

Metabolic Ecology: A Scaling Approach

Edited by Richard M. Sibly,
James H. Brown & Astrid
Kodric-Brown (2012)
Wiley-Blackwell, Chichester.
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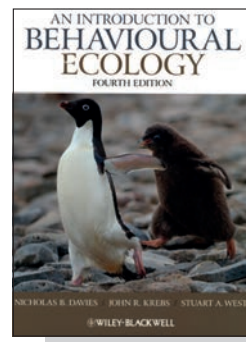
Ecology has been described as a science built on contingent generalisations and criticised as a discipline that accepts explanations in place of predictive theories. In a clear effort to obviate those concerns, recent decades have seen the promotion of metabolic theory as an underlying, unifying and widely predictive ecological construct. The 'metabolic theory of ecology' has rapidly become one of the most discussed and controversial phenomena in the field. In *Metabolic Ecology*, the editors remind us that, whether or not we subscribe to the specific underpinnings of the metabolic theory of ecology, we cannot deny the fundamental role of metabolism in influencing all ecological processes. In that sense, they are also keen to point out that there is more to metabolic ecology than the controversial theory. To illustrate this, they have recruited a large number of co-authors to describe the importance of understanding metabolism to an impressively wide range of subjects within ecology.

As edited books go, *Metabolic Ecology* must be something of a record. In spite of having 45 contributors, the preface reports that the book took substantially less than a year to complete, from conception to production of the edited manuscript. This can only reflect the enthusiasm of the authors to be involved with the project. Chapters are generally short and highly readable, each beginning with a clear summary and ending with a short section of conclusions. The book is split into three sections: 11 chapters on the foundations of metabolic ecology; 9 chapters showcasing the pervasive influence of metabolic theory on microbes to humans; and 5 chapters on the practical applications of metabolic ecology to management, conservation and areas beyond biology.

Overall, *Metabolic Theory* comes over as conciliatory in its approach to recent controversy. In their introductory chapter,

the editors note that general models, embodied by simple equations with few terms, are not intended to capture all the rich detail of ecology; we remain a very long way from a metabolic theory of everything. In addition, authors of several chapters are known to be sceptical of some elements of metabolic theory. Nevertheless, the book presents a powerful argument that metabolism is a unifying process that will allow disparate ecological phenomena to be related and discussed with reference to a common currency. Intended to be accessible to upper-level undergraduates, the book should be widely-read by anyone who seeks a more powerful science of ecology.

 Phil Stephens



An Introduction to Behavioural Ecology (4th ed.)

Nicholas B. Davies, John
R. Krebs & Stuart A. West
(2012) Wiley-Blackwell,
Chichester.
£90.00 (hbk)

ISBN 978-1-4443-3949-9

£35.00 (pbk)

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It is almost 20 years since the appearance of the 3rd edition of Krebs & Davies' influential *Introduction to Behavioural Ecology*. Although the central problems on which behavioural ecologists concentrate have remained the same (how selection shapes economical behaviour in organisms and what constrains that, and how behaviours become established in populations and what determines their frequencies), important technological developments have changed and enhanced our understanding of these issues in recent decades. Capitalising on those advances in understanding, Nick Davies and John Krebs have teamed up with Oxford University's Stu West to produce the 4th edition of their text.

It is perhaps unnecessary to comment on the importance of this book, as both an introductory textbook for undergraduates and an essential resource for lecturers in the field. In the latter context, one innovation is easy online access to PowerPoint slides of all of the figures and tables. In general, the book has a more modern feel, with colour figures

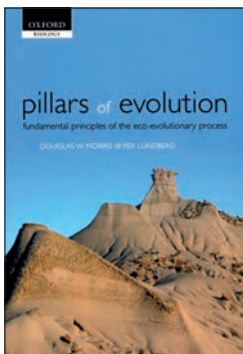
Book Reviews

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throughout, but it retains its relatively informal style. The use of margin notes emphasises the flow of arguments, as before, and boxes are still used to highlight case studies on more complex theoretical points. The text has been substantially overhauled, with more recent examples used throughout but it seems likely that many will still draw on earlier editions for familiarly classic examples of a range of phenomena.

More intriguing, is to note where the larger changes have occurred. Chapters on 'fighting and assessment' and 'alternative breeding strategies' have gone, with only a little of the material finding its way into remaining chapters. By contrast, sperm competition has become a more dominant theme in the chapter on sexual selection, and sex allocation is now a chapter on its own (with room for recent developments on sex ratio distorters). The former chapter on 'parental care and mating systems' has been split in two, and that on parental care now includes family conflicts (including recent findings on genomic imprinting). Other developments include a brief overview of 'animal personalities' and capitalise on advances in linking cognition, neuroscience and behaviour, and on the widespread use of genetic analyses to differentiate between social and genetic monogamy. Overall, this seems a timely update to a very useful book; it should be widely used by lecturers and undergraduates alike.

 Phil Stephens



Pillars of Evolution: Fundamental Principles of the Eco-evolutionary Process

Douglas W. Morris & Per Lundberg (2012) Oxford University Press, Oxford.
£65.00 (hbk)

ISBN 978-1-4443-3720-4

£29.95 (pbk)

ISBN 978-1-4051-8658-2

It is an interesting question how we bridge our increasingly multifaceted understanding of evolution if we are to have a coherent overview of the process. Morris and Lundberg develop a theoretical framing for evolution based upon five

pillars: mechanics, function, structure, scale, dynamics and adaptation, each given its own chapter. This use of terms is not always intuitive. For example they use the term structure not to refer to morphological features but the structure of the evolutionary process as an interaction between genotypes, traits, function (of traits) and environments.

At the outset we are told that logic and mathematics are the main tools for understanding evolution and true to their word the authors develop a rigorous and carefully thought through logical approach. Although the mathematics is not difficult, and much of the theory is explored in prose, none-the-less the approach is similar in rigour to that of a mathematical proof. I found a few minutes inattentive reading meant I had lost the logic and had to backtrack several times; this is not a book one just dips into for information. Overall the content is persuasive as theory and includes many interesting perspectives on linking genotype with adaptation and maladaptation.

I have however struggled to be a complete friend to this book. Each of the five pillars is supported by a lengthy set of single sentence principles followed by between a paragraph or several pages of supporting text. I did not find myself agreeing with every principle. For example I do not agree that 'evolutionary understanding is centred in logic and mathematics'. Surely observation and experimentation are equally important. For some other principles I think more nuanced debate could be had. The fact that the text is written expressly to support the principles, and so does not often include contrary evidence and draws on a rather narrow base of empirical examples makes me uneasy to follow where they lead.

 John Hopkins



Predictive Ecology: Systems Approaches

Edited by Matthew Evans, Tim Benton & Ken Norris (2012) Royal Society Publishing, London.
£59.50 (pbk)

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Meteorologists have become accustomed to the demands made upon them for accurate predictive statements that