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Book reviews

Basic Cloning Procedures. Valdis Berzins (ed.). Springer, Berlin. 1998. Pp. 169. Price £37.50, spiral-bound softback. ISBN 3 540 63539 4.

There is now a considerable number of practical manuals which deal with the general area of molecular biology, and more appear every year. *Basic Cloning Procedures* is the latest offering from Springer, who already publish some 40 laboratory manuals covering such diverse areas as *Analytical Supercritical Fluid Extraction* and *Polymer Fractionation*. Many of these are on molecular biology subjects, some specific (for example, *Gene Transfer to Plants* and *PCR: Protocols for Diagnosis of Human and Animal Viral Diseases*), and some more general (for example, *Plant Molecular Biology*). *Basic Cloning Procedures* purports to fall into the second category and would at first sight appear to be an ideal recipe book for someone who is new to the molecular biology area.

So here I am, armed with a carrier bag full of leaves and *Basic Cloning Procedures* and ready to isolate RNA to use in cDNA library construction (the first chapter is on cDNA synthesis and cloning). After a reasonable introduction to RNA isolation, poly(A) RNA libraries and RT-PCR, and a comprehensive list of materials needed, I turn to the procedure page… 'Step 1: Collect 5×107 hybridoma cells producing mouse monoclonal antibody s-26 (IgG1, x) against preS2 antigen of Hepatitis B virus in 1.5 mL centrifuge tube and remove supernatant…' What are the odds of any reader happening to work with hybridoma cells producing mouse monoclonal antibody s-26? Absolutely no mention is made of the fact that the starting material may be somewhat different, and no attempt is made to suggest alternative methods. However, once total RNA has been isolated, procedures for isolation of mRNA and other downstream procedures are not dependent on the nature of the starting material.

The next seven chapters cover the following: DNA sequencing, RNA *in vitro* synthesis by phage T7 DNA-dependent RNA polymerase, PCR-based site-specific mutagenesis, analysis of specific protein-DNA interactions, gel electrophoresis, transfer and hybridization of nucleic acids, immunological methods for analysis of recombinant proteins, and lastly, protein synthesis in cell-free systems. This list is not coherent and does not comprise a collection of the important 'basic cloning techniques'; it presumably reflects the interests of the authors from Latvia and Lithuania. Obvious basic techniques which are omitted include restriction digestion of DNA, phage work, and library screening.

Molecular biology methods are evolving rapidly; new techniques appear which add to the existing ones. One reason for publishing another lab. manual is that new techniques are described (remember the flood of PCR methods books?). This book does not describe new techniques and indeed some of the methods, such as that on DNA sequencing, are quite dated. Given the price tag of £37.50 and the strange collection of methods, I can see no reason to buy this book. For an inexpensive book on cloning methods, there is much to recommend *Essential Molecular Biology* in the excellent *Practical Approach* series. Alternatively, one can do no better than 'The Red Book' (*Current Protocols in Molecular Biology* by Ausubel *et al*.) or 'Maniatis' (now by Sambrook *et al*.) if a really comprehensive manual is required.

On the plus side, *Basic Cloning Procedures* has some useful introductory theory to the methods, provides specimen results (for example, photographs of gels) and has trouble-shooting guides in each chapter.

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Mutation Breeding: Theory and Practical Applications. A. M. van Harten, Cambridge University Press, Cambridge. 1998. Pp. 353. Price £75.00, hardback. ISBN 0 521 47074 9.

It is very seldom that a scientific book can be presented in such a nice narrative form. The book is full of history and more clearly said sentiments. This is most probably the first and only book on induced mutations so deeply based on history and chronology of discovery. Even chapters related to types and uses of physical and chemical mutagens are full of citations referring to various meetings, seminars and symposia mainly organized by the Plant Breeding and Genetics Section of the Joint FAO/IAEA Division and thus presents, to some extent, the history of the Section. Nevertheless, this historical aspect, although so detailed, could be expanded to include information on the first phase of the organization of mutation breeding activity in the FAO and IAEA, especially through the activities of B. Sigurbjörnsson, the organizer and first Section Head and the intellectual father for the future

scientific strategy of the Section (Sigurbjörnsson *et al.*, 1966; Sigurbjörnsson, 1971).

The subject of the book, as clearly indicated by the title, is limited to the application of induced mutations in plant breeding, so called 'mutation breeding'. Consequently, the book focuses more on topics related to the development of mutant varieties than on the creation of biodiversity by mutagenic treatment. The book covers mainly the period from the early 1940s to 1990, the year of the FAO/IAEA Symposium on Plant Mutation Breeding for Crop Improvement, Vienna. The Symposium summarized and, to some extent critically evaluated, the entire concept of 'mutation breeding'. From this period, the work on induced mutations has become much broader and has also moved in the direction of the application of various mutation techniques and connected modern biotechnology to the creation and analysis of genetic variability, which is desired for breeding programmes. It is difficult to use the term 'mutation breeding' in relation to creation of mutants for molecular analysis of gene structure and function.

The historical approach taken most probably led the author to a rather traditional presentation of some concepts and terminology. The author is referring to Hugo de Vries and his 'Die Mutationstheorie' (1901) in using the term 'artificially induced mutations'. How will mutations obtained by transposition of transposons be classified? Will it not be enough, in the era of molecular biology, to say 'induced mutations'? Similarly, the concept of macro- and micromutations will be difficult to explain in molecular terms.

The author has paid special attention to an explanation of chimerism in seed propagated plants and has produced a critical evaluation of the concept of diplontic selection. According to my knowledge this is the first such broad attempt to correct the concept of diplontic selection which generates a serious problem in understanding the genetic structure of M_1 plants and specific segregation ratios in the following generation. Unfortunately, current knowledge on architecture and programming of shoot meristem was not used in this explanation to support genetic results against diplontic selection (Hake & Char, 1997).

The book will be much desired on the shelf of young undergraduate and graduate geneticists and plant breeders. There is also no doubt that everyone who has been working on application of induced mutations in crop breeding programmes will read this book with great pleasure, admiring its attractive style of presentation and the enormous amount of well organized data on the golden age of mutation breeding.

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Molecular Genetic Analysis of Populations — A Practical Approach (2nd edn). A. R. Hoelzel (ed.). IRL Press (Oxford University Press), Oxford. 1998. Pp. 445. Price £29.95, paperback. ISBN 0 19 963635 4.

A text detailing the main approaches to molecular genetic population analysis is a vital resource for researchers in this area. Chapters authored by different workers have been assembled and each includes background information and principal applications of the techniques. Suggested protocols are complemented by clear diagrams and photographs.

The book contains chapters describing established molecular approaches such as restriction fragment length polymorphism (RFLP) and sections illustrating recently developed applications in greater detail. Appendices of restriction enzymes, statistical methods and Internet homepages are included. For the past 30 years, investigation of population genetics has concentrated on allozyme variation and many of the statistical tests were derived for this system. The principles of gel electrophoresis in relation to allozymes are summarised. Mitochondrial DNA extraction and analysis is covered but much of the detail present in the first edition has been removed. The practicalities of DNA library construction and screening are described; however, the direct relevance of these procedures to population biology is not clearly stated.

The second edition marks a change of emphasis towards PCR-based techniques, reflecting the increasing use of genetic information to answer questions in population biology. PCR is a detailed procedure and other texts should be consulted in conjunction with this chapter. Determination of microsatellite variation has provided important information about many species. Mutation models are defined and comparisons of different methods available for microsatellite characterisation are made. Automated fluorescent detection, although expensive and complex, has advantages over radiolabelling methods, by removing the need for radioisotope use and allowing improved data processing. The importance of single strand conformation polymorphism (SSCP) and denaturing gradient gel electrophoresis (DGGE) for paternity testing, allele assignment, and determination of mutation rate is detailed and contrasted with the limitation of low between-population discrimination power. The application

of DNA fingerprinting to examine reproductive behaviour and success and to investigate populations having undergone putative genetic bottlenecks is described.

This book provides a useful basis for molecular genetic population analysis for undergraduates and postgraduates requiring an introduction to the techniques involved. However, it could be improved by a more direct focus on population genetics rather than on general molecular techniques. Increased clarification of the aims of the text would be facilitated by the inclusion of a summary of the population biology questions that can be addressed using molecular methods, and the addition of a concluding chapter evaluating the relative importance of different techniques and suggesting future research directions in this field.

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Foundations of Social Evolution. Steven A. Frank. Princeton University Press, Princeton, NJ. 1998. Pp. 268. Price £13.95, paperback. ISBN 0 691 05934 9.

Genetic Engineering: Principles and Methods, Vol. 20. Jane K. Setlow (ed.). Plenum Press, New York. 1998. Pp. 292. Price $95.00, hardback. ISBN 0 306 45911 6.