

completely replaced the ultracentrifuge for the exploration of the shapes of nucleic acid molecules.

All molecular biology laboratories operate a series of protocols for the preparation and running of electrophoretic gels that newcomers must quickly learn. This book provides a primer for the uninitiated in the use and application of electrophoresis. It begins with some very basic theory on the physical principles and then discusses in general terms the choices to be made between media (agarose, polyacrylamide), conditions (native, denaturing) and mode of operation (vertical, horizontal) as well as methods of detection (staining, autoradiography, blotting etc). It then moves on chapter by chapter to consider the specific uses of native and denaturing agarose gels, native and denaturing polyacrylamide gels and pulse field gels. In these later chapters the methods are illustrated by specific examples — so-called 'research applications'. Along the way a number of methods in common use are introduced, such as DNA sequencing, analysis of DNA-protein interactions by electrophoretic retardation and footprinting, and the detection of polymorphisms.

I think that this book would be most useful to an undergraduate student who is about to embark on an extended project in molecular biology. In general it is written at such a basic level that anyone using the techniques will grow out of it very quickly. Despite this, there are no practical protocols given, and the reader is directed to those found in Sambrook, Frisch & Maniatis (1989) and manufacturers' handbooks.

I feel that there are a number of limitations to the book. Given that the entire technique rests on an analysis of migration through gels, the theory is quite superficial, with very little reference to theories such as the classical analysis of Lumpkin and Zimm, and later approaches. An important aspect of gel electrophoresis of nucleic acids has been the analysis of molecular shape, such as that of bent and branched DNA molecules, which is neglected. The execution of the technique is simple, yet it has proved extraordinarily powerful in such systems, and has always provided a reliable description of global shape when further analysed by other biophysical methods. Gel electrophoresis has been central to the study of the topological properties of circular DNA, and hence in the analysis of site-specific recombination reactions for example.

Quantitation of material in gel bands is critical to many applications, but this is hardly discussed. For example, while gel shift methods are covered in terms of crude cellular extracts, the estimation of association constants using purified proteins is not. Some guidelines on the pitfalls to avoid in this process would be very useful. I found it surprising that in the chapter devoted to detection, the phosphorimager only merited the most cursory mention. Yet this is the source of most quantitative data from gel electrophoresis.

Finally, the great resolving power of gel electrophoresis is commonly exploited as a purification tool; it is generally superior to HPLC methods in this regard. This requires the recovery of DNA and RNA in a form that can be

used in further manipulations. There are many ways this is done in different laboratories, to say nothing of the myths that abound. Some review of these methods would be useful, and would certainly fit in with the other techniques presented.

In conclusion I feel that this book will be useful to the real beginner in practical molecular biology, but would have been more widely read if it had been pitched at a somewhat higher level. How many people will be willing to pay £17.95 for a book that they will probably discard after a few months is hard to judge, but they might prefer to spend the money on more general practical guides.

References

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Wheat Rusts – An Atlas of Resistance Genes. R. A. McIntosh, C. R. Wellings and R. F. Park. CSIRO Publications, Melbourne. 1995. Pp. 208. Price £63.00, hardback. ISBN 0 643 05428 6.

Nearly all wheat researchers, breeders and pathologists will know Bob McIntosh, the senior author of *Wheat Rusts – An Atlas of Resistance Genes* for the invaluable service he has provided for over 25 years in producing the annually updated *Catalogue of Gene Symbols for Wheat*. An extremely important part of this comprehensive list of all published genes, DNA and protein markers in wheat is the section dealing with pathogens. The new *Atlas* brings together a wealth of information accumulated by Bob McIntosh, his past colleagues and present co-authors, Colin Wellings and Robert Park, on the rust diseases of wheat.

The main aim of the book is to provide comprehensive information of all known genes for resistance to stem rust (*Puccinia graminis*), leaf rust (*Puccinia recondita*) and stripe rust (*Puccinia striiformis*) in wheat and triticale, with the aim of helping breeders in their continuous battle to reduce the potentially devastating yield losses that can be caused by rust epidemics. For more than one hundred recognized rust resistance genes comprehensive details are given for chromosome location, infection type, environmental variability, origin, pathogenic variability, varietal reference and source stocks and potential agricultural uses of the gene. All genes are illustrated with colour plates of infection types to help with gene identification. In addition to the main catalogue of resistance genes the book also contains a well presented introduc-

tory chapter on wheat rusts and the genetic bases of disease resistance.

The comprehensive descriptions of all known genes for rust resistance in wheat and triticale will prove to be of immense value to breeders striving to improve levels of genetic disease resistance in plants and reduce our dependence on costly and environmentally damaging chemical methods of disease control. An immense amount of work must have been involved in producing the clear and informative colour plates used to illustrate the vast array of host-pathogen interactions described. It is a pity that for the one plate that I have personal knowledge of (plate 4-16 illustrating *Yr16*), the infection types are illustrated in the reverse order to that given in the figure legend. I am sure, however, that this is an unfortunate mistake due to the authors being less familiar with this material.

Whilst the information presented throughout most of the book is extremely comprehensive I was disappointed with the descriptions given for disease assessment. The descriptions of adult plant assessments seemed particularly vague. A clear summary table showing location of resistance genes to each of the 21 wheat chromosome pairs would also be useful.

I am sure that the book will serve as an indispensable reference for wheat rusts for many years.

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