

applicability. There is not enough discussion about possible empirical approaches to the niche concept (Chapter 4). Although this is probably due to niche hypotheses being very difficult to test empirically, it will be necessary if their framework is to be adopted at all.

The authors boldly claim that the niche framework is able to provide explanatory hypotheses about macro-ecological and macro-evolutionary patterns. However, they don't provide adequate examples of how this could be done. For example, how might the niche framework be used to ask questions concerning adaptive radiations? What kinds of hypotheses may be generated and how could they be tested? The major problem with this book is that, having built a tantalizing framework with which to address questions in ecology and evolutionary biology, it does not spend enough time demonstrating to the reader that it is applicable in reality.

In summary, *Ecological Niches* is well written, with excellent graphical representations of the models presented, and it makes some very interesting observations. It is also well priced and suitable for postgraduate level or academic reading. Although the book will probably not fundamentally influence ecologists' *modus operandi* until there is more empirical support, it will no doubt stimulate new hypotheses and discussion. I highly recommend it!

FRANCESCA D. FRENTIU
*School of Life Sciences,
 University of Queensland,
 St. Lucia, Queensland, Australia
 Email: ffrentiu@zen.uq.edu.au*

REFERENCES

- Begon M., Harper J. L. & Townsend C. R. (1996) *Ecology: Individuals, Populations and Communities*, 2nd edn. Blackwell Scientific, London.
- Losos J. B., Leal M., Glor R. E., de Queiroz K., Hertz P. E., Rodriguez S. L., Chanizo L. A., Jackman T. R. & Larson A. (2003) Niche lability in the evolution of a Caribbean lizard community. *Nature* **424**, 542–5.

Mating Systems and Strategies

S. M. Shuster and M. J. Wade. Princeton University Press, Princeton, 2003, X+533 pages. Price US\$35. ISBN 0691 04931 9.

An essential prerequisite to progress in understanding sexual selection is the classification of mating systems in order to reveal macroevolutionary patterns and allow comparisons between diverse species. For 25 years, the backbone of such a classification system has been the seminal work of Emlen and Oring (1977), which intro-

duced such fundamental concepts as the operational sex ratio and the environmental potential for polygyny. A revision of this work has been long overdue, but the challenge in improving Emlen and Oring's designations is imposing. Shuster and Wade have not taken this task lightly. Fifteen years in the making, their book is exceedingly thorough; it presents not only the theory underlying their new nomenclature, but also many critical predictions that allow their system to be empirically tested.

While Shuster and Wade's approach incorporates many of the concepts presented by Emlen and Oring, this is not simply an update of the old categories with reference to recent empirical work. Instead, Shuster and Wade assemble their classification scheme from first principles using basic elements of evolutionary genetics. To measure sexual selection in a comparable way across different systems, they quantify the difference in the opportunity for selection between the sexes, and relate this value to measures of temporal and spatial clustering of females adapted from the ecological concept of 'mean crowding' (Lloyd 1967). This approach has appeal because it relates the currency of evolution (the selection intensity) with the ecological variables that are crucial in determining variation in mating systems. The quantitative nature of their approach also allows mating systems to be defined in a systematic and objective manner. As a result, Shuster and Wade's arrangement is much more taxonomically inclusive than Emlen and Oring's scheme, which was primarily focused on vertebrates.

Shuster and Wade define 12 major categories and 41 subcategories of mating systems (compared to the four major and seven subcategories described by Emlen and Oring). The complete survey and its associated nomenclature are a bit overwhelming, but they are clearly presented and thoroughly explained using examples. Along the way, the authors discuss many well-known characteristics of mating systems, including mate guarding, mate choice, mate choice copying, parental care, sex-role reversal and alternative mating tactics. In many cases, their new approach leads to innovative predictions, which are likely to form the basis for research in mating systems for years to come.

This is a book that needs to be read from cover to cover. The subject matter is challenging, but the extended format of the book allows the authors to introduce concepts gradually. As a result, even those who are anxious about algebra can work through crucial theory. Although the book is very well-written, it is not light bedtime reading; the content is complex and demands its reader's full concentration. However, attentive readers will be rewarded for working through the challenging sections early in the book when in later chapters the different components of theory come together into a single framework that underlies this intensive survey of mating systems.

Our only complaint is that we often found ourselves needing to flip through pages to remind ourselves of the definitions applied to terms, especially mathematical expressions. An appendix that featured the most common terms and equations would have been useful. We also noticed some potentially confusing mistakes in the example calculations used to illustrate the classification scheme. However, such minor quibbles are insignificant in light of the overall contribution Shuster and Wade's work is likely to make. To put it briefly, it is hard for us to imagine a volume that is more likely to provoke new theoretical and empirical research in our field than this book. Every student of reproductive biology and sexual selection should read it.

LUC F. BUSSIÈRE AND MEGAN L. HEAD
*School of Biological, Earth, and Environmental Sciences,
University of New South Wales,
Sydney, New South Wales, Australia
Email: luc.bussiere@unsw.edu.au*

REFERENCES

- Emlen S. T. & Oring L. W. (1977) Ecology, sexual selection and the evolution of mating systems. *Science* **197**, 215–22.
Lloyd M. (1967) Mean crowding. *J. Anim. Ecol.* **36**, 1–30.