

## Book reviews

Gelvin, S. B.; Schilperoort, R. A. (eds.): *Plant Molecular Biology*. 1st edn. Dordrecht, Boston, London: Kluwer Academic 1988. Ring binder Hfl 110.00.

While we have had no shortage of lab manuals dealing with molecular biology in general, no such manual was available on plant molecular biology – until now. The book under review covers most of the established methods in this area. Well-known specialists have contributed, e.g., N. H. Chua (Rockefeller), who reports on gene expression in transgenic plants. The manual is published as a ring binder, and periodical updating is planned for the future.

The manual is organized into three sections: the introduction of DNA into cells, the expression of genes, and the fate of introduced genes. In my opinion, the sections have a wider scope than their titles suggest. The following complete list of methods, dealt with in sections one and two, may be regarded as proof of this: direct DNA transfer to protoplasts, cointegrating Ti-plasmid vectors, binary vectors, *Agrobacterium* molecular genetics, leaf disc transformation, extraction of DNA from plant tissues, constructing ds-cDNA and genomic clone banks, selectable and screenable markers. The second section includes reports from areas as different as reporter genes, chromatin structure, DNA methylation, gene expression in transgenic plants, subcellular targeting of proteins, isolation of total and poly-somal RNA, and the use of *Xenopus* oocytes for the translation of RNA. The third section contains only two reports.

Each report consists of an introduction followed by a detailed experimental protocol and a list of references. In my research group, the manual found its way to the lab within a few hours after its arrival.

F. Herzfeld, Hannover

Loeschcke, Volker (ed.): *Genetic Constraints on Adaptive Evolution*. Berlin Heidelberg New York: Springer 1987. 188 pp., 52 figs., 14 tabs. Hard bound DM 89.–.

Many popular evolutionary concepts are based only on phenotypic characteristics and thus ignore genetic constraints on adaptive evolution. The main aim of this volume is to present a comprehensive critical discussion of these genetic constraints with approaches and contributions from the different, relevant fields: quantitative genetics, population genetics, ecological genetics, and molecular genetics. In the preface, the editor outlines the main objectives of this volume: "The fundamental theorem of natural selection, however, is based on simplifying assumptions that are often violated by a number of phenomena related to genetic constraints. By genetic constraints on adaptive evolution is meant genetic factors which prevent the direct access to the optimum phenotype through natural selection". A critical discussion of such genetic factors must include: genetic transmission, genetic and population structure, mode of selection, breeding system, relation between genotype and phenotype, effects of linkage and pleiotropy (genetic correlations), consequences of the absence of genetic variability, non-randomness of spontaneous mutations, epistasis, and developmental organization resulting in non-linear mapping from genotype to phenotype. Crucial points of this general view on genetic constraints on adaptive evolution are (1) the organization and the maintenance of quantitative genetic variation; (2) a discussion of the

substantial relations between genetics, ecology, and evolution and (3) a study of the processes connecting genotype and phenotype.

This volume contains the papers presented at a symposium on "Evolutionary Constraints in Ecology", held at the 4th International Congress of Ecology at Syracuse, N.Y. in 1986. Some other contributions were included to broaden the scope of a general discussion on genetic constraints on evolutionary processes.

In this book review, a citation of the headings of the different chapters may be sufficient to give some further insight into the contents of this volume: "A quantitative genetic perspective on adaptive evolution" (Barker and Thomas); "Genetic correlations: the quantitative genetics of evolutionary constraints" (Clark); "Genetic constraints on the evolution of phenotypic plasticity" (Via); "Reflections on the genetics of quantitative traits with continuous environmental variation" (van Noordwijk and Gebhardt); "Three approaches to trade-offs in life-history evolution" (Rose, Service and Hutchinson); "Pleiotropy in dynamical parameters of models on the evolution of simple phenotypes" (Christiansen); "Constraints in selection response" (Scharloo); "Nonrandom patterns of mutation are reflected in evolutionary divergence and may cause some of the unusual patterns observed in sequences" (Golding); "Genetic constraints on plant adaptive evolution" (Schaal and Leverich). After reviewing the main content of this volume, some further comments shall be added:

In most publications consisting of contributions by several authors, it is often very difficult to get a consensus of emphasis and a homogeneous style of presentation. In this volume, the editor and authors have succeeded in solving this problem. All contributions are excellently written in a very informative and concise style with figures which have been carefully designed with clear and descriptive headings. The mathematics and statistics involved have been restricted to a moderate level – laborious derivations and extensive formalisms have not been included. Emphasis is given to the application of these mathematical and statistical tools and to techniques in modeling and formulating the biological problem. Nevertheless, the reader should be familiar with some basic facts of mathematics and statistics, for example: differential equations, matrix algebra, recurrence equations, and elementary probability and statistics. Necessary special results from evolutionary biology as well as details from population genetics and quantitative genetics theory have been also kept to a moderate level.

Each chapter of this volume ends with an extensive list of references that provides the reader with the possibility for advanced and extended studies. In spite of this large number of cited references, some recent publications having an important bearing on *Genetic Constraints on Adaptive Evolution* are missing; for example: Mayo, O.: Natural selection and its constraints. Academic Press, London New York 1983. None of the reference lists of the nine chapters has included this recommendable book whose content is of intimate connection with the topics and approaches discussed in the present volume.

Finally, I want to characterize this volume as stimulating and fascinating. I enjoyed reading it. I am sure any biologist with an interest in the problems of evolution will confirm this opinion.

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