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Book Reviews

The genetics and biology of *Drosophila* Volume 3d. M. Ashburner, H. L. Carson and J. N. Thompson, Jr. (eds). Academic Press, Orlando, Florida. 1983. Pp. xiv+382. Price $95.00 US.

This book is number four, in volume 3, in the series on the Biology of *Drosophila* published by Academic Press. The books in this volume have dealt with a range of topics, broadly in the fields of taxonomy, evolution and ecology, each one containing an unrelated collection of chapters. This book is composed of a similar collection of chapters ranging from methods of collecting *Drosophila* to the ecology of flower-breeding *Drosophila*. All the chapters contain a wealth of information useful to the *Drosophila* worker and also to many other biologists.

Chapter 27 (the first in this book) by Hampton Carson and Bill Heed is a useful and entertaining account of traps, bait, nets and containers. I feel that too much emphasis was placed on efficiency and the size of collections obtained. Most trapping methods distort the natural frequency of *Drosophila* species in the community and in addition "large" baits distort local distribution and abundance. For many ecological studies smaller, less efficient, baited traps are required.

Chapter 28 by Charles Taylor and Jeffrey Powell is a nice review of the population structure of *Drosophila* bringing together both the genetic and ecological approaches to the problem. The discussion is confined to the adult populations only and does not encompass the pre-adult distributions.

Chapter 29 by Philip Hedrick and Elizabeth Murray is devoted to selection and measures of fitness while Chapter 30 by Jean David and his colleagues at Villeurbanne is about the effects of light, temperature, water and food on development, growth and other physiological traits.

The interesting topic of seasonability and diapause in drosophilids is reviewed in Chapter 31 by the Finnish workers Jaakko Lumme and Seppo Lakovaara. Their laboratory at Oulu has made a significant contribution to this area and the chapter is an important one for all population biologists. In contrast to most laboratory populations of *Drosophila*, all temperate species have rather few generations a year (one to six depending upon species and location) and each generation experiences different climate, resources and competitors. The genetic consequences for these real populations may be somewhat different to those of the stable laboratory system.

Those geneticists who still think that nothing is known about the ecology of wild drosophilids should read the last two chapters. These detailed accounts of the tropical African species by Daniel Lachaise and Leonidas Tsacas and the flower-breeding *Drosophila* by Danko Brncic are excellent. In particular, I enjoyed reading the account of the 35 African fig-breeding species which show a range of specialisation from monophagy to complete opportunism. In addition, both these chapters contain useful summaries of all work carried out on their respective groups.

In conclusion I will say that all the chapters are of a high standard and the book forms yet another useful addition to a series that has become a major source of reference for *Drosophila* workers. It is a pity they are so expensive.

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Plant genetic engineering. John H. Dodds (ed). Cambridge University Press, Cambridge. 1984. Pp. vii+312. Price £25.00, $39.50 US.

The development of plant transformation has led to numerous research programmes aimed at producing genetically improved crops. However, two major challenges still face these attempts. First, the routine introduction of DNA sequences into most crop plants is still not possible. This is largely because of the technical difficulties involved in the tissue-culture and regeneration of most crop plants. Secondly, there are great difficulties in the identification and isolation of genes which would confer desirable and relevant properties when introduced into plants. This book addresses these challenges in two broad sections.

The first section deals with current techniques in tissue-culture and plant transformation. Most of the chapters are concise and the chapter on the use of *Agrobacterium* as a vector system is particularly well written and clear. Unfortunately, one major technique of plant transformation, the direct uptake of DNA by protoplasts, is not dealt with in the book.

The second section of the book contains descriptions of some particular genes and how they might be usefully modified for introduction into plants. One chapter discusses the possibility of modifying the genes for ribulose bisphosphate carboxylase in order to increase photosynthetic efficiency. There is also an excessively long chapter on seed storage protein genes which comprises almost half of the entire book. Even though storage proteins can represent up to 50 per cent of seed dry weight, they do not warrant a similar proportion of the book. This space would have been better used for describing other genes which may be useful in crop modification. For

example, the book might have included a chapter on approaches to modifying plant disease resistance or on new approaches to plant gene isolation such as transposon-tagging. These subjects are dealt with too briefly in a final general chapter on various agricultural applications of genetic engineering.

It is difficult to recommend this book as a whole to readers interested in general aspects of plant genetic engineering unless they are fascinated by the details of seed storage proteins. However, the book does contain some good concise reviews of certain areas and problems in current plant research.

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Advanced molecular genetics. A. Pühler and K. N. Timmis (eds). Springer-Verlag, Vienna. 1984. Pp. ix+347. Price DM89.00.

Like all good cookery books, the recipes in successful laboratory practical manuals are culled from many sources. Participants in popular practical courses offered by many laboratories bring back the manuals which are then commonly circulated around departments in photocopy form, losing their legibility as yet more copies are made. Eventually (as they are always the last to see a potential market) the publishers take over.

Advanced molecular genetics arises from some courses sponsored by the European Molecular Biology Organisation leaning heavily upon the expertise of the individual instructors. The emphasis is upon the manipulation of bacterial plasmids and the examination of their protein products. In the description of the examination of whole plasmid DNA by agarose gel electrophoresis more care should have been taken over the correct identification of CCC, OC, linear and multimers. This is always a hazard to the inexperienced. However, this apart, the general description and background information are very good. It is a pleasure to see some microbial genetics in this manual—the successful cloning and expression of genes requires careful thought about the genotype of the recipient strains. Transduction by bacteriophage P1 does, however, require Ca^{2+} for adsorption.

Some of the techniques described are already somewhat dated, an indication of the rapid advances that are being made in the field of molecular biology. Many people are now using *in vitro*, directed mutagenesis, to identify sequences of importance, whereas a belt-and-braces method of hydroxylamine mutagenesis is described. The description of the use of bacteriophage lambda is annoyingly short and lacks any mention of the vectors which use the *spi*$^-$ phenotype for selection of recombinants. I must spend several hours every week explaining this to people, and so would have welcomed an easily understood treatment—not many people can read Lambda II. One omission is that of transcriptional mapping using S1 nuclease. This is a very commonly used technique and, given the objective of this manual, would have been an asset.

It must be stated that this book has not been produced as a competitor to the Cold Spring Harbor Manuals. Rather it complements them by introducing some more specialist techniques with organisms other than *Escherichia coli*. There is overlap, the chapter on DNA sequencing for instance, but this is an excellent account. On the other hand some of the less common pastimes, *e.g.* electron microscopy, are covered. It is a very useful book, and was in my laboratory before the review copy arrived. Whilst it may be possible to write the definitive treatise upon the theory of a scientific discipline, there will never be the same accolade for a practical manual. Otherwise, Elizabeth David would have given up many years ago.

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Developmental biology of higher fungi. D. Moore, L. A. Casselton, D. A. Wood and J. C. Frankland (eds). British Mycological Society Symposium 10, Cambridge University Press, Cambridge. 1985. Pp. xii+615. Price £70, $99.50 (US).

The title of this volume, a printed version of a symposium held in Manchester in 1984, is misleading. Of the 27 chapters, only about two-thirds relate to the title of the book. The others include topics as diverse as resource relations, fine structure of mycorrhizae, strategies for mushroom breeding, composting technology, and secondary metabolic products of selected agarics. Amongst the chapters which do relate broadly to the title, the following held my interest:

Wheeler (Chapter 4) deals with the fascinating problem posed by *Crinipellis perniciosa*, a pathogen of cocoa. The monokaryon is difficult or impossible to grow in culture, possibly because in this state it is biotrophic, but the dikaryon, which is apparently non-parasitic, can readily be grown in culture. Does the living host in some way inhibit dikaryotisation?

In Chapter 5, Dighton and Mason discuss the population dynamics of sheathing mycorrhizal fungi in relation to the age of stands of their hosts, and provide a stimulating, thought-provoking review on "i"-"K"-"A" adaptive strategies.

Moore (Chapter 7) reviews variations in dolipore structure in different groups of Basidiomycetes, and also the development of dolipores.

Dikaryon formation is discussed by Casselton and Economou (Chapter 8) in relation to the effects of B-factor mutation and recombination of mitochrondrial genomes.

Rayner *et al.*, (Chapter 10) survey the little-explored morphogenesis of vegetative organs, pointing out the