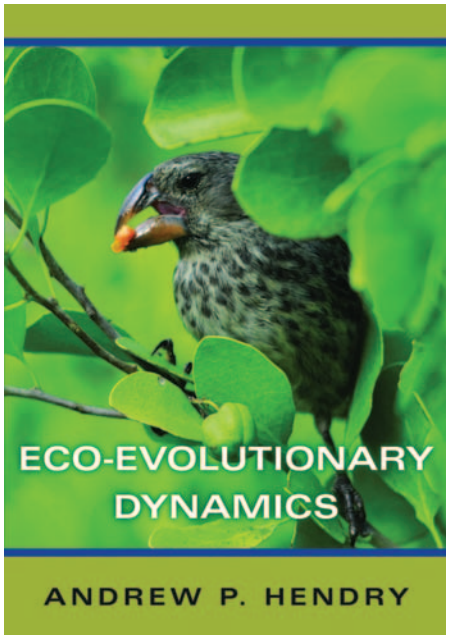

Eco-evolutionary Dynamics. By Andrew P. Hendry. 2017. Princeton University Press. (ISBN 9780691145433). 397pp. Hardcover. $65.00.

This book is based upon the concept that "ecology and evolution are so closely intertwined as to be inseparable." The author provides a thorough and detailed explanation that defines eco-evolutionary dynamics.

The early chapters in this book cover evolution topics such as selection, adaptation, and gene flow. It is filled with data sets and accompanying analysis. Many of the classic model organisms such as finches and stickleback fish are used as exemplars. The middle chapters cover ecological concepts such as community structure and population dynamics. Each chapter connects evolution to ecology, or ecology to evolution. The latter chapters of the book discuss the influence of genetics and "plastic variation."

Throughout the book, the author supports his eco-evolutionary dynamics hypothesis, and also identifies its shortfalls. In many instances, the book describes current and historical studies while pointing out where more experiments need to be conducted. "Eco-evolutionary feedbacks at the community and ecosystem levels must be common, yet relatively few studies have formally tested for their action in the context of contemporary evolution." The last chapter of the book sums up the current knowledge, and what still needs to be addressed.

Eco-evolutionary Dynamics reads somewhat like a textbook, and it is well documented. Over 66 pages of references are cited within the work. Teachers of advanced biology or professors would find this a useful book for professional growth. Many of the examples and graphs could be incorporated into an ecology or evolution lecture, as well as introducing the concept of eco-evolutionary dynamics. The concept of eco-evolutionary dynamics is a hypothesis that deserves a closer look.

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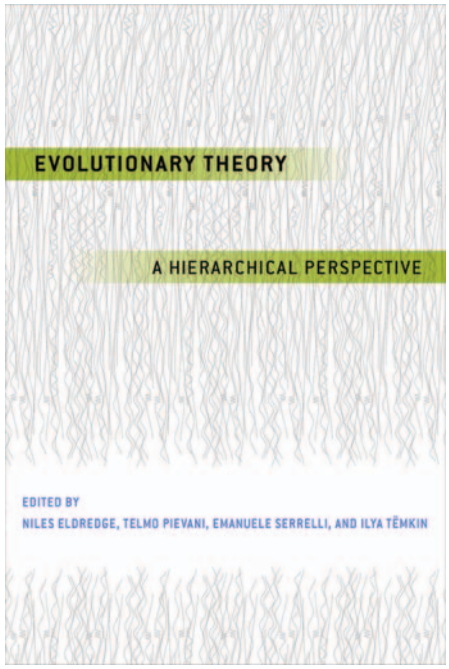

Evolutionary Theory: A Hierarchical Perspective. Edited by Niles Eldredge, Telmo Pievani, Emanuele Serrelli, and Ilya Tëmkin. 2016. The University of Chicago Press. (ISBN 9780226426228) 385 pp. Paperback. $35.00.

Evolutionary Theory is the published culmination of 30 years' worth of collaboration between evolutionary biologists and philosophers of science. It provides a structure for framing our understanding of the relationship between evolution and all other aspects of biology. The book is divided into three parts, along with an introductory chapter and a concluding chapter. The introduction provides the history behind attempts to develop hierarchical thinking in developing evolutionary theory. Chapters in the first part address principles and basic organization of hierarchy as applied to biological evolution. The second part examines integration of hierarchical mechanisms within dynamic processes. The third integrates hierarchical theory and macroevolutionary patterns. The conclusion applies this structure to the extended synthesis debate.

First editor Niles Eldredge has been a key proponent of revolutionizing our understanding of the nature and pace of evolutionary processes. Eldredge, who is a past recipient of NABT's Distinguished Service Award, is emeritus curator of the Division of Paleontology at the American Museum of Natural History. Along with his coauthors and coeditors, he has assembled a diverse collection of chapters on how hierarchical thinking allows us to advance our understanding of the relationship between evolutionary mechanisms and all other aspects of biological history, processes, and dynamics.

Eldredge defines his use of the term "hierarchy" in the introduction: "that biological entities, be they molecules or species, are seen as parts of larger wholes—for example, populations are parts of species—and that this structural organization of biological entities is in itself germane to understanding the evolutionary process" (p. 1). Later in the introduction, he provides a figure that visualizes the correspondence between the ecological hierarchy (from biosphere, through lower levels such as biotic, population, organismal, and cellular) and the evolutionary (genealogical) hierarchy, from the top-level "tree of life" down through monophyletic taxa, populations, germlines, and genomes (Figure 0.2). Pievani returns to this central idea in the conclusion: "Organisms are simultaneously part of the two different interacting hierarchies: as reproducing 'packages' of genetic information (replicators), they are part of the genealogical hierarchy; as matter-energy transfer systems (interactors), they are part of the ecological hierarchy . . . " (p. 353).

The utility of hierarchical thinking in understanding biological history and processes is fully developed in the body of the book. For example, a chapter is devoted to explaining "why genomics needs multilevel evolutionary theory" (ch. 6). The struggle to understand and explain non-coding DNA, transposable elements, and the size of the genome is recast in light of the role of genes, individuals, and evolving populations as hierarchical levels that interact to produce the genome of an individual or a species. Hierarchical thinking has also prompted reinterpretation of the fossil record. Realizing that larger systems are composed of smaller ones, and that "process rates and products, integration, boundaries, spatiotemporal continuity, and other features can be different at different levels of organization" (p. 244) has shifted the way paleontologists view the forces at work and the magnitude of effect when exploring the causes of past events.

Evolutionary Theory is a framework for understanding the history of life on Earth and for coming to grips with ongoing biological processes and