

Preface



Animal Diversity is tailored for the restrictive requirements of a one-semester or one-quarter course in zoology, and is appropriate for both non-science and science majors of varying backgrounds. This fourth edition of *Animal Diversity* presents a survey of the animal kingdom with emphasis on diversity, evolutionary relationships, functional adaptations, environmental interactions, and certainly not least, readability.

We are fortunate to recruit as coauthors Susan L. Keen, who supervised this revision, and David J. Eisenhour. They bring fresh perspectives and the most current coverage from their research areas.

Organization and Coverage

The sixteen survey chapters of animal diversity are prefaced by four chapters presenting the principles of evolution, ecology, classification, and animal architecture. Throughout this revision we updated references and worked to simplify and streamline the writing.

Chapter 1 begins with a brief explanation of the scientific method—what science is (and what it is not)—and then moves to a discussion of evolutionary principles. Following an historical account of Charles Darwin's life and discoveries, the five major components of Darwin's evolutionary theory are presented, together with important challenges and revisions to his theory and an assessment of its current scientific status. This approach reflects our understanding that Darwinism is not a single, simple statement easily confirmed or refuted. It also prepares the student to dismiss the arguments of creationists who misconstrue scientific challenges to Darwinism as contradictions to the validity of organic evolution. The chapter ends with discussion of micro- and macroevolution.

Chapter 2 explains the principles of ecology, with emphasis on populations, community ecology, and variations in life history strategies of natural populations. The treatment includes discussions of niche, population growth and its regulation, limits to growth, competition, energy flow, nutrient cycles, and extinction.

Chapter 3 on animal architecture is a short but important chapter that describes the organization and development of body plans distinguishing major groups of animals. This chapter includes a picture essay of tissue types and a section explaining important developmental features associated with the evolutionary diversification of the bilateral metazoa.

Chapter 4 treats classification and phylogeny of animals. We present a brief history of how animal diversity has been organized for systematic study, emphasizing current use of Darwin's theory of common descent as the major principle underlying animal taxonomy. Continuing controversies over concepts of species and higher taxa are presented, including a discussion of how alternative taxonomic philosophies affect our study of evolution. Special attention is given to phylogenetic systematics (cladistics) and the interpretation of cladograms. Chapter 4 also emphasizes that current issues in ecology, evolution, and conservation biology all depend upon our taxonomic system.

The sixteen survey chapters are a comprehensive, modern, and thoroughly researched coverage of the animal phyla. We emphasize the unifying phylogenetic, architectural, and functional themes of each group. Structure and function of representative forms for major taxonomic groups are described, together with their ecological, behavioral, and evolutionary relationships. Each chapter includes succinct statements of "Position in the Animal Kingdom" and "Biological Contributions." Students find these highlights, a distinctive feature of this text, helpful in organizing their knowledge of animal diversity.

The Linnean classifications in each chapter are positioned following other coverage of a particular group, in most cases immediately preceding the summary at the end of the chapter. Discussions of phylogenetic relationships are written from a cladistic viewpoint, and cladograms are presented to show the structure of each group's history and the origin of the principal shared derived characters. Phylogenetic trees have been drawn to agree with cladistic analyses as closely as possible.