

## Book reviews

**Molecular Evolution and Phylogenetics.** Masatoshi Nei and Sudhir Kumar. Oxford University Press, Oxford. 2000. Pp. 333. Price £65.00, hardback. ISBN 0 19 513584 9.

We live in interesting times. The curse is that it is near impossible to keep up with a field moving as rapidly as molecular evolution. The blessing is that we have clear-writing proponents, such as the authors of this book, to help us with comprehensive and comprehensible reviews. *Molecular Evolution and Phylogenetics* is essentially a major update of Nei's 1987 book, *Molecular Evolutionary Genetics*. The title of the newer volume from the doyen of distance methods accurately reflects its much greater emphasis on phylogenetic issues. The book begins with chapters on the molecular basis of evolution, evolutionary change in amino acid and DNA sequences, and models of nucleotide substitutions. Inferring phylogenies from molecular sequence data is a fast moving and increasingly complex subject and it is covered in the following seven chapters. The basics of all current tree-building methods are well covered, although, not surprisingly, the work of the first author and his many collaborators over the years is covered in more depth. Partisans of other approaches (like me) will find things to carp about here, but no more so than in other books.

The final chapters consider polymorphism and the production of trees from genetic markers (RFLPs, AFLPs, RAPDs, etc.) in populations. These provide a useful introduction to this limited part of the field but readers in search of information on analysing population samples of sequences will need to look elsewhere. The level of the material is suitable for advanced undergraduate and graduate courses. Molecular biologists, tired of being told by snooty reviewers that their tree (which magically popped out of the computer) just isn't good enough, will also find enlightenment. Examples are included and readers are encouraged to use the second author's computer program, MEGA, to work through these.

Where does this book fit with others on the market? The long book chapter by Swofford *et al.* (1996) is a balanced and concise introduction to making trees from sequences (sometimes too concise for beginning students). Three other books are pitched at about the same level as Nei & Kumar. Li's book (1997) concentrates more on the molecular evolution and less on the phylogenetics. Page and Holmes (1998) is the least mathematical of the lot and covers the field from more of a parsimony perspective; they also consider issues such as co-evolution and phylogeography in more detail than the others. We'll have to wait until sometime in 2001 for Joe Felsenstein's book on the entire field of inferring phylogenies for a book-length exposition from the man who made maximum likelihood approaches practical.

It is worth mentioning that there is a paperback edition of this book available at a more student-friendly price. Students

will find *Molecular Evolution and Phylogenetics* as useful as its previous incarnation and all readers will come away with the fully justified feeling that there is a lot more to this tree building business than first meets the eye.

### References

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**Genetic and Evolutionary Diversity — The Sport of Nature (2nd. edn).** Laurence M. Cook and Robert S. Callow. Stanley Thornes, Cheltenham. 1999. Pp. 290. Price £22.50, paperback. ISBN 0 7487 4336 7.

This book has an interesting evolutionary history. The first edition, authored by Laurence Cook alone under the title *Genetic and Ecological Diversity — The Sport of Nature*, was published in 1991 by Chapman and Hall. This second edition has a mutated title, an additional author and emerges from the stable of a different publisher. It is also one hundred pages longer and the shells of the visibly polymorphic marine snail, *Nerita polita*, illustrated on the front cover, have been re-arranged! The subject material of the book covers what might be called 'classical' population genetics, population dynamics and evolution, and explores mechanisms responsible for the generation and maintenance of diversity at both inter- and intra-specific levels. The authors point out that students in the life sciences today are steeped in the minutiae of modern techniques and theoretical advances, for example in molecular genetics, phylogenetic analyses and metapopulation models, but may lack the broader perspective so necessary to contextualize the true implications of these newer approaches. This book sets out to provide that wider context and is aimed at both undergraduate and postgraduate audiences.

As in the first edition, chapters are divided among three major sections; species abundance, population processes, and population genetics and evolution. Each chapter ends with a clear summary and, new to the present edition, a short list of textbooks for further reading. The first section introduces the concept of species diversity, explains how species are classified, provides explanations of why there might be so many species (in terms of adaptation, trophic systems and niches) and discusses the ways in which species can be defined. Apart from one or two additional sentences, and the re-arrangement of a table to make the contents less clear (in my opinion), this section is identical to that in the first edition — it does its job pretty well.

The second section comprises the guts of the book and consist of 12 chapters covering the usual topics of population genetics: the concept of the gene (from the standpoint of population genetics), intensity of selection, genetic variability in natural populations, factors affecting gene-frequency changes, etc. New to this edition are chapters on 'Sources of continuous variation' (dealt with very cursorily in the first edition) and 'Polymorphism: a case history', and additional sections on cyanogenesis in plants, chromosomal polymorphisms, and the genetic control of mutation and recombination. The case study (on *Cepaea*) demonstrates clearly how messy life is when one really starts to scratch beneath the surface of polymorphic, visible variation — a valuable lesson indeed for the student used to examining evolutionary processes one at a time. The final section of the book (three chapters) considers ecological and evolutionary topics such as speciation species associations and has a new chapter on 'Pattern and process — the long-term evolutionary perspective' in which mating systems and sex are explored.

So, do the authors succeed in providing the broader theoretical and empirical background they consider may be missing from the education of modern students? I think the answer has to be yes. I particularly liked the approach via the concept of diversity. This neatly spans the crack that, in the past at least, often existed between the disciplines of ecology and genetics. The gap is perhaps less wide these days with the advent of metapopulation studies, which explicitly embrace both subjects, but none-the-less the framework chosen is a useful one. The book is 'classical' in the sense that the

examples used are mostly well-worn favourites out of the E. B. Ford era. Although the authors explicitly did not set out to review the literature, they could have introduced some more recently investigated systems, if only to illustrate that the problems thrown up by the 'favourites' are not unique. The 'classical' epithet also applies to the fact that molecular variation is only mentioned in passing, but then one impetus for writing the book was to provide the missing broad-brush perspective, and students these days will know at least something about molecules.

Will this volume be attractive to students? Possibly. It has to compete with books that specifically cover population genetics, such as Hedrick (2000) and Hartl & Clark (1997) which are more expansively laid out, and those that delve into evolution as well, for example Ridley (1996), with its two-colour text and information boxes. Against this competition, *Genetic and Evolutionary Diversity* might not immediately draw a reader in. However, it is a very worthwhile book to have in a library for students to browse, if not to buy.

One final point, why is *Heredity* reviewing a book in 2001 that was published in 1999? The answer is that the new publishers apparently fail to see the value of announcing their wares to the appropriate public. I have never seen the book advertised or reviewed and after two unanswered requests to the publisher for a review copy one had to be obtained from an alternative source. This is not a good way to sell books or, more importantly, repay the efforts of authors.

## References

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## Book received

**Thinking about Evolution — Historical, Philosophical, and Political Perspectives.** Rama S. Singh, Costa B. Krimbas, Diane B. Paul and John Beatty (eds). Cambridge University Press, Cambridge. 2000. Pp. 606. Price £60.00, hardback. ISBN 0 521 62070 8.

**Genes, Peoples & Languages.** Luigi L. Cavalli-Sforza. Penguin Books, London. 2000. Pp. 228. Price £18.99, hardback. ISBN 0 713 99486 X.