recent books reveals. C. B. Jørgensen's *Bivalve filter feeding* (1990. Olsen and Olsen, Fredensborg, Denmark) is a relatively small (140 p.) but concise treatment of how filter feeding mechanisms are affected by different factors. Population and ecosystem level aspects of bivalves are also discussed but not from the systems ecology perspective. The volume edited by E. Gosling, *The mussel Mytilus* (1992. Elsevier, New York), provides an in depth treatment of biochemistry, genetics, autecology and population ecology of a temperate genus of mussels, with minimal overlap with the present volume. In short, the *Ecology of marine bivalves* is a relatively brief overview of a very broad topic. It will be welcomed by many and criticized by others on this account alone. It will be a useful addition to marine ecologists and especially to ecosystem and systems ecologists.

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PARADIGMS OF POPULATION REGULATION

den Boer, P. J., and J. Reddingius. 1996. **Regulation and stabilization paradigms in population ecology.** Population and Community Biology Series 16. Chapman and Hall, New York. xiii + 397 p. $139.95, ISBN: 0-412-57540-X.

I am writing this review from Tatoosh Island. At this time of year, millions of barnacle cyprids settle out of the water column and attach to rock surfaces in the intertidal. As the primary surface becomes crowded, mortality ensues, and the rate of increase in barnacle density decelerates. This concept of density-dependent regulation is central to modern population and community ecology, and is the subject of an important new treatise by P. J. den Boer and J. Reddingius.

The authors argue that population regulation is controversial because it has been studied from the perspective of two opposing paradigms: the ''systems'' paradigm, which emphasizes mathematical models of competition in closed, deterministic environments, and the ''natural history'' paradigm, which emphasizes the biological details of dispersal and chance events in open, stochastic environments. In seven lengthy chapters, the authors thoroughly explore the history, empirical evidence, and statistical issues in population regulation.

As the authors warn in their preface, the subject is not easy, and I found this to be a dense and difficult book. The text veers unexpectedly from rigorous biometrical proofs to semantic hair-splitting to details of insect life history to philosophical ramblings on the nature of paradigms. In many places, the authors quote extensive passages from other papers, which does not always enhance the readability of the book.

And den Boer and Reddingius are by no means disinterested observers. In their efforts to deconstruct the systems paradigm, the authors are overly opinionated and too quick to dismiss counter evidence. For example, after reviewing a pair of excellent manipulative studies on density regulation, den Boer and Reddingius conclude that regulation cannot be inferred because field enclosures prevented animal migration. But isn't that the point of density manipulations in the first place? One wonders what sort of evidence would convince them that density dependence is important in nature. I was also disappointed to see the recent analyses of chaotic time series by Peter Turchin, Stephen Ellner, and colleagues curtly dismissed in Chapter 2 because ''We are still convinced that 'chaotics' is a mathematical and not a biological phenomenon.'' These statistical probes represent the most exciting new research in population regulation, and they deserve a more sensitive and detailed treatment.

A great strength of this book is that it introduces readers to the ''Dutch school'' of population regulation, which has been neglected by most American ecologists. Indeed, den Boer's extended focus on ''interaction groups'' and open populations predates much of the current interest in metapopulation dynamics. Chapter 4 best illustrates the strengths of the natural history paradigm. Six simulation models nicely demonstrate how open population structure can stabilize abundances even in the absence of density-dependent regulation. For barnacles of Tatoosh, den Boer and Reddingius would be quick to point out that most of the settling cyprids originated from distant sites, so in what sense can we claim that the barnacle ''population'' in a patch—or even of the entire island—is ''regulated''?

Chapter 4 also discusses an outstanding data set: 27 years of pitfall-trap data of carabid beetles collected by den Boer and colleagues from 16 subpopulations at Kralo Heath, Netherlands. Detailed analyses of these data illustrate the importance of migration and population subdivision to the stabilization of animal numbers. The raw data for all subpopulations are generously provided in a series of tables, which should encourage additional statistical explorations.

The book is unfortunately priced beyond the reach of most instructors and graduate students. However, if it appears on the shelves of your library, check it out, head for the nearest natural island, and spend a few days reading and contemplating the nature of population regulation. It's worth the effort.

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