossoming of his career and include a list of his general (textbooks) and specific (reviews, expertises and publications) contributions.

The biography can be recommended to students of plant breeding research as a valuable contemporary report of an exciting period of plant breeding. Remaining interested readers will, without doubt, read the book with pleasure and conclude that H. Kuckuck is in fact one of the "great old men" of plant breeding in Germany. H. Uhrig, Köln

Ogita, Z. J., Market, C. L.: Isozymes: Structure, Function and Use in Biology and Medicine. New York: Wiley-Liss 1990. 973 pp., many tabs and figs. Hard bound $ 330.00. ISBN 0-471-56807-4.

Heat shock or stress represents one of the most highly conserved physiological adaptive mechanisms of transcriptional and post-transcriptional regulated processes ever examined. Initial studies on the heat-shock proteins (HSPs) concentrated almost entirely on the cloning and characterization of *Drosophila* heat-shock gene expression. More recently, the field of stress protein research has grown and diversified, although the role of stress response in human disease and in animal and plant systems is unclear. The functions of HSPs have been suggested to play a central role in the process by which protein complexes assemble and disassemble or are transported to subcellular compartments. Numerous observations on the activation of stress proteins during human disease states implicate the stress response as an important modifier of cell and tissue function.

This book represents a comprehensive evaluation of the stress response, from the molecular examination of gene structure and expression, the biochemistry and cell biology of stress-induced proteins to the potential role of the response and stress proteins in human disease. The book contains eighteen chapters, each written by specialised author(s). It starts with an introduction into the biology of the stress response by giving an overview of the early studies, the latest developments and the meaning of stress proteins in medicine. Subsequent chapters deal with medical subjects like responses to fluctuating thermal environments and fever, thermo-tolerance and -resistance, hyperthermia in cancer therapy and results of combined hyperthermia and radiotherapy, stress proteins and infectious diseases.

In four chapters special attention is given to hsp70. There is an overview of its functions, the special role of hsp70 proteins in the translocation of proteins, the regulation and function of hsp70 genes in yeast and vertebrate, and the function of HSPs in *E. coli* and their role in the growth of bacteriophage. Some of the other subjects presented are the transcriptional and post-transcriptional regulation of the response to heat shock in *Drosophila*.

This textbook will be of interest to people involved in HS research in the medical field. It is clearly written each chapter has an introduction and the results are presented with figures or tables. The book up-dates the reader in shock/stress protein regulation and function in the human field. This reviewer wonders why the authors did not use the results of HS research in the plant system. A short overview would have clarified more completely the generally identical adaptation of eucaryotic systems to stress. J. A. M. Schrauwen, Nijmegen

El Bassam, N.; Dambroth, M.; Loughman, B. C. (eds.): Genetic Aspects of Plant Mineral Nutrition. – Developments in Plant and Soil Sciences, Vol. 42. Dordrecht: Kluwer Academic 1990. 558 pp., many figs. and tabs. Hard bound £ 145.00.

This book is based on lectures held at the Third International Symposium on Genetic Aspects of Plant Mineral Nutrition in Braunschweig, June 1988.

The cultivars of many plants respond differently to various nutritional and stress factors, e.g. drought or salt stress. The response of cultivars to inorganic nutrients and stress conditions can be improved through the screening, selection, and breeding of the plant genetic resources. In addition to plant breeding techniques methods of plant biochemistry and genetic engineering are also necessary to achieve this goal.

The book under review is composed of five sections. The first section deals with the physiological and biomechanical mechanisms associated with genetic variation in the utilization of major nutrients, such as nitrogen and phosphorus as well iron. The next section is devoted to genotypic responses to water stress, salinity and acidity, and deficiency or excess of elements. Special emphasis is given to aluminium, which is one of the main toxic factors of acidic minerals soils. Screening techniques for the detection of nutritional deficiences and abiotic stress under genetic control are discussed in the third section. Especially informative are the articles by P. B. Vose concerning general problems of screening methods and by G. F. Rühl et al. on biochemical techniques for genotypes identification and characterization.

Genetic variation in symbiotic systems, e.g. aspects of N_2 fixation as well VA mycorrhiza efficiency, are discussed in the fourth section. Germplasm resources and the creation of genotypes for specific environmental (including low input) systems are the topics of the last section in this volume. Most of the articles have been presented by plant breeders working with cereals and other crop plants.

The contributions are written by leading experts from all over the world. The results are well summarized and include a wide number of recent references (including the full titles). The contents of the book may be regarded as a comprehensive compilation of our knowledge in this important area of agriculture. This extremely presentable volume is recommended to scientific researchers from various disciplines interested or working in the fields of plant physiology and plant breeding.

D. Gröger, Halle (Saale)

Campbell, A.; Baker, B. S.; Herskowitz, J. (eds.): Annual Reviews of Genetics, Vol. 23. Annual Reviews Inc.: Palo Alto Calif. 1989. XII + 679 pp., Several illustrations an plates. Hard bound $ 38.00.

It is not easy to review this volume of the very well-known periodical because it contains 25 contributions. It is absolutely impossible for this referee to give credit to all of these papers! However, it should be mentioned that this volume is dedicated to Herschel Roman, who was the "spiritus rector" of this periodical. His death leaves a gap in the scientific community, especially with respect to yeast genetics. One may hope that his work will be evaluated in a later volume in a similar way that the work of another world-renowned geneticist, namely Sewal Wright, is honoured in the present volume.

Following the trend of the times, this periodical is becoming more and more devoted to reviews from the area of molecular genetics (about two-thirds of the contributions). In addition to microorganisms and viruses, *Drosophila* and mammalian tissues are also covered by specific reviews. It is good to see that an old field of plant genetics, namely sexual incompatibility, has evidently also become of interest to molecular biologists. This supports the idea that in the near future the tremendous amount of knowledge gained in the field of molecular genetics from microbes will be more and more applied to solve problems in higher organisms, which hitherto were immune to attack from modern techniques of genetics.

It is also delightful to see that in many of the contributions illustrations are used to explain complicated facts. It certainly would be welcomed by the readers if this policy becomes more common in the future as enhances the quality and comprehension of the papers.

In summary this volume is a valuable tool for providing geneticists with the possibility to obtain information in other fields of research other than their own main interests.

K. Esser, Bochum

Hahn, M. E.; Hewitt, J. E.; Henderson, N. E.; Benno, R.: Developmental Behavior Genetics. Neural, Biometrical, and Evolutionary Approaches. New York, Oxford: Oxford University Press 1990. 319 pp., 72 figs., 35 tabs. Hard cover.

This excellent book is the result of a symposium organized at the William Patterson College (Wayne, NJ) in which it was attempted "to bring together leading scientists in animal and human behavior, the neurosciences, quantitative genetics, and evolutionary theory to engage in face-to-face discussion in search of common ground" (p. xvii).

The first part of the book, subtitled "The Challenge of Developmental Behavior Genetics" and introduced by M. E. Hahn, starts with an insightful account of the history of behavior genetics written by G. Whitney. Next, three chapters follow describing some developmental behavioral genetic studies dealing with the Lousville Twin Study (A. P. Matheny Jr.), mouse aggression (R. B. Cairns and J. L. Gariépy), and social behavior in a number of different organisms (M. E. Hahn).

The second part of the book is entitled "Genetic Approaches to the Developing Nervous System", introduced by R. H. Benno. It contains four chapters dealing with diverse, yet related, topics such as brain development (C. Wimer), neural development and behavior in *Drosophila* (J. C. Hall et al.), and a very lucid and thought-provoking theoretical framework for the study of the development of the nervous system (R. H. Benno). Finally, L. Leamy skillfully reviews studies concerning genetic and maternal influences on brain and body size. It is very unfortunate, however, that almost all studies on this topic employ quantitative-genetic designs that do not allow for dominance, so that this important feature of the genetic architecture underlying those traits is completely neglected.

The third part of the book, introduced by J. K. Hewitt, deals with "Biometrical Approaches to Evolution and Behavioral Development". Here, S. J. Arnold presents theoretical considerations regarding the inheritance and evolution of behavioral ontogenies. Furthermore, N. D. Henderson introduces the diallel-cross design and J. K. Hewitt discusses some intriguing parallels between changes in genetic control during learning processes and development. This part is concluded by two chapters dealing with human behavioral development; R. P. Corley and D. W. Fulker analyze data from adoption studies, whereas L. Eaves et al. present some approaches, employing path analysis, that might aid in the analysis of the results of behavior-genetic studies of human behavioral development.

The fourth and last part of the book is introduced by J. K. Hewitt and contains three chapters by the four editors themselves, in which they strongly advocate the above-mentioned necessity for integrating approaches and methods from a number of disciplines to address questions concerning behavioral development. The book is completed by a detailed subject index, although an author index, unfortunately, is wanting.

I strongly recommend this book to anyone interested in developmental processes in general and behavioral development in particular.

W. E. Crusio, Paris

Wiener, G. (ed.): Animal Genetic Resources – A Global Programme for Sustainable Development. FAO Animal Production and Health Paper 80. 1990. 300 pp. Soft bound $ 30.00.

This book contains the recommendations and papers of a gathering of experts held under the auspices of the Food and Agriculture Organization of the United Nations (FAO) in Rome, Italy, September 1989. The following topics, all bearing on various aspects of a global programme for the preservation of animal genetic resources and the necessary infrastructure for this, were covered: institutional and legal aspects, technical problems associated with the preservation of animal genetic resources, live animal preservation, world watch list and early warning system, technical and organisational aspects. The papers were prepared by experts from all regions of the world and they covered all species of domestic animals.

There are two very important reasons why populations deserve to be preserved: the endangered status and the genetic value. However, this gathering adopted a more general definition of Animal Genetic Resources, and this definition included not only scientific views, but also economic and cultural viewpoints. The "Expert Consultation" recognized that there is no single method of preservation that is optimal for all situations.

The book is directed in particular to politicians and experts having an interest in the strategies for preserving animal genetic resources all over the world.

D. Sumpf, Rostock