

Preface

The aims and audience of *Evolutionary Analysis* have not changed from the first edition to the second. Our goal is still to help students learn how to think like evolutionary biologists. The presentation is intended for undergraduates who are majoring in the biological sciences in preparation for careers in medicine, conservation, education, science journalism, or research. We assume that our readers have finished their introductory coursework and are ready to explore how a course in evolutionary biology can enrich their personal and professional lives.

Our approach and philosophy are also unchanged. Our tack is to present the topics that form the core of evolutionary biology in the same spirit of inquiry that drives research. Wherever possible, we motivate the material with the types of questions that evolutionary biologists ask. Are humans more closely related to chimpanzees or gorillas? If people with the *CCR5-Δ32* mutation are resistant to infection by HIV, will this allele increase in frequency in populations afflicted by the AIDS epidemic? Why did the dinosaurs suddenly go extinct, after dominating the land vertebrates for over 150 million years? Often a theoretical treatment will help to focus these questions, generate hypotheses, and make predictions that can be tested. After introducing the experiments and observations that biologists have used to test competing hypotheses, we analyze the data that resulted and consider what work remains to be done. Throughout the book, our objective is to present evolutionary biology as a dynamic and increasingly interdisciplinary enterprise.

Although the fundamental premise and approach of the book have not changed, its organization has. To align the sequence of chapters more closely with the way that most professors teach the course, we have reorganized the chapters into five units:

- **Part I, Introduction**, demonstrates why evolution is relevant to real-world problems, establishes the fact of evolution, and presents natural selection as an observable process.
- **Part II, Mechanisms of Evolutionary Change**, develops the theoretical underpinnings of the Modern Synthesis by exploring how mutation, selection, migration, and drift produce evolutionary change. The population genetics coverage is dramatically expanded from the first edition, but simplified by the placement of most algebraic treatments in boxes. These chapters have also been enriched by an increased focus on how population and quantitative genetic models can be applied to real-life problems in medicine and conservation.
- **Part III, Adaptation**, is a new unit that begins by introducing methods for studying adaptation, and follows up by offering detailed investigations into sexual selection, kin selection, and selection on life history characters.

- **Part IV, The History of Life**, starts with an analysis of speciation and phylogeny inference methods. Subsequent chapters focus on Precambrian evolution, the Phanerozoic, and human evolution.
- **Part V, Current Research—A Sampler**, includes a chapter treating classical and recent topics in molecular evolution. The unit also contains two new chapters. One of these focuses on evolutionary insights that have emerged from advances in developmental genetics; the other explores applications of evolutionary biology in epidemiology, medical physiology, human behavior, and public health.

As in the first edition, most chapters include boxes that cover special topics or methods, provide more detailed analyses, or offer derivations of equations. All chapters end with a set of questions that encourage students to review the material, apply concepts to new issues, and explore the primary literature.

Website and Transparencies

The companion website for *Evolutionary Analysis* has been revised and expanded. Each unit now includes two case studies. These tutorials challenge students to pose questions, formulate hypotheses, design experiments, analyze data, and draw conclusions. A tutorial for population genetics features problems students can solve using a downloadable simulation. The website also provides answers to selected end-of-chapter questions, guides to exploring the literature, links to other evolution-related sites, and an opportunity to email us with suggestions and comments.

The website for *Evolutionary Analysis* is accessible through the book's homepage at

<http://www.prenhall.com/freeman>

Prentice Hall's commitment to a four-color format for this edition of *Evolutionary Analysis* has enabled us to make the diagrams, data graphics, and photographs easier to interpret and the overall presentation brighter and more accessible. In response to requests from professors using the first edition, a set of 100 full-color overhead transparencies has been developed for the second edition. All transparencies are labeled with large, boldface type for easy reading in the classroom. Professors can get the transparency set by contacting either their local Prentice Hall representative, or Prentice Hall faculty services at (800) 526-0485.

Acknowledgments

We'd like to extend our heartfelt thanks to all of the colleagues who have helped this book serve students better by contributing published reviews, commissioned reviews, emailed suggestions, packets of reprints, and conversations with us at meetings. In particular, the additions and revisions in this edition were inspired by a series of thoughtful and constructive critiques provided by the following colleagues:

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It would be difficult to overemphasize how much this edition has benefited from the care and creativity of these reviewers. In a very real sense, this book is a product of a community that is passionate about the study of evolution and devoted to teaching.

In addition, we'd like to extend our sincere thanks to students who emailed suggestions for improvement. Especially helpful were the formal written critiques contributed by Dr. Peter Wimberger's class at the University of Puget Sound, and many comments and suggestions from our own students at the University of Washington.

We owe a special debt to three colleagues who contributed revisions of key chapters and to Dr. Kathleen Hunt, who contributed revised versions of the end-of-chapter questions. We are tremendously fortunate to have had such talented contributors involved in the preparation of this edition. Specifically, Dr. Michael Hart of Dalhousie University revised the chapters on life history, phylogeny inference, and the Phanerozoic and originated the chapter on evolution and development. His command of the literature and enthusiasm for evolutionary biology were a tremendous asset during the revision process, and his ingenuity and excitement about science made him an absolute joy to work with. Dr. Niles Lehman of the State University of New York, Albany, revised the chapter on the origin of life and Precambrian evolution. His creativity, passion, knowledge, and rapid work were vital in bringing students a fresh and accurate read on this dynamic topic. Dr. David Begun of the University of Toronto updated the chapter on human evolution. His expertise was an invaluable contribution to our coverage of this fast-moving field, and his willingness to work to a tight deadline was greatly appreciated.

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for the book. Andrew Stull was responsible for expanding and improving the website. Executive Marketing Manager Jennifer Welchans is supplying the drive and tools necessary to ensure that professors throughout the world have an opportunity to consider the book for their course.

Finally and most, we thank Editor in Chief of Biology Sheri Snavely, whose vision and energy are the wellspring of this book. Her passion for publishing, infallible instincts, humor, and devotion are a constant source of inspiration.

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