

Reichard, U. H., and C. Boesch (eds.). 2003. *MONOGAMY: MATING STRATEGIES AND PARTNERSHIPS IN BIRDS, HUMANS AND OTHER MAMMALS*. Cambridge University Press, Cambridge, United Kingdom, 267 pp. ISBN 0-521-52577-2, price (paper), \$45.00.

Understanding the evolution of monogamy in mammals has challenged behavioral ecologists for decades, because in most cases males are predicted to experience higher fitness through polygynous mating. In contrast to birds, gestation and lactation limit the potential fitness benefits of paternal care for all but a handful of species. Individuals that live in monogamous pairs but mate with extra-pair partners present an additional puzzle. *Monogamy: Mating Strategies and Partnerships in Birds, Humans and Other Mammals* brings together the most recent comparative analyses and long-term field studies that address the evolution of monogamy in mammals.

A book-length review of this topic is very welcome. The conceptual framework for thinking about mating systems in mammals for nearly a decade and a half (Clutton-Brock 1989; Davies 1991) has been rooted in Kleiman's (1977) seminal review of monogamy and Emlen and Oring's (1977) ecological framework of mating system evolution. These reviews over-emphasized the role of parental care, now believed to have evolved after the evolution of monogamy in most cases, and de-emphasized the role of female choice in favor of male control of female reproduction. The advent of molecular techniques for parentage assignment has ushered in a new understanding of the costs and benefits of monogamy for individuals that has not previously been reviewed.

Readers expecting a significant focus on birds should not be fooled by the book's title. Only 2 of 16 chapters deal explicitly with birds, and the remaining 14 chapters focus almost exclusively on mammals. Chapter 2 deals with the role of extra-pair paternity (EPP) in the evolution of social monogamy in birds. EPP may be important in some mammalian populations (as seen in later chapters), and this chapter serves as a useful guide for future studies of parentage in mammals. Chapter 6 provides an interesting discussion of the social function of extra-pair copulations in the razorbill, but seems out of place given the book's focus on mammals. Most monogamous mammals do not copulate often outside of brief breeding periods.

Chapter 1 (*Monogamy: Past and Present*) introduces a common vocabulary that generally is employed throughout the book. The authors distinguish between social, sexual, and genetic monogamy to characterize the complexity of social associations, copulations, and paternity in male–female pairs. This introduction also centers the discussion on evolutionary routes to social monogamy rather than simple social and ecological correlations that explain the maintenance of monogamy.

The remaining chapters are divided into three sections: *Evolution of Social Monogamy*, *Reproductive Strategies*

of Socially Monogamous Males and Females, and *Reproductive Strategies of Human and Non-Human Primates*. Chapters 3, 4, and 5 all present comparative analyses of the evolution of social monogamy, but reach different conclusions for Mammalia, primates, and the rodent genus *Peromyscus*, respectively. These chapters present an excellent and exhaustive review of the possible origins of social monogamy, but only the latter 2 chapters use phylogenetic methods to examine changes in mating systems over evolutionary time. The authors of Chapter 3 previously published a phylogenetic study of social monogamy in mammals (Komers and Brotherton 1997), but unfortunately do not update that analysis for this book. A comparative study employing a comprehensive phylogeny and the many new social and ecological data presented in this book is needed to determine whether female dispersion, mate guarding, infanticide reduction, or parental care are primary explanations for social monogamy in mammals.

The editors divided the remaining chapters into primate and nonprimate sections, but this decision is not distracting and will be of little consequence to most readers. The great strength of these later chapters is that they examine the same concepts presented earlier in the book using data from long-term field studies. Contributions from multiple authors could have led to a confusing multiplicity of hypotheses, especially because most of the data in the book have been presented elsewhere. In this case, coordination between the authors and editors has resulted in an uncommonly robust examination of a single set of evolutionary ideas.

Of particular note are the chapters that examine both genetic and social monogamy (Chapter 7, Malagasy giant jumping rat, *Hypogeomys antimena*; Chapter 8, kinkajou, *Potos flavus*; Chapter 14, fat-tailed dwarf lemurs, *Cheirogaleus medius*), sometimes revealing extraordinary levels of EPP (i.e., 44% EPP in the lemur population). Chapter 13 (*Social Monogamy in Gibbons: The Male Perspective*) is another highlight. Here, Reichard presents data collected during 12 years to argue that male–female pair bonds in the white-handed gibbon (*Hylobates lar*), a poster child of monogamy, are not as exclusive or long-lasting as often believed. The republication of a series of under-utilized equations that quantify the conditions promoting social polygyny is a welcome addition that could be useful in many other studies.

Two chapters on social monogamy in humans (Chapters 11 and 12) deviated significantly from the overall themes and hypotheses of other chapters to an extent that they seemed non sequitur. Monogamy is confounded with several cultural aspects of human societies, particularly marriage customs, making it difficult to collect data on monogamy that correspond to the definitions in Chapter 1. Neither chapter makes a strong case for an ecological explanation of human mating systems, leaving the reader to wonder whether human monogamy is actually shaped by the same influences as in other mammal populations.

One major drawback of this book is the lack of a concluding chapter. The book ends with 2 meandering chapters, 1 a review of Callitrichids that seems focused on the natural history of

these primates rather than social monogamy, and the other a comparative analysis of olfactory communication in monogamous primates. A summary of support for different hypotheses and directions for future research would have moved the book closer to its goal of a comprehensive, but extremely focused, review of the evolution of social monogamy. Instead, the book is slightly biased in favor of research that will primarily interest primatologists.

Despite the criticisms above, I strongly recommend this book to anyone interested in the evolution of mating systems in mammals. The hypotheses presented in this book will undoubtedly exert a strong influence on the next generation of studies on social monogamy. Several of the chapters also deal with social monogamy in tropical mammals, which is an unexpected bonus for tropical biologists.—JASON MUNSHI-

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