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[Book review]

Introduction to Population Ecology by Larry L. Rockwood, 2006, 340 pages, ISBN 1-4051-3263-9, Blackwell Publishing, paperback, US$44.95.

There have been several introductory population ecology textbooks in recent years, such as Begon et al. (1996), Hastings (1996), Gotelli (2001), Vandermeer and Goldberg (2003) and Ranta et al. (2006). With publication of Introduction to Population Ecology, the question "do we need another text?" comes to mind. Population ecology is indeed a rapidly advancing discipline in the field of ecology. As the synthesis of theoretical and empirical studies is currently underway (Turchin 2003) it is important to introduce students to the field from as many various viewpoints as possible so that they can think and make their own judgment about some of the more controversial, as well as current research topics. All these texts do a wonderful job introducing important concepts that are fundamental to population ecology. However, depending on the target audience, some of these are terse; sometimes a detailed introduction given to theoretical concepts is superficial, while others lack good empirical data illustrating theoretical concepts. Therefore, as long as a textbook provides a different way of approaching concepts and offers some advantage over other books, the answer to the above question is 'yes'. Rockwood's Introduction is a welcome addition to the list.

The book follows a conventional structure of population ecology texts starting with single species population dynamics (Chapters 1 through 6) and ending with interspecific interactions (Chapters 7 through 11). It covers wide ranging concepts from simple, unstructured and unlimited populations to more complex, physiologically (age or stage structures) and spatially structured interacting populations, while discussing other relevant fundamental concepts such as metabolic theory of ecology and life history strategy. In keeping with the simple-to-complex logic, deterministic models were also developed into stochastic ones. Two appendices that dealt with sample exercises and matrix algebra operations and a list of mathematical symbols were provided at the end.

While the structure of the book is somewhat conventional, the coverage of some concepts is significantly deeper than most other texts. For example, one of the advantages of the entire text is that it places a great deal of emphasis on metapopulation dynamics in a variety of contexts because many existing texts lack an adequate discussion of metapopulation structure. While many texts do not even discuss Pulliam's (Pulliam 1988) metapopulation model of source-sink dynamics, Rockwood not only covers the model itself, but also integrates metapopulation concept into discussions of all types of interspecific interactions, even in the context of disease dynamics. Spatial ecology and disease ecology are currently hot fields of study in population and community ecology research. The concept of spatially explicit models, which has rarely been discussed in ecology texts, is covered by the example of Hanski's incidence function model (Hanski 1994). However, discussion of disease ecology was mostly limited to the classic SIR model, but with consideration of metapopulation structure of host organism. The author also included more about interspecific interactions; some other texts limit their coverage to discussion of competition and predator-prey relationships. From these, it is clear that Rockwood attempted to provide more in-depth coverage of these key topics that some other texts only superficially touch on.

Another nice feature of the text is its level of mathematical sophistication that the author tried to balance with topic coverage. Because population ecology is a quantitatively demanding discipline and becoming more so, the challenge should be to acquaint students to the field with an appropriate level of mathematics by making it accessible, rather than circumventing it. This is not a mathematical population ecology book, as it is intended to be an introduction for advanced undergraduate and graduate students, but its coverage of mathematical models go further than most introductory texts. Therefore, some students may be turned away by equations and some basic calculus and linear algebraic operations contained in the text. But if one follows equations and models from the beginning, they are quite accessible and well explained. For example, while some other texts may only mention the eigenvalue of a population projection matrix as being the finite rate of growth for a structured population, this text demonstrates how to solve a characteristic equation to find the