

Book review

THE LARGEST AVIAN RADIATION. THE EVOLUTION OF PERCHING BIRDS OR THE ORDER PASSERIFORMES

Jon Fjeldså, Les Christidis, Per G. P. Ericson (Eds)
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Jon Fjeldså (lead editor and author) is an Emeritus Professor at Natural History Museum of Denmark. In addition to sporting a spectacular beard he is a significant scientist and has published extensively on Passeriformes using traditional biogeographic methods and DNA studies. Professor Per G. P. Ericson is based at the Swedish Museum of Natural History, his research is broadly within the fields of systematics, evolutionary biology and palaeobiology. Professor Les Christidis is well known to many readers for his work on the taxonomy of Australian birds with Walter Boles. He is currently Associate Deputy Vice Chancellor (Research) and Dean of the Graduate School at Southern Cross University. All these editors have extensive experience with the systematics and taxonomy of birds.

This is a serious book and not a picture book, checklist or even handbook. It presents a revised evolutionary history of the Passeriformes and reveals the current thoughts on how passerines diversified and dispersed across the globe. It presents and explains the latest phylogenetic history. It identifies adaptational changes, including shifts in life history strategies that underlie major evolutionary expansions. In relation to species, the authors have chosen a conservative approach using the biological species concept rather than the splits suggested in the IOC list and the BirdLife/IBW list, because these have not yet been broadly validated by experts. The authors' aim is to further the development of a unified theory to explain how the prodigious variation of Earth's biodiversity is generated.

The volume is divided in three main sub-divisions. The first presents the modern view on the origins of Passeriformes, which is heavily informed by DNA data. After looking at how passerines came to be such a global presence it looks back to explain why morphological methods failed to reach the modern view, before emphasising DNA data that is used to generate the phylogenies presented in the second section. The second section presents the core and bulk of the book, which opens by outlining principles of modern classification. It then provides the overviews for the 147 families of the Passeriformes. The third section is a series of thematic chapters, which outline the processes that underlie the variation in the global diversity of Passeriformes. This section attempts to explain the new findings at the forefront of macro-ecological and macro-evolutionary research by using the Passeriformes as a model group. To be more up-to-date you would need to search the latest primary literature; this volume's cut-off point was (with exceptions) July, 2018. This final section ends with a synthesis on what has been learnt in understanding the global variation in the diversity of passerines. An appendix follows on global climate and landscape histories, and plate tectonics. This section is intended

as further backgrounding to help the readers understand the Passeriform radiation. The final, and second, appendix describes the methods in detail for generating the time-calibrated tree used in the main classification (presented earlier in the book). The book has a contents, front material e.g. preface, then the three core sections mentioned above that are divided into 20 chapters. Ten chapters are devoted to the second and core section – the *Classification and families of passerine birds*, two appendices, a reference section and an index conclude the book.

The audience being addressed is a professional one. The audience will include all those with an interest in avian taxonomy, evolution and biogeography. It will include all those keen to see the latest and most detailed iteration of the passeriform phylogeny, and those ecologists who include the phylogenetic effects in their studies. The audience will stretch broadly across avian researchers and others. No doubt non-professionals will be drawn to this volume, especially if they are keen to see a well-resolved phylogeny of the Passeriformes. It will be a little less interesting to those working within species, because the book's focus is on higher level taxa.

The strength of this volume lies in its authority. It is the amalgamation of thousands of research papers and 15 years of focused research by international teams, although it began at the natural history museums in Copenhagen and Sweden. Has the text aided the understanding of the discipline? If the discipline is the classification of Passeriformes it has achieved more than any other resource. Yet it goes well beyond this: outlining the past, detailing the present and projecting at least a little into the future. By drawing on so many well-resolved phylogenies of so many species with known life-histories and biogeographies (only perhaps equalled by mammals) it will surely guide the understanding of other groups, in illustrating global patterns in biogeography and speciation. Overall, this volume takes a giant and significant step forward toward finding a unified theory explaining how Earth's biodiversity is generated.

Its educational role is diverse in that it is a resource for researchers and postgraduate students. No doubt it will be useful to some undergraduates. It served me immediately when I wanted to know how the Corvidae are currently structured as I looked into behaviour and brain volume. I now look at the Passeriform phylogenies in its pages with greater excitement and trust. I would teach from it drawing on its core phylogeny, its biogeography, or with reference to the thematic chapters to teach many aspects of evolution. For example, to highlight how my first studies into the Australian Passeriform phylogeny using avian skeletons were limited by convergence and a lack of character differentiation (Fulton and Boles 2002) and how molecular methods have revolutionised the science of systematics, taxonomy and biogeography.

The organisation of the text is entirely appropriate moving through time in the progression of knowledge and by explaining the book and the science before getting the readers immersed in the trees. The thematic chapters of the third section delve more deeply into superfamilies and important concepts that need greater explanation. The reference list of 2400 citations, taken as a rough measure of the level of research, indicates a massive research effort. They are (as far as I have checked) completely

pertinent to the work presented. The writing style is friendly and I found it engaging. However, there will be many new terms for those without a background in systematics and taxonomy, but a glossary is supplied, although I often refer to the internet if I get stuck. Given the level, amount and quantity of information in this volume it is well worthwhile for readers unfamiliar with phylogenetic terms to learn them. I am slightly familiar with the terminology used and I found the text easy to follow.

The phylogenetic trees and various tables are a core component of this book and as such they are presented clearly and well-labelled. They are highly detailed; clearly the clarity and arrangement of these features has been a priority for both the authors and the publisher. Overall the book is permeated with maps and bird paintings. This is done appropriately. All the figures in the book, including bird figures, were painted by the Senior Editor Jon Fjeldså. He has used watercolours, which are not intended to be detailed or used for identification; but, all the pigments are dabbed in the right places so I actually found them to be perfectly useful. Jon's paintings lend an artistic aspect to this technical book that I found aesthetically stimulating.

This is a serious book and I would recommend it to all researchers interested in the phylogenetics of the Passeriformes and the science that underlies the findings. I strongly recommend this book to all relevant universities, natural history museums and other pertinent scientific organisation libraries. Good high-school libraries might benefit from a copy. It is marketed to a broad general audience and I suspect it is not what that audience will be expecting, but if they continue to read and work through it they will become the best informed birdwatchers with a deeper understanding to the Passeriform phylogeny.

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Reference

- Fulton, G. R., and Boles, W. (2002). Pneumaticity of the dorsal foramen and dorsal sulcus of the sternum in Australasian Passeriformes. *The Bulletin of the British Ornithologists' Club* **122**, 304–312.