

between species following domestication. Dvorak reviews our present understanding of molecular diversity in plants and debates future directions of research. There is some interesting discussion about both the neutrality of RFLP alleles, given that many seem to have insertional origins, and also the rapid changes in copy number in certain multigene families in response to stress environments. The consequences of transposon-induced changes in maize and the extent and adaptive causation of molecular variation with particular reference to serine protease inhibitors are considered in the final two chapters of this section by Nelson & Nei respectively.

The second section, on Evolutionary Processes, opens with an interesting review of plant mating systems and the methods used for their characterization (Brown). Hastings examines the theory and experimental evidence for epistatic selection and linkage disequilibrium in populations, and argues that the evidence for the importance of this type of selection in all populations is strong. The study of the inheritance of quantitative traits in natural populations is of central importance to evolutionary studies but very difficult to achieve in practice. In a chapter titled 'Gene identity and the genetic demography of plant populations' Ritland explores the possibility of using a combination of marker loci and quantitative traits as a partial solution to these problems. This is an approach which deserves further consideration given the strong case presented by Ennos of the need to move away from simple population models towards complex interacting ecological systems. Such approaches, he argues, are necessary to develop a more predictive theory of population change. The importance of diversity in natural or agricultural populations for reducing disease losses is critically reviewed by Burdon & Jarosz. They emphasize that the apparently small yield increases achieved in mixtures despite considerable disease reduction may be misleading, while the costs and benefits of resistance/virulence to the host/pathogen deserve closer scrutiny. The final two chapters in this section consider aspects of population dynamics. The first by Epperson reviews the recent statistical methodology for spatial pattern analysis and explores theoretical results from defined situations of selection and gene flow. Barrett & Husband emphasize that, while a good formal theory exists to understand migration and colonization, we are still woefully ignorant about effective population size and migration rates in natural populations.

The final section on Breeding & Genetic Resources opens with a chapter on forest tree improvement, principally looking at reproductive patterns using isozymes. These reveal fertility selection with selfed progeny failing to reach maturity and conflicting patterns of within- and between-population variation as revealed by isozymes and quantitative traits (Muona).

Weber, Qualset and Wricke examine selection strategies for autogamous species, comparing the efficiencies of a variety of selfing and backcrossing systems. The problem of alien gene transfer, particularly for quantitative traits, is illustrated through *Phaseolus* breeding (Bliss). As well as the normal problems of untested germplasm and linkage to undesirable alleles, the difficulties of predicting the expression of favourable alleles in diverse genotypes and environments are emphasized. Stuber provides a useful account of the advantages of molecular marker-aided selection for quantitative traits and provides empirical evidence for its potential in his own maize experiments. The book finishes with reviews of the role of quantitative genetics (Mayo) and of future strategies in genetic resource management (Marshall).

This compilation is a very valuable addition to the plant genetic/breeding literature, and the editors are to be commended for bringing together under one cover such an interesting collection of papers. It will be most useful to breeders and geneticists both in teaching and research.

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DNA Replication: in Focus. By ROGER L. P. ADAMS.
Oxford: IRL Press. 1991. 86 pages. £6.50 paperback. ISBN 0 19 963216 2.

This book is one of a series specifically designed to enable students to keep up to date in key areas of biology and medicine. It should prove particularly useful to honours students, Ph.D. students and researchers who have an interest in DNA replication. It covers many aspects of the field and includes a good set of references, many as recent as 1990. It also directs the reader to problems that still have to be resolved and puts forward some challenging viewpoints.

DNA replication is an all-embracing subject, which has been studied in a vast number of viral and cellular systems, each with their own peculiarities. This makes the organization and cohesion of a small book on the topic extremely difficult.

The book starts with an introductory overview of the topic, which provides a framework upon which the later chapters are based. The need for brevity in a book such as this, however, has its drawbacks. I feel that a slightly enlarged first chapter would have allowed a fuller explanation of the basics of DNA replication and better prepared the less knowledgeable reader for the later chapters.

The second chapter describes the enzymes involved in DNA replication in some detail and discusses their concerted action at the replication fork. This is followed by chapters on the initiation of replication at

defined origins and, in particular, initiation in eukaryotic systems which contain multiple origins of replication. This latter section is particularly noteworthy for its emphasis on the experimental approaches used in studying eukaryotic origins and its discussion of possible roles for matrix attachment sites. The book concludes with chapters on termination of DNA replication, a topic often ignored when discussing DNA replication, and the packaging of DNA in nuclei.

The book is well cross-referenced, and constant referral to information contained elsewhere in the book gives rise to an integrated picture of DNA replication. A strong attempt is also made to place DNA replication within the context of cell cycle control, and much space is given to the temporal regulation of DNA replication and gene expression and how the two processes of replication and transcription can be integrated.

An aspect of the book I found particularly welcome was the lack of a specific division between prokaryotic and eukaryotic DNA replication. While acknowledging differences between the systems, and indeed between viral and cellular systems, it is the common aspects which are stressed.

A problem frequently encountered by newcomers to the field of bacterial and viral DNA replication is the terminology used to define the proteins involved. Most proteins involved in replication in these systems were originally defined in terms of mutations affecting particular genes, thus for *E. coli* we have DNA A, B, C, ... and so on referring to particular gene products. The author avoids unnecessary confusion by referring, where possible, to protein function, e.g. DNA B is referred to as DNA B helicase.

One the whole I feel Roger Adams has managed a difficult task quite well. The large number of informative diagrams used to supplement the concepts presented in the text are particularly valuable. One of the strengths of the book, however, is its use of recent published data, which brings a freshness to the issues discussed. Our knowledge of DNA replication, especially in eukaryotes, is currently expanding at a tremendous rate. The publishers will be doing a great service if they take account of this and bring out a second edition of this book in a few years' time.

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