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## Mechanisms of Life History Evolution: The Genetics and Physiology of Life History Traits and Trade-Offs

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Variations on evolutionary themes

Editors: Thomas Flatt and Andreas Heyland

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I was a PhD student when Mosaic - the first graphical interface to the internet - emerged, at a time when synthetic books on major themes in ecology and evolution were still required reading. I recall the first few Princeton University Press monographs I purchased, and the early financial constraints that forced me to decide whether to buy first Derek A. Roff's *The Evolution of Life Histories: Theory and Analysis* (1992) or Stephen C. Stearns' *The Evolution of Life Histories* (1992). Such books provided historical frames of reference, reference lists to search through, and the opportunity to find gaps in knowledge on which to plan future careers.

Of course all that changed with the internet. Hyperlinks, referencing software and webs of knowledge are the new library, and we often seem to prefer the gentle warmth of a browser to the pages of a journal or a book. However, Thomas Flatt and Andreas Heyland's *Mechanisms of Life History Evolution: The Genetics and Physiology of Life History Traits and Trade-offs* single-handedly kept me off a computer for a long time and renewed my excitement about books.

Flatt and Heyland have clearly spent much time editing this book and have produced an effective template for an impressive set of authors, organised contributions into coherent sets with logical flow, and offer their own preview of each section. This provides readers with multiple points of access to the material.

The content is motivating. Evolutionary ecology is slowly embracing the possible merits of the genome revolution. The 25 chapters in this book shed light on many advances made in linking tissue-specific and temporal patterns of development that govern intra- and inter-specific variation to gene expression and the endocrine physiological pathways they regulate. We are reminded repeatedly that life history variation requires mechanisms that allow for temporal and spatial variation in development; that resource allocation alone may not underpin trade-offs; and that conservation of genetic and physiological function can be interpreted differently within and between species. It all feels important!

But will it change anything? For some, the most compelling aspects of this book will be the pair of chapters where Stearns and the editors argue over the merits of this "molecular natural history". Is Stearns right to argue that these 25 chapters of molecular natural history are not yet effective because they fail to overturn any of the synthetic, simplifying theory on which our understanding of life history evolution is based? Although these chapters

make for one of the most exciting exchanges in print for a long time, do your utmost to read it last, not first! The core chapters help us think, across the breadth of organisms, about how the molecular natural history of life histories affects life history theory, evolutionary theory, ecological theory and whether (or when) it might reveal new patterns that require new theory.

**Who is it for?** Evolutionary ecologists looking for some molecular biology and molecular biologists looking for some evolutionary ecology.

**Presentation:** Well-structured compilation from field leaders with a real "discussion" at the end.

**Would you recommend it?** Excellent chapters, sections and overview by the editors will turn this book into a much-read, dog-eared reference staple. Highly recommended.

Reviewer :

Andrew P. Beckerman is senior lecturer in evolutionary ecology, University of Sheffield.