Theory-Based Ecology—a Darwinian Approach by Liz Pásztor, Zoltán Botta-Dukát, Gabriella Magyar, Tamás Czárán, and Géza Meszéna

György Barabás

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One of the defining visions of the 1960s and '70s was a unified population biology in which ecological and evolutionary processes appear on an equal footing. Despite important advances, the general consensus today seems to be that this project was overly ambitious and failed to fulfil its initial promise.

Onto this scene enters "Theory-Based Ecology–a Darwinian Approach" by Pásztor et al., a new population and community ecology textbook attempting a unified treatment of ecology and evolution. The book is threaded along what the authors call the seven "Darwinian principles": those of exponential growth, population regulation, heritable individual differences, finiteness, competitive exclusion, robust coexistence, and tradeoffs. After examining the dynamics of unregulated, exponentially growing populations from all angles (including chapters on structured populations and connecting ecological tolerance with geographical distributions), population regulation and its consequences are discussed in great detail, first for the case of a single regulating factor (trophic interactions, competitive exclusion, and tradeoffs/adaptations are all discussed), and then for several ones leading to robust coexistence and niche partitioning. Finally, demographic stochasticity is discussed, with a closing chapter on global biodiversity patterns.

The book is written from an especially unique and original perspective, not only in terms of its general organization, but also in its particular treatment of various topics such as competitive exclusion and the ecological niche. The book frequently emphasizes that competitive exclusion and natural selection really represent the same fundamental process, be they between species, clones, or alleles. Building on the concept of robust population regulation, the authors present their version of the ecological niche in a chapter that is, in many ways, the cornerstone of the book (ch. 10). Not only do the authors propose a formal niche concept that unifies and makes sense of various traditions in which the word has been historically used, the concept also applies to and remains useful for complex ecological scenarios, e.g., to communities in fluctuating environments or when the interacting species possess age or stage structure. And, all the while, the evolutionary aspect of the niche is emphasized through many examples and a discussion of adaptive diversification.

The book is replete with empirical examples from the modern ecological literature: one of its strengths is the seamless integration of the myriad empirical results with the book's basic thread provided by the Darwinian principles. And while the book does provide some mathematical technique (conveniently separated into theory boxes which may be skipped without breaking the flow of the text), this is by no means a theoretical ecology textbook. It is, instead, a theory-*based* ecology book, most useful for ecologists, graduate students, and advanced undergraduates—empirical and theoretical alike—who wish to see ecology and evolution through a simple, unified perspective. And, while the book is undoubtedly far from being the last word on the subject, it revitalizes and thus hopefully contributes to fulfilling the dream of the '60s and '70s: having a unified population biology, based on simple foundational principles which can be used to explain the living world around us.