The Speciation and Biogeography of Birds

Ian Newton, 2003.
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BIRDS are an ecologically important and conspicuous component of the fauna throughout the world, with more than 9 700 species inhabiting a diverse range of habitats from the tropics and deserts to the Arctic tundra and Antarctic. Bird species are not distributed evenly throughout the world. Species richness is greatest in tropical habitats (especially in South America), decreasing toward the poles. Furthermore, the distribution of birds varies from species with a global distribution (for example, the Peregrine Falcon) to species, such as the Sydney Rock Warbler, which are restricted to a relatively small geographic area.

The Speciation and Biogeography of Birds, written by Ian Newton, synthesizes current information on the process of species formation in birds and the scientific evidence for past and present geographical distributions. Newton achieves this by presenting evidence gleaned from a variety of scientific disciplines, including ecology, evolutionary biology, genetics, paleontology, geology and climatology.

The nineteen chapters are divided up into six parts, with the first three parts covering the evolution and diversity of birds, major distribution patterns (with an emphasis on island birds and seabirds) and effects of past climate changes. Parts four and five deal with the factors limiting bird species distribution, bird dispersal and migration. Part six synthesizes the book's information and provides a comprehensive conclusion.

The text is well structured, with a logical ordering of chapters. The introductory chapter provides a crash-course in geology, plate tectonics, paleontology and climatology. This assists the reader in the understanding of the factors leading to the distribution of bird species, as discussed in the book's following chapters. Chapters two and three integrate recent advances in DNA studies with traditional methods to ascertain the phylogenetic relationships between bird species. DNA-DNA hybridization, nucleotide sequence analysis and mitochondrial DNA are just a number of molecular methods used in the interpretation of the understanding of bird species relationships. Furthermore, throughout these chapters, there is ample information to assist the reader in understanding the terminology and processes associated with DNA studies. Chapter four, on rounding up Part One, provides a discussion on the estimated number of species and their richness in relation to families, while imparting a cautionary note on interpretation, by providing a comprehensive synopsis of issues associated with the biological, phylogenetic and evolutionary species concepts. Chapter five focuses on the geological factors giving rise to the distribution of birds on the continental landmasses, and Chapters six to eight focuses on island birds and seabirds. Part three, on covering effects of past climate change, focuses primarily on glacial cycles in the Northern Hemisphere, and the factors leading to the distribution (Chapter nine) and speciation (Chapter 10) of birds in these regions. Chapter eleven discusses the effect of past climate changes on birds of tropical regions, although it considers all terrestrial habitats throughout the Southern Hemisphere. Tacked on to the end of Part three is a chapter on disjunct ranges. This chapter follows on quite well to Part four, which comprises four chapters that cover issues of ecological barriers including climate, habitat, food and nest-site, predator, parasite, competition and physical constraint barriers. Chapter 14 covers limitation of geographical ranges, while Chapters 15 and 16 cover recent range changes and cross barrier colonizations. Throughout these three chapters, the influence of humans on the current distribution of bird species is discussed, including the influence of change to habitat, the provision of additional food and water, the role of translocations by humans, as well as distributional changes due to human persecution and conservation measures. Part five covers bird movements through dispersal (Chapter 17) and migration biogeography (Chapter 18). Both chapters are comprehensive, covering all temporal and spatial aspects of bird dispersal and migration.

In *The Speciation and Biogeography of Birds*, Newton takes a global view, as is evident in over 1 200 referenced sources. In conjunction with the detailed definitions provided throughout the text, there is also a 290 word glossary preceding the references, as well as a 38 page index.

Where this book excels is in the quality and clarity of the information presented in the figures and tables. Although only using shades of blue and grey, the figures are clear, well labelled, with informative captions. Many ecology-based books have a tendency to be too specific and complicated with their tables and figures, whereas Ian Newton has included representative examples that illustrate general principles very well, and for this he is to be commended.

It is hard to find flaws in *The Speciation and Biogeography of Birds*, although a couple are worthy of note. There appears to be confusion about the classification of the Australo-Papuan Robins, whereby they are referred to as both the Petroicidae and Eopsaltridae throughout the text. In addition, there is even more confusion on the proper name and reference (in the text and index) to the Western

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Yellow Robin as the Grey-breasted Robin and the species name as *Eopsaltria australis* instead of *Eopsaltria griseogularis*. The book would have benefited from having consistency in the presentation of Concluding remarks and Summary entries at the end of each chapter, as a number of chapters lacked Concluding remarks.

Newton has effectively provided the framework for understanding the speciation and biogeography of much of the world's fauna. Much of this idea stems from the fact that much of what we know about evolutionary ecology and biogeography we know from studies of birds.

This book is targeted at students and young researchers in avian evolution, biogeography and ecology, and more generally to advanced students of population and evolutionary ecology. As Newton states in the Preface however, "... jargon has been cut to a minimum in the hope that the text will be enjoyed by a wider readership, including interested bird-watchers." With the content provided, I believe this book has the potential to also be a valuable reference for tertiary students studying all aspects and fields of speciation and biogeography, especially in the Pacific region. *The Speciation and Biogeography of Birds* encompasses a lot of the speciation and biogeography processes associated with the islands of the Pacific (e.g., the Hawaiian and Galapagos Islands) as well as the continental landmasses and large oceanic expanses of this region. In addition, with the broad coverage of information on genetics and DNA technology, this book is also well suited for students and researchers studying ecological genetics.