Bird Species: How They Arise, Modify and Vanish

Author: Linck, Ethan

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BOOK REVIEW

Bird Species: How They Arise, Modify and Vanish

Reviewed by Ethan Linck

1290 Elder Avenue, Boulder, Colorado, USA
ethanblinck@gmail.com

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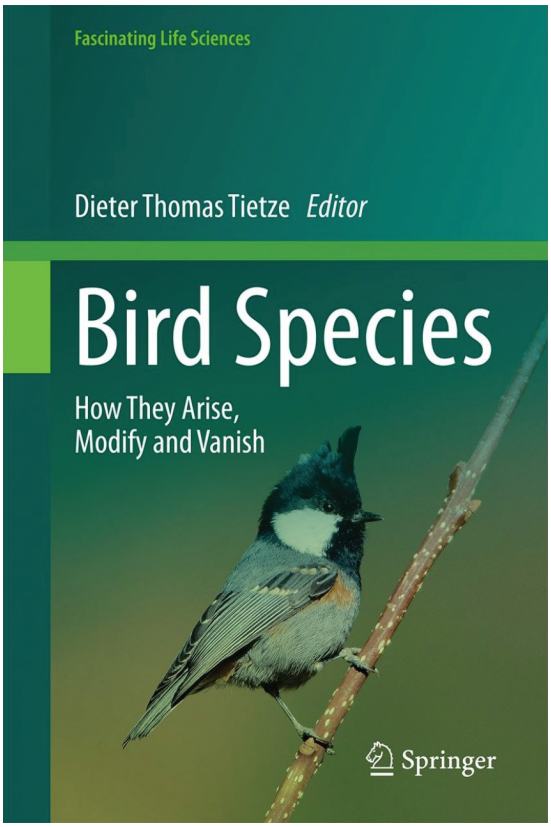
Bird Species: How They Arise, Modify and Vanish by Dieter Thomas Tietze, Editor. 2018. Fascinating Life Sciences Series. SpringerOpen. xii + 266 pp., 44 figures. Gewerbestrasse, Switzerland. $57.49 (hardback), $0.00 (eBook), ISBN 978-3-319-91688-0.

In a draft of a recent manuscript on speciation, I suggested that the field was undergoing a "renaissance," lazily citing several papers from the early 2000s as proof. "An 18-yr-old renaissance?" one of my early editors commented. He was right, and I deleted the line. But it made me reflect on the fact that evolutionary biology's renewed interest in speciation shows no signs of abating, fueled by the explosive proliferation of high throughput sequence data. This is certainly true in ornithology: in 2019 to date alone, *The Auk: Ornithological Advances* has published 4 research articles with "speciation" in the title or abstract. Yet the last major synthesis of speciation in birds, Trevor Price's eponymous textbook (Price 2008), came out over a decade ago, before genomics approaches were widely applied to non-model organisms. The time would seem ripe for a text that updates our state of knowledge with all we have learned in the past decade.



SpringerOpen's *Bird Species: How They Arise, Modify and Vanish* is not that book. It is not even strictly a book about speciation, although given the stated goals in the introduction and a foreword from Price himself, you would be forgiven for thinking otherwise. Instead, it is a wide-ranging survey of bird diversity from an evolutionary perspective: one that centers species as the fundamental unit of study but deviates considerably from the discipline's traditional emphasis on reproductive isolating mechanisms. Interspersed with discussions of the contributions of ecology, allochrony, and hybridization to speciation are chapters that focus on how and why to study morphology and species distributions. Furthermore, by concluding with a focus on climate change and urbanization on bird diversity, *Bird Species* gives ample space to "the other side of the diversification coin," especially the anthropogenic pruning shears now looming over the avian tree of life.

This impressive scope is both a strength and a weakness. "Speciation (like a criminal act) may have been a complex, protracted process, and therefore multiple types of evidence may be useful to highlight various aspects of this process," writes George Sangster in the second chapter, near the end of his convincing argument for the merits of integrative taxonomy. It is a passage that summarizes the book's ethos more generally. By spanning diverse lines of evidence, ideas are reinforced across chapters and topics; for example, niche divergence is considered as it relates to both morphology and geographic ranges. However, at the same time, this approach can leave the book feeling somewhat rudderless and less than the sum of its parts. The overall effect is more that of an introductory textbook than that of a work intended to catalyze a discipline.

That is not to say the book lacks important information for researchers who study bird speciation or indications

as to where the field is heading. Price's introduction highlights previous work detailing the role of avian intelligence in mediating dispersal rates and range expansions, and, by extension, speciation—an intriguing topic that is sadly mostly absent from the rest of the book. I found Pim Edalaar's chapter on ecological divergence in speciation, with its provocative emphasis on phenotypic plasticity, both stimulating and frustrating. On the one hand, it is rich with important ideas: the complex interaction of sexual selection and local adaptation, the prospect of genetic accommodation of traits that might lead to reproductive isolation, and the way in which observed patterns can misrepresent the underlying speciation process. On the other hand, its impact is somewhat hampered by word choice; for example, he frequently uses the phrase "selection of environment" in a way that distinguishes it from the term "habitat choice." I think I know what he means by this phrase, but it is difficult not to confuse it with ecologically mediated natural selection, especially given his broader topic.

More generally, I wanted to see *Bird Species* spend more time addressing 2 questions that editor Dieter Thomas Tietze poses in the introduction: Why do we study speciation in birds in the first place, and how is speciation in birds different from other taxa? Partial answers, both direct and indirect, are given here. Tietze mentions the long history of ornithology and the mounting threat of extinction. Chapters on the roles of song and seasonal migration highlight unique aspects of avian behavior that have influenced population divergence, and there are discussions of the contributions of plumage and sexual selection throughout the text. However, the unusually strong conservatism of avian genomic architecture and limited role for post-zygotic isolating mechanisms in avian speciation are only briefly alluded to. While ornithologists are unlikely to need convincing that the origin of bird species deserves our attention, positioning the field of ornithology within the broader context of evolutionary biology and speciation processes in other lineages is important for its own advancement.

These complaints, however, are minor relative to one of the textbook's greatest advantages: its cost. Available as a fully open access eBook, *Bird Species* can be assigned to advanced undergraduate or graduate students without the worry of imposing a financial burden. For researchers without access to an academic library, or for those who work at institutions with limited resources, the benefit should be equally obvious. This is a significant and laudable contribution, and one that I hope will be a boon to scientists across the world who strive to study avian biodiversity and train the next generation of ornithologists under economic constraints. Because for all of the significant conceptual issues the book raises (or that I wish it had raised), our knowledge of the evolutionary processes responsible for bird species richness is rooted in the wonderful diverse particulars of birds in the wild: in the lives, distributions, and habits of Greenish Warblers *(Phylloscopus trochiloides)*, *Ficedula* flycatchers, Indigobirds *(Vidua chalybeata)*, and Carolina Chickadees *(Poecile carolinensis)*. Describing and interpreting these particulars is both a monumental undertaking and, as *Bird Species* makes clear, a race against time. For that, we need all hands on deck.

LITERATURE CITED

Price, T. (2008). Speciation in Birds. Roberts and Company, Greenwood Village, CO, USA.

Book Review Editor: Jay Mager, j-mager@onu.edu