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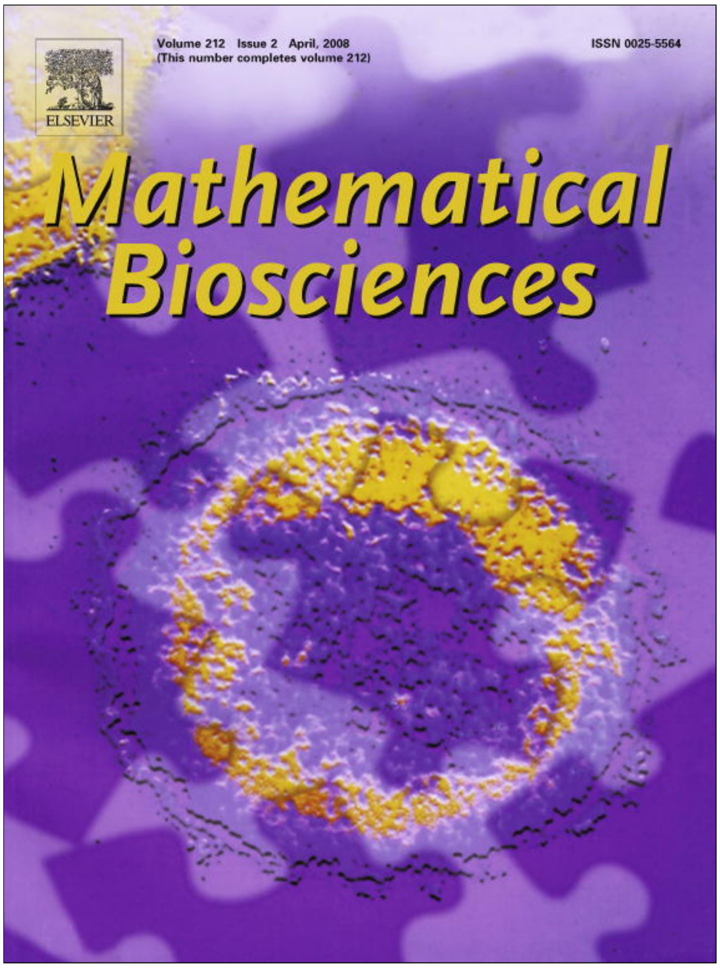

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Book Review

Robert M. May, Angela R. McLean (Eds.), Theoretical Ecology: Principles and Applications, third ed., Oxford University Press, 272 pp., ISBN13: 9780199209996, ISBN10: 0199209995

The third edition of *Theoretical Ecology: Principles and Applications* is a completely rewritten, updated and reworked version of the previous edition. This edition is written by a new set of authors (apart from May only two of the authors contributed to the previous editions). This edition shares with the previous editions the aim to provide students and researchers in ecology with an account of the basic principles of theoretical ecology and a number of selected applications. The book contains 15 chapters written by prominent researchers in theoretical ecology and in doing so the books provide a snapshot of the state the art of, and topical questions in, theoretical ecology.

The first half of the book describes the principles of and models for population dynamics, covering: cooperation (Nowak and Sigmund), single species dynamics (Coulson and Godfray), metapopulations (Nee), predator–prey interactions (Bonsall and Hassell), intra- and interspecific competition, mainly applied to plants (Crawley and Tilman) and ecological communities (Ives, May et al.). The second half of the book covers selected applications of theoretical ecology. The chapters all differ in their approach and structure: some authors review a certain area in some detail, whereas others give an overview that is largely based on a review of their own work or in which a topical question is addressed using novel material. This format makes it an excellent supplement to a course in theoretical ecology for either biology students interested in the theoretical foundations of ecology or mathematics/physics students interested in biology. The book also is a good starting point for graduate students or researchers seeking an introduction to the main questions and views in this area. This book does not offer synoptic coverage but instead concentrates on whatever the authors deemed most interesting in a particular subfield. This is the main strength of the book: in almost every chapter I found interesting viewpoints and inspiring avenues of thought.

On the whole I found the coverage good, and in particular the selection of applications which deal with highly topical and important issues (epidemics (Grenfell and Keeling), fisheries (Beddington and Kirkwood), food production (Conway), conservation (Dobson et al.) and climate change (Kerr)) excellent. The one area where coverage could have been better is in the evolutionary aspects of ecology. Apart from a chapter on cooperation and altruism, and the evolution thereof, there is very little mention of the role of evolution and selection in the book. In the introductory chapter this is partly justified because "resource managers get by, and seem to be content, with treating the parameters in population models as phenomenological constants, fitted to the data". I found this statement somewhat surprising as one could equally well argue that resource managers would be just as content without any models at all. The fields of ecology and evolutionary biology are intimately linked: once the rules of the ecology are specified, it allows prediction of the course of evolution (see e.g. [1,2]). This makes evolutionary analysis a promising and valuable tool for theoretical ecology as it offers the potential to check the validity of assumptions, predict parameters or generate testable hypotheses.

The successive editions of Theoretical Ecology provide an opportunity to judge the progress in theoretical ecology over the years. One would have hoped that in the four decades since the publication of the first edition many questions would have been answered through the availability of new data. Unfortunately, this appears not to be the case. In a way this is not all that surprising: the most useful data sets are often long data sets and new data become available very slowly. One could take this is an indication that many of the big questions that ecology has been attempting to answer are perhaps too difficult and unlikely to become answered in reasonable time. However, as Ives puts it in his contribution to the book, one could also take the fact we are still asking the same questions is also an indication that we are asking the right sort of questions. Indeed, it is interesting to see that forty years on many of the issues addressed in the first edition are still current, and I would not be surprised if the same can be said about the third edition four decades from now.

In the book's final chapter, May gives a list of unanswered questions in biology. This is an interesting chapter that, instead of giving the customary list of technically challenging or academically interesting list of questions, addresses the human impact on our environment and the resulting loss of biodiversity. May identifies a number of areas and topics where further research would be help us to assess the scale of the problem and shape policies to deal

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with biodiversity loss. This chapter reviews in a vivid and clear way the reasons why we should care about the loss of biodiversity, and is worth reading for that reason alone. It also reflects the conviction that with the joy of doing science comes the responsibility to use this science, making this chapter an interesting and inspiring statement about how theoretical ecologists really can make a difference.

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