

Book reviews

Reproduction in Fungi: Genetical and Physiological Aspects. Charles G. Elliot. Chapman and Hall, London (1994). Pp. 309. Price £35.00, hardback. ISBN 0 412 49640.

It is a very substantial task for a single author to provide a comprehensive review of our current knowledge of the genetics and physiology of reproduction in fungi. In this text, Charles Elliot has gone a long way towards achieving this aim. He has produced an in-depth analysis of the subject, which illustrates the inter-relationships between environmental stimuli, biochemical products and gene function in the regulation of sexual reproduction within the fungal kingdom. The aim of the book was not to provide an exhaustive review, but to illustrate the concepts. In places these concepts are somewhat buried amongst the detailed examples. Also, several systems, including *Schizosaccharomyces pombe* and the Myxomycetes, are not described.

Following a short introductory chapter, in which the reasons for sexual reproduction are considered, chapters 2, 3 and 4 describe the well-established genetic systems of the filamentous Ascomycetes, the Basidiomycetes and the Hemiascomycete *Saccharomyces cerevisiae*. Our current understanding of the structure and function of mating type genes is also discussed. This is followed in chapter 5 by an analysis of the genetics of conidium and ascocarp development, in which *Aspergillus* and *Neurospora* are used to provide detailed examples. Subsequently, in chapters 6 and 7, reproduction in the Zygomycetes and the Oomycetes is discussed. Although our understanding of the genetics of members of these groups is much more rudimentary, analysis of the hormonal control of sexual reproduction provides some interesting insights. Nutritional and environmental signals play an important role in fungal development, and their known effects on reproduction are covered in chapter 8. Chapter 9 focuses on our knowledge of the physiological and morphological processes involved in the development of fruiting bodies in the Basidiomycetes. Finally, chapter 10 provides a useful summary, which draws together strands from the whole of the text and identifies fruitful areas for further research.

Overall, the text is well organized and presented. In particular the summary at the end of each of the major chapters will be invaluable to students. Although I am not an advocate of microscopic figures, several figures seemed disproportionately large in relation to those in the rest of the book. Inevitably, it is not possible to include the very latest developments in such a book. For example, recent advances in understanding the mating type loci of *Ustilago maydis* are not described. In my opinion, the single major omission is the lack of a glossary, which would be of tremendous value to the non-specialist reader. This would have been a useful replacement

for the author index, which I found to be very frustrating since it only referred to the first authors of cited papers.

This is a specialist text which assumes a good working knowledge of the fungi. It will be essential reading for final year undergraduates and researchers in this field, as well as being a valuable asset to library collections.

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Gene Mapping: Using Law and Ethics as Guides. George J. Annas and Sherman Elias. Oxford University Press, Oxford. 1992. Pp. 291. Price £35.00, hardback. ISBN 0 19 507303 7.

The first thing that came to mind when asked by *Heredity* to review *Gene Mapping – Using Law and Ethics as Guides* was why a British journal, in which I've never published and probably never will, sent *moi* this book. The second thought after reading the jacket cover and checking the copyright date, a habit from my public school days, was why a 1993 review of a 1992 edition. Now that it's 1994 and I'm finally seated (listening to Rod Stewart's *Unplugged and Seated*) the second question has answered itself, but the first remains a mystery though not on a par with anything that would concern Inspector Morse. However, there was this supper at Bob Williamson's flat with ... hmm, let's think about that while we get on with the review.

Once mass times momentum was overcome, this was an enjoyable and educational read. Annoyingly, the book is broken into six sections that contain a total of seventeen chapters but includes no page of contents. It makes navigating the book like travelling in London without taxis or making the tube colourless. In the first section, a fleeting parallel is drawn between the impact of past big-budget hard science (physics and engineering) projects, like the Apollo programme, but more aptly the Manhattan Project, with the possible unforeseen societal effects of the Human Genome project. I wish more time had been spent here, describing this first opportunity for biologists (who have long been made to feel like second-class citizens in the science community) to flex their collective muscles. Also, I wonder if the authors sensed two years ago a growing resentment amongst biologists with the continuing success of these hard scientists to technologically retool and compete for public and private funding in this new biomedical and biotechnological age. The description of minimal standards for the establishment of a DNA 'gene bank' includes some lofty ideals. Although these

are ethically sound, they would virtually assure failure at most investigator-driven academic institutions where research is tantamount and personnel and finances for managing such a bank are dwindling. Has Victor McKusick ever written anything that isn't good? His chapter is a highlight not only for people outside the field of biology who need an introduction to the principles of gene mapping and the application of information gathered to biology and medicine, but for those of us within the field who are deluged with questions about this project, but often have not thoroughly thought about our answers.

The second section, entitled 'Social Policy Issues' consists of three chapters which were my favourites. The highlight is Judith Swazey's attack of the Genome Project as 'a fascinating example of how the reductionistic world view of molecular biology is fused with a secular utopianism that has been particularly characteristic of the American experience.' This may be *the* politically correct chapter of biology in the 90s, yet her text is thought-provoking and extremely well-written.

The third section concerns itself with the human genome project and the human condition. Determinism and reductionism; 'in large measure, our fate is in our genes', as proposed by James Watson is further attacked, and the authors consistently argue that this view needs to be persuasively dispelled. The fear in this case is that the public perception of genetic data (when relayed in a manner that equates the biological animal man to a machine that functions via its DNA blueprint) may lead to the lay interpretation that criminality, individual capability and sexual differences can be accounted for by genetics alone. 'Normal' vs. 'diseased' is also discussed. Sometimes questions have answers that are not as simple as a first-year medical student might think.

The case for genetic privacy and control of access to this information is made in the fourth section. Illustrative disease examples include patients that may be asymptomatic but at risk for adult polycystic kidney disease, and community screening for carriers of cystic fibrosis. These chapters include careful discussions about what is known and not known regarding the effectiveness and usefulness of genetic counselling.

The concluding sections of the book deal further with legal and ethical issues and include a review of the patentability of DNA sequences, recombinant genes and organisms. This discussion suffers somewhat from now being 2–3 years old. It deals almost exclusively with implications for basic science research and little with the explosive increase in the application of molecular diagnostic testing in hospital-based laboratories. With each molecular test implemented today there are potential conflicts between individual scientists, academic institutions and biotechnology or pharmaceutical companies, often each holding multiple gene and process patents applicable to a single test. It's a legal mine-field out there!

This book, although discussing at length the frontier science of molecular genetics, is distinctly non-technical in nature and would be an excellent primer for non-scientists who would like to understand the human genome project. It is also a book that stimulates introspection and should appeal to biologists intent on understanding the place their

science may play in a societal context and is a must for anyone in the fields of genetic counselling or medical ethics.

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The Evolution of Life Histories: Theory and Analysis. Derek A. Roff. Chapman & Hall, London, 1993. Pp. 535. Price £24.95, paperback. ISBN 0 412 02391 1.

Students of the evolution of life histories try to understand how natural selection acts on the major patterns of growth and reproduction in plants and animals. The classical problems in the field are the evolution of the age and size at first breeding, the allocation of resources between reproduction and growth or maintenance, and the evolution of clutch size and offspring size. The present book sticks largely to this agenda, although it occasionally wanders into related fields such as the evolution of parental care and alternative mating strategies. Roff concentrates on the phenotypic approach to life-history theory, using optimality arguments to predict expected life-history strategies after specifying the constraints and trade-offs that are likely to affect different traits. However, a strength of the book is that he does not ignore the underlying genetics and there is a full discussion of the extent to which it is legitimate to assume that a phenotypic optimum can be genetically supported.

The book consists of a series of general, introductory chapters, followed by a detailed treatment of the main topics in life-history theory. The introductory chapters discuss background quantitative genetics, the basic Euler-Lotka equation that forms the core of much life-history theory and the debate about how best to measure trade-offs between different life history traits. There is also a chapter introducing the different tools used to solve for optimal life histories which will be important for readers with little background in theory. The second part of the book has chapters on age-specific patterns of birth and death, cost of reproduction, age and size at maturity, reproductive effort, clutch size and offspring size. In each chapter, the relevant theory is introduced and the most important results are normally rederived. The experimental support for the predictions is then critically examined, often with large tables to summarize work in popular areas such as clutch-size manipulation in birds.

This book will be an indispensable information source for anyone working in life history theory. While championing the phenotypic optimization approach, Roff is not afraid to point out shortcomings in theories or experimental tests, and he provides a valuable commentary on current areas of contention. The coverage of the animal literature is a little biased towards ectothermic vertebrates and *Drosophila*, perhaps reflecting Roff's own research interests. More seriously, the coverage of life-history problems in plants, while not