Ecology, 78(1), 1997, pp. 327–328

POLLINATION REVIEWED

Proctor, Michael, Peter Yeo, and Andrew Lack. 1996. **The natural history of pollination.** The New Naturalist Series. Timber Press, Portland, Oregon. 479 p. $42.95 (cloth), ISBN: 0-88192-352-4; $24.95 (paper), ISBN: 0-88192-353-2.

Pollination biology and plant reproductive ecology are active research areas with long histories and enormous literatures. A student or other neophyte entering these areas needs a thorough understanding of both plants and their animal pollinators, and must master a long list of bewildering jargon. One book that was frequently turned to in the past was Proctor and Yeo's *The pollination of flowers,* but since the publication of that book in 1973 the field has undergone a rapid expansion. *The natural history of pollination* is a complete re-write of the earlier book, covering many developments in pollination since 1973. In addition, the authors have tried to cover more examples from outside Britain. The new book succeeds in providing an up-to-date introduction to the natural history of pollination.

The book opens with an interesting history of pollination biology. The second chapter gives a very clear summary of floral biology and terminology, which will be very useful to those without a strong botany background. The next nine chapters constitute the bulk of the book, and provide exactly what the title promises: a thorough overview of the natural history of pollination. These chapters are not always easy reading, because they consist of many detailed descriptions of the enormous diversity of flowers, pollinators, and pollination mechanisms. One can skim these chapters and get an overview of this diversity, however, and then refer to the details when necessary. Despite the general lack of conceptual material in these chapters, the natural history information suggests questions and species for future research. The chapters centered on insects are less successful than the others, as they are less well-organized and rely heavily on a few older sources. This points out a strength of the book as a whole, however; it summarizes older literature that is difficult to find and often not in English. Readers who want a more complete review of the insect side of pollination could consult F. G. Barth's *Insects and flowers: the biology of a partnership* (1985. Princeton University Press, Princeton, New Jersey).

The final five chapters are more conceptually oriented and are primarily focused on the ecology and evolution of pollination. I found these final five chapters to be the most interesting in the book. The first of these provides a useful overview of the sometimes-perplexing diversity of plant mating systems. The second covers pollination in agriculture and the third reviews the evolutionary history of flowers and pollination. The next chapter on ecology draws several interesting and reasonable general conclusions that should stimulate debate and research. The last chapter on microevolution is clear and accurate, but it could have been improved by including recent studies that directly measured pollinator-mediated selection on floral traits, since these are relevant to an understanding of the diversity of floral forms described so thoroughly in the earlier chapters. An important theme running throughout the book is the flexibility and generality of most pollination systems, in contrast to the few well-known examples of highly specialized plant-pollinator relationships.

Overall, the authors have done a thorough job of updating the previous version; there are well over 1000 references cited, with many from 1995. Although the examples are still weighted toward British and European species, the authors have succeeded in broadening the geographical scope of the book considerably. A particular strength of the book is the large number of excellent illustrations, including line drawings, black and white photographs, and color plates. The book

is very reasonably priced and attractively produced, with reasonably few typographical errors (I found eight in over 400 pages).

In summary, *The natural history of pollination* provides a good overview of the extensive pollination literature. It is most useful as a reference, but not thought-provoking enough for a graduate seminar or course textbook. This book, combined with the books by Barth (see above) for additional insect information and Kearns and Inouye (*Techniques for pollination biologists.* 1993. University Press of Colorado, Niwot, Colorado) for methods and additional references, give an up-to-date basic introduction to pollination biology. A needed addition to this group is a more conceptually-oriented volume along the lines of L. A. Real's now somewhat dated *Pollination biology* (1983. Academic Press, Orlando, Florida).

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