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

Thomas Flatt, Andreas Heyland
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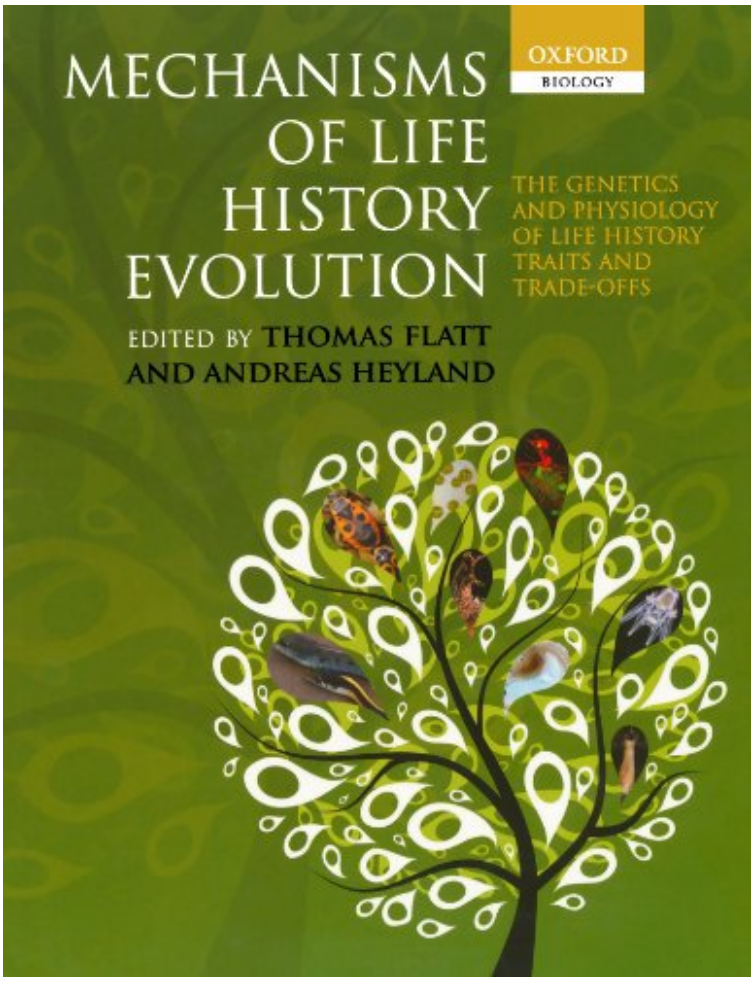

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Thomas Flatt, Andreas Heyland : Mechanisms of Life History Evolution: The Genetics and Physiology of Life History Traits and Trade-Offs before purchasing it in order to gage whether or not it would be worth my time, and all praised Mechanisms of Life History Evolution: The Genetics and Physiology of Life History Traits and Trade-Offs:

0 of 0 people found the following review helpful. Five StarsBy Jose Luis Villarreal BenitezExcellent

Life history theory seeks to explain the evolution of the major features of life cycles by analyzing the ecological factors that shape age-specific schedules of growth, reproduction, and survival and by investigating the trade-offs that constrain the evolution of these traits. Although life history theory has made enormous progress in explaining the

diversity of life history strategies among species, it traditionally ignores the underlying proximate mechanisms. Mechanisms of Life History Evolution argues that many fundamental problems in life history evolution, including the nature of trade-offs, can only be fully resolved if we begin to integrate information on developmental, physiological, and genetic mechanisms into the classical life history framework. Each chapter is written by an established or up-and-coming leader in their respective field; they not only represent the state of the art but also offer fresh perspectives for future research. The text is divided into 7 sections that cover basic concepts (Part 1), the mechanisms that affect different parts of the life cycle (growth, development, and maturation; reproduction; and aging and somatic maintenance) (Parts 2-4), life history plasticity (Part 5), life history integration and trade-offs (Part 6), and concludes with a synthesis chapter written by a prominent leader in the field and an editorial postscript (Part 7).

"This book is a fantastic resource for anyone interested in life history. My own research is moving from behavioural ecology into a more detailed examination of the mechanisms underlying life history trade-offs and I found fascinating insights into the field of life history. The chapters are detailed enough to satisfy me as an experienced researcher, but also would offer a wonderful introduction to graduate students or early career scientists wanting to engage in this field of study. I particularly liked the concluding chapters, which provide insight into the challenges that lie at the intersection between molecular mechanisms and evolutionary outcomes. I am certain that this book is one that will be frequently pulled off my shelf as I work to design and understand my experiments." -- Professor Patricia Moore, University of Exeter, UK"For years there has been a divide between biologists that asked why and those that asked how. This book integrates the two perspectives beautifully, while addressing the most fundamental of all aspects of an organism - its life history. Here we learn how adopting genetic, genomic, and physiological perspectives informs evolutionary patterns of birth, growth, reproduction, ageing, and death. This book comprehensively reviews and informs us about the latest developments in mechanistic and evolutionary approaches to understanding the diversity of life history patterns in nature. With chapters by the authorities and innovators in the field, this is a work that will inform and inspire my laboratory for years to come." -- Professor Allen J. Moore, University of Exeter, UK"Flatt and Heyland have solicited contributions from an impressive array of researchers studying the mechanisms of life history evolution in organisms ranging from algae to humans. This timely volume not only provides a snapshot of our current understanding of the genetic, physiological, and developmental mechanisms of life history evolution, but also points the way toward a promising integration of theoretical and mechanistic approaches to the study of life history evolution. As such, this book complements our understanding of the principles of life history evolution by revealing the diverse and sometimes constraining tools that organisms have evolved to solve their unique ecological puzzles. This comprehensive treatment of the mechanisms of life history evolution is sure to become the subject of many graduate seminars and will be a welcome companion to classic texts on life history theory on comprehensive exam reading lists." -- Professor Andrew McAdam, University of Guelph, Canada"An expanded modern synthesis of evolutionary biology, which truly integrates ecology, evolution, and development, is on the horizon. This edited volume brings together an impressive team of scientists from diverse fields in an attempt to integrate recent advances in the molecular and developmental biology with traditional life history theory. In so doing, this volume will not only inspire a better understanding of the evolution of development, but will also inspire revisions and advances in traditional life history theory, and thus, take us one step closer toward achieving an expanded evolutionary synthesis." -- Professor Ehab Abouheif, McGill University, Canada"Flatt and Heyland's exciting new volume gives a rich harvest of current work on life history evolution across the Animal and Plant kingdoms. Wisely, the editors included several chapters discussing human biology. The diverse species discussed should catalyze biomedical researchers to look beyond the standard animal models of fly, worm, and mouse. Inclusion of diverse life history paradigms will be essential to developing the genomics of life history evolution." -- Professor Caleb E. Finch, University of Southern California, USA "This edited volume provides a fresh and much-needed update to the venerable field of life history evolution by emphasizing the importance of understanding its underlying genetic and molecular basis." -- Professor Gregory Wray, Duke University"In this impressive and substantial edited work, Thomas Flatt and Andreas Heyland have gathered together contributions from numerous authors, many of them leaders in their fields, all aimed at a common goal: the integration of a mechanistic component into life-history theory. Although, as the editors state, this integration is still in its infancy, the volume they have assembled will help enormously in the growth of the infant concerned, which in turn will help in the further integration of evolutionary biology as a whole." -- Professor Wallace Arthur, National University of Ireland, Galway, Ireland"This volume contains an impressive amount of information about the molecular and physiological mechanisms behind life-history trade-offs, with contributions from leading authors in the field. It should be an excellent entry to this vast literature for those who wish to bring the field further and wish to understand how organismal life-histories evolve and the factors that constrain them. The book also includes a critical discussion about the utility of mechanistic knowledge in the development of life-history theory; here radically different viewpoints are contrasted against each other. I recommend this book to those who are interested in this classical field and the many controversies surrounding it." -- Professor Erik Svensson, Lund University, Sweden"This compilation by Flatt and Heyland is especially timely as it fills a long-standing lacuna in the balanced integration of ecology, evolution and

development. The book brings together well written chapters by many leading experts, covering mechanisms of life-history traits and trade-offs in a range of organisms from algae to angiosperms and cnidarians to humans. Unlike in many compilations, the broader issues and questions are always in sight. Section headers that thread together related chapters do a great job of putting the issues in a more general conceptual context, something that will be particularly helpful for graduate students. I can imagine this book being a superb resource for established researchers and graduate students alike." -- Professor Amitabh Joshi, Jawaharlal Nehru Centre for Advanced Scientific Research, India"This book is a fantastic resource for anyone interested in life history. My own research is moving from behavioural ecology into a more detailed examination of the mechanisms underlying life history trade-offs and I found fascinating insights into the field of life history. The chapters are detailed enough to satisfy me as an experienced researcher, but also would offer a wonderful introduction to graduate students or early career scientists wanting to engage in this field of study. I particularly liked the concluding chapters, which provide insight into the challenges that lie at the intersection between molecular mechanisms and evolutionary outcomes. I am certain that this book is one that will be frequently pulled off my shelf as I work to design and understand my experiments." -- Professor Patricia Moore, University of Exeter, UK"The content is motivating. 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. Excellent chapters, sections and overview by the editors will turn this book into a much-read, dog-eared reference staple. Highly recommended." -- Andrew P. Beckerman is senior lecturer in evolutionary ecology, University of Sheffield. Times Higher Education"The volume has an impressive range (covering animals and plants, although taxonomically, the arthropods dominate), arranged into seven parts, with the central five sections focused on key aspects of life-history biology: growth; reproduction; lifespan; plasticity; and tradeoffs. The editors do an impressive job of bringing coherence to the structure of every chapter as well as an introduction to each section. The book is topped and tailed by an introductory call to arms and a concluding critique." -- Mark Viney, Biological Sciences, University of Bristol, Bristol, United Kingdom and Wissenschaftskolleg zu Berlin, Berlin, Germany "...an excellent book to work out of for graduate students as well as researchers interested in ecological and evolutionary genomics...it is a great jumping off point for new investigations and an exchange of ideas within and between groups of theorists and experimental biologists alike." -- Nicholas Achille Blouin, Department of Biological Sciences, University of Rhode Island, American Journal of Human BiologyAbout the AuthorThomas Flatt has been a Group Leader at the Institute of Population Genetics at University of Veterinary Medicine in Vienna since January 2009. His main research interest is in the biology of aging, life history evolution, and evolutionary physiology. He studied biology at the University of Basel, from where he received his M.Sc. in population biology in 1999, for work supervised by Prof. Stephen C. Stearns (Basel) and Prof. Richard Shine (Sydney). In 2004 he earned his Ph.D. in evolutionary biology from the University of Fribourg (under Prof. Tadeusz Kawecki). Between 2004 and 2008 he was a postdoctoral research fellow in Prof. Marc Tatar's laboratory at Brown University (Providence, USA), sponsored by the Swiss National Science Foundation and the Roche Research Foundation. He is a faculty member of the Vienna Graduate School of Population Genetics (Doktoratskolleg Populationsgenetik). He is also currently serving as a deciding editor for the Journal of Evolutionary Biology.Andreas Heyland is an Assistant Professor at the Department of Integrative Biology at the University of Guelph, Canada. He works primarily on the evolution and development of marine invertebrates. His interest in life history theory began as an undergraduate student in the laboratory of the late Paul I. Ward at the University of Zurich. After completing his MSc at the University of Zurich he continued as a Ph.D. student at the University of Florida in Gainesville, exploring the mechanisms underlying metamorphosis. After a post-doc in Neuroscience he started his faculty position at the University of Guelph in Ontario, Canada where he is an Assistant Professor in the Department of Integrative Biology.