

Contents

<i>Preface</i>	vii		
<i>Contributors</i>	ix		
Section I Introduction	1		
I.1 What Is Evolution?	3		
I.2 The History of Evolutionary Thought	10		
I.3 The Evidence for Evolution	28		
I.4 From DNA to Phenotypes	40		
Section II Phylogenetics and the History of Life	47		
II.1 Interpretation of Phylogenetic Trees	51		
II.2 Phylogenetic Inference	60		
II.3 Molecular Clock Dating	67		
II.4 Historical Biogeography	75		
II.5 Phylogeography	82		
II.6 Concepts in Character Macroevolution: Adaptation, Homology, and Evolvability	89		
II.7 Using Phylogenies to Study Phenotypic Evolution: Comparative Methods and Tests of Adaptation	100		
II.8 Taxonomy in a Phylogenetic Framework	106		
II.9 The Fossil Record	112		
II.10 The Origin of Life	120		
II.11 Evolution in the Prokaryotic Grade	127		
II.12 Origin and Diversification of Eukaryotes	136		
II.13 Major Events in the Evolution of Land Plants	143		
II.14 Major Events in the Evolution of Fungi	152		
II.15 Origin and Early Evolution of Animals	159		
II.16 Major Events in the Evolution of Arthropods	167		
II.17 Major Features of Tetrapod Evolution	174		
II.18 Human Evolution	183		
Section III Natural Selection and Adaptation	189		
III.1 Natural Selection, Adaptation, and Fitness: Overview	193		
III.2 Units and Levels of Selection	200		
III.3 Theory of Selection in Populations	206		
III.4 Kin Selection and Inclusive Fitness	215		
III.5 Phenotypic Selection on Quantitative Traits	221		
III.6 Responses to Selection: Experimental Populations	230		
III.7 Responses to Selection: Natural Populations	238		
III.8 Evolutionary Limits and Constraints	247		
III.9 Evolution of Modifier Genes and Biological Systems	253		
III.10 Evolution of Reaction Norms	261		
III.11 Evolution of Life Histories	268		
III.12 Evolution of Form and Function	276		
III.13 Biochemical and Physiological Adaptations	282		
III.14 Evolution of the Ecological Niche	288		
III.15 Adaptation to the Biotic Environment	298		
Section IV Evolutionary Processes	305		
IV.1 Genetic Drift	307		
IV.2 Mutation	315		
IV.3 Geographic Variation, Population Structure, and Migration	321		
IV.4 Recombination and Sex	328		
IV.5 Genetic Load	334		
IV.6 Inbreeding	340		
IV.7 Selfish Genetic Elements and Genetic Conflict	347		
IV.8 Evolution of Mating Systems: Outcrossing versus Selfing	356		
Section V Genes, Genomes, Phenotypes	363		
V.1 Molecular Evolution	367		
V.2 Genome Evolution	374		
V.3 Comparative Genomics	380		
V.4 Evolution of Sex Chromosomes	387		
V.5 Gene Duplication	397		
V.6 Evolution of New Genes	406		
V.7 Evolution of Gene Expression	413		
V.8 Epigenetics	420		

V.9	Evolution of Molecular Networks	428	VII.5	Sexual Selection: Male-Male Competition	641
V.10	Evolution and Development: Organisms	436	VII.6	Sexual Selection: Mate Choice	647
V.11	Evolution and Development: Molecules	444	VII.7	Evolution of Communication	655
V.12	Genetics of Phenotypic Evolution	452	VII.8	Evolution of Parental Care	663
V.13	Dissection of Complex Trait Evolution	458	VII.9	Cooperation and Conflict: Microbes to Humans	671
V.14	Searching for Adaptation in the Genome	466	VII.10	Cooperative Breeding	677
V.15	Ancient DNA	475	VII.11	Human Behavioral Ecology	683
Section VI	Speciation and Macroevolution	483	VII.12	Evolutionary Psychology	690
VI.1	Species and Speciation	489	VII.13	Evolution of Eusociality	697
VI.2	Speciation Patterns	496	VII.14	Cognition: Phylogeny, Adaptation, and By-Products	703
VI.3	Geography, Range Evolution, and Speciation	504	VII.15	Evolution of Apparently Nonadaptive Behavior	710
VI.4	Speciation and Natural Selection	512	VII.16	Aging and Menopause	718
VI.5	Speciation and Sexual Selection	520	Section VIII	Evolution and Modern Society	727
VI.6	Gene Flow, Hybridization, and Speciation	529	VIII.1	Evolutionary Medicine	733
VI.7	Coevolution and Speciation	535	VIII.2	Evolution of Parasite Virulence	741
VI.8	Genetics of Speciation	543	VIII.3	Evolution of Antibiotic Resistance	747
VI.9	Speciation and Genome Evolution	549	VIII.4	Evolution and Microbial Forensics	754
VI.10	Adaptive Radiation	559	VIII.5	Domestication and the Evolution of Agriculture	760
VI.11	Macroevolutionary Rates	567	VIII.6	Evolution and Conservation	766
VI.12	Macroevolutionary Trends	573	VIII.7	Directed Evolution	774
VI.13	Causes and Consequences of Extinction	579	VIII.8	Evolution and Computing	780
VI.14	Species Selection	586	VIII.9	Linguistics and the Evolution of Human Language	786
VI.15	Key Evolutionary Innovations	592	VIII.10	Cultural Evolution	795
VI.16	Evolution of Communities	599	VIII.11	Evolution and Notions of Human Race	801
Section VII	Evolution of Behavior, Society, and Humans	605	VIII.12	The Future of Human Evolution	809
VII.1	Genes, Brains, and Behavior	609	VIII.13	Evolution and Religion	817
VII.2	Evolution of Hormones and Behavior	616	VIII.14	Creationism and Intelligent Design	825
VII.3	Game Theory and Behavior	624	VIII.15	Evolution and the Media	832
VII.4	Sexual Selection and Its Impact on Mating Systems	632	Index		837