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Book Reviews

Evolutionary Ecology: Concepts and Case Studies. By C. W. FOX, D. A. ROFF & D. J. FAIRBAIRN. Oxford: Oxford University Press (2001). Pp. vii+424. Price $45.00 paperback.

Ecological research can no longer proceed without consideration of evolutionary history and process, just as research in evolution must account for the ecological interactions. Accordingly, unification of ecology and evolutionary biology has been vital to our understanding of the processes responsible for establishing patterns of biological diversity. Much like the synthetic field of conservation biology, evolutionary ecology depends largely on the synthesis of interdisciplinary techniques, theory and empirical evidence in addressing relevant questions. Recent advances in statistics, computer modelling and especially molecular and quantitative genetics have carried this synthesis and interdependence even further. It is no surprise that evolutionary ecology has quickly grown into a mature field of research in both basic and applied directions.

Unfortunately, the growth and importance of the discipline is not reflected by an abundance of texts appropriate for courses in evolutionary ecology, or for researchers looking for a review of current research programmes. When teaching evolutionary ecology, unlike either ecology or evolution, an instructor has few current textbooks to choose from. The recent publication of Fox et al.'s *Evolutionary Ecology: Concepts and Case Studies* should serve to fill this empty niche. As two graduate students and a professor reviewing this text, we attempt to illustrate why the structure and content of the volume are appropriate in light of the editors' objectives.

Their stated goal is to supply a collection of readings outside of the primary literature to give advanced undergraduates, graduate students and researchers an introduction to contemporary research programmes central to the field of evolutionary ecology. The 28 independently authored chapters are grouped into five parts: recurring themes in evolutionary ecology, life histories, behaviour, species interactions and adaptation to anthropogenic change. The book's first section covers the basic recurring principles of evolutionary ecology. These early chapters provide reviews of concepts and ideas central to the historical development of the field (e.g. natural selection and the causes and significance of individual and population variation) that are essential for understanding the volume's subsequent chapters. Readers will encounter content in the opening section that reflects the increasing incorporation of evolutionary theory and molecular genetics into this discipline.

The 18 chapters in the book's core (parts II–IV) build on the recurring themes section and cover topics in life histories, behaviour and species interactions. Readers may be surprised, and perhaps disappointed, that some areas of research in evolutionary ecology such as speciation were left out of this volume. The editors justify this deficit by noting the many recent volumes solely dedicated to this topic and its coverage in evolution textbooks; however, given the surge of interest in ecological speciation, this decision may have been a mistake. None the less, the book's core provides excellent coverage of many of the key areas of evolutionary ecology.

The book's final section (part IV) focuses on adaptation to anthropogenic change, and highlights the recent birth of applied approaches in evolutionary ecology. Included here are chapters on pesticide resistance, biological control and evolutionary conservation biology. This is an exciting area of new research in evolution and ecology, and one that deserves serious attention given the rapid encroachment of humans and human-modified organisms into nature and the often-unpredictable outcome of such actions. These chapters offer a glimpse of how the field is growing, as some would suggest (e.g. Thompson 1999), into one of the central fields of the applied biological sciences. It is eye-opening to consider the vast potential that exists in this field of research and these three chapters set the stage for the development of some very exciting research programmes.

Chapters are written with an advanced audience in mind and are structured into a form particularly useful for students seeking an introduction to the research programmes in the field. The multiauthored format provides readers with up-to-date reviews on topics written by leading researchers from North America (where 34 of the 35 authors reside). Chapters begin with a history of research on the topic, focusing on important contributors and seminal papers. The chapter midsections focus on the central concepts and problems of the topic at hand. Here the concepts of each chapter are illustrated using case studies usually dominated by the author's own research. Usually this works well, as for example, when Dolph Schluter uses his exemplary research on sticklebacks to illustrate ecological character displacement. Other authors effectively highlight several research programmes. For example, Curtis Lively draws on a handful of outstanding studies, including his own, to illustrate effectively the concepts that he reviews on parasite–host interactions. A few authors are not as effective. Lastly, the conclusions and future directions sections of each chapter provide a glimpse of where the field is or should be heading, and serve to illustrate how little has been answered, and how much is yet to be asked.

A challenge for any multiauthored volume is to overcome the variation of different authors' styles so that the volume reads as a cohesive unit. With 28 chapters written by different authors, readers of Fox et al.'s volume will experience a wide range of style and delivery. One problem, as with many edited volumes, is applying a similar upper word (8000 words) and reference (30 references) limit to each chapter. Many chapters used their 8000 words to integrate concepts and case studies superbly (e.g. Bronstein's chapter on mutualisms), but a few were much more descriptive and tedious and would have benefited from being shorter. Similarly, not all authors effectively used their limit of 30 references to highlight important books, reviews and seminal papers. We were, however,

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pleased to see little in the way of changes in, or novel, terminology. Most authors used well-known terms or provided definitions (as footnotes or endnotes) where appropriate, although a glossary for the book would have been an asset. Nevertheless, the cost of this variation in author's styles is far outweighed by the diverse range of perspectives and expertise afforded to each chapter.

That this review is written for *Animal Behaviour* is a testament to the diversity of fields that evolutionary ecology draws from. It is a daunting task to develop an integrated text that successfully draws from the diverse disciplines within ecology and evolutionary biology, yet Fox et al. have done this quite well. In accord with the editors' hopes, this text should prove especially useful to professors seeking a well-organized and thorough volume for advanced undergraduate and graduate level courses focusing on evolutionary ecology. The book's structure gives readers an excellent introduction to contemporary research in evolutionary ecology, as well as reiterating key findings with many classic examples. Each chapter is also structured into a form particularly useful for graduate students entering the field, beginning with a solid review and ending with future directions for nascent evolutionary ecologists to pursue. Indeed, one of us (C.W.B) has ordered the volume for use as the text for a graduate evolutionary ecology course this fall. Given the void of textbooks for teaching evolutionary ecology at the graduate level and the high quality of this volume, we expect Fox et al.'s text to become a standard reader for evolution and ecology graduate programmes, as well as for researchers seeking an up-to-date overview of evolutionary ecology research.

ADAM M. SIEPIELSKI
THOMAS L. PARCHMAN
CRAIG W. BENKMAN

Department of Biology,
MSC 3AF,
New Mexico State University,
Las Cruces,
NM 88003,
U.S.A.

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