

Evolution and Ecology of the Organism by Michael R. Rose and Laurence D. Mueller, 2006, 720 pages, ISBN 0-13-010404-3, Prentice Hall, hardback, US\$118.70.

This is an undergraduate text for courses in what the authors called “the Darwinian biology” which covers a wide variety of subjects of ecology, evolution and organismal biology. Specifically, it introduces readers to fundamental concepts of population genetics, population ecology, community ecology, macroevolution, physiological ecology, behavior, systematics and functional morphology. These disciplines are introduced by 22 chapters in five parts: Introduction to Darwinian Biology (Darwin’s ecology and evolution, and evolutionary tree concept); Machinery of Evolution (genetics, natural selection, molecular evolution, speciation and extinction); the Darwinian Organism (life history, physical ecology, physiological ecology, population dynamics and dispersal); Ecology of Interacting Species (competition, predation, parasitism, mutualism, communities, ecosystems, biosphere, physical environment and conservation); and Darwinian Biology in Everyday Life (evolution and ecology of sex, mating strategies, social evolution, human evolution and behavior, and Darwinian medicine). The first part, which is a historical account of the development of Darwinian biology, provides a relatively detailed introduction to Darwin’s life and his views, ideas and works that changed the landscape of modern biology. The most other chapters allow readers to study elementary concepts and theories first to learn and absorb the fundamental concepts. Each chapter ends with summary of key concepts, review questions, a list of key terms, and most importantly, a list of selected references for further reading. The book ends with three appendices that will help understand basic statistical concepts (short introductions to random variables, probability, statistical distributions, correlation, regression and analysis of variance) and with a glossary of terms.

This is a highly unorthodox book in its coverage even though ecology books have to cover some evolution and vice versa. As admitted by the authors, the text breaks tradition with not only the topic coverage, but also with its format. This text covers many disciplines. It is intended to be

an image-driven guide to concepts in a wide variety of disciplines with goals of communicating the basic concepts to readers and integrating ideas across disciplines to understand the organism. The first goal of communication is accomplished wonderfully thanks to eye-catching creative illustrations and attractive magazine-style design of the book. Concepts are given in one- or two-page spreads that are art-centered and self-contained. However, there usually is a trade-off between coverage and depth of concepts of a textbook as long as the number of pages is limited. Getting the idea of fundamental concepts across was admittedly given the priority in this book. Therefore, as compared to some other specialized illustrated guides, such as Case (2000) or any textbook in any of the disciplines, the depth of coverage is at very basic level (for example, coverage on single species population dynamics does not go further than the logistic model).

Roughly, <50% of the material is given in text and >50% is conveyed graphically. Illustrations include historic drawings such as cartoons satirizing Darwin, portraits of many scientists that we do not often see, classical illustrations such as Gause’s work on Paramecium and Darwin’s finches, and of course, ecology and evolution models depicted graphically. I enjoyed thumbing thoroughly through the book because of its format and illustrations. After all, as the old saying “a picture is worth a thousand words.” Some of my personal favorites were illustrations showing differences in views about the history of life, such as creationist, Lamarckian and Lyellian systems; Tilman’s model of resource competition; the Prisoner’s Dilemma and reconstructions of the Burgess Shale fossils. However, on many pages, some pictures were used to illustrate the concept discussed on that page and in some cases just for decorative purpose, along with other captioned illustrations. Although many of them are self-explanatory, I would have personally preferred to have captions for some of these photographs and use the space taken by some others to discuss the topic in more detail.

The second goal was integrated understanding of the organism. The text does a nice job of linking ideas of different fields together, for example, integrating natural selection into population dynamics or introducing evolutionary biology into modern medicine etc. Organisms are performing the evolutionary play in the ecological theater, as Hutchinson (1965) put it. Therefore, the synthetic understanding of the organism should come from the integration of various fields of ecology and evolutionary biology, the process that has not always been straightforward. Suffice to mention the r- and K-selection theory, group selection theory and sociobiology as examples. Overall, the book does illustrate the interconnectedness of environment, ecology, evolution and organism, by pointing out the issues that arise when various concepts are integrated.

I believe the book can be effectively used as a teaching tool by instructors for various introductory courses in ecology and evolution, as interconnectedness and interdependence of ideas in ecology, evolution and organismal biology should be conveyed to students. Due to highly specialized science courses of modern time, it seems to me that students often fail to grasp the intercon-

nectedness of ideas in not only ecology, evolution and organismal biology, but also in different fields of science in general. The accompanying web site of the book offers an access to digital files of the illustrations for instructors' use, which will undoubtedly prove a great teaching supplement. For advanced learners of ecology and evolutionary biology, this book will not satisfy and they are advised to use traditional advanced textbooks. However, this book should still be used by beginning- and intermediate-level students, both major and nonmajor, to understand the basic ideas and fundamental concepts of the "Darwinian biology." This was the level intended by the authors. It can also be used by anyone as a quick reference to refresh their memory of the key concepts of ecology and evolutionary biology.

References

- Case T. J. 2000. *An Illustrated Guide to Theoretical Ecology*. Oxford University Press, Oxford.
- Hutchinson G. E. 1965. *The Ecological Theater and the Evolutionary Play*. Yale University Press, New Haven.

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