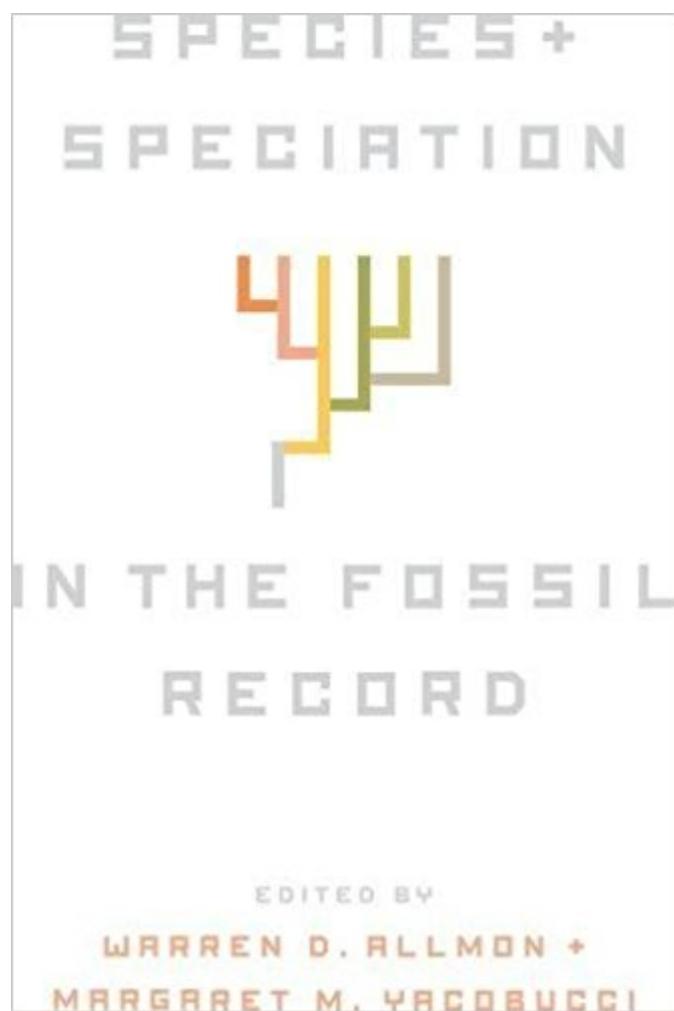


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Species And Speciation In The Fossil Record



Synopsis

Although the species is one of the fundamental units of biological classification, there is remarkably little consensus among biologists about what defines a species, even within distinct sub-disciplines. The literature of paleobiology, in particular, is littered with qualifiers and cautions about applying the term to the fossil record or equating such species with those recognized among living organisms. In *Species and Speciation in the Fossil Record*, experts in the field examine how they conceive of species of fossil animals and consider the implications these different approaches have for thinking about species in the context of macroevolution. After outlining views of the Modern Synthesis of evolutionary disciplines and detailing the development within paleobiology of quantitative methods for documenting and analyzing variation within fossil assemblages, contributors explore the challenges of recognizing and defining species from fossil specimens—and offer potential solutions. Addressing both the tempo and mode of speciation over time, they show how with careful interpretation and a clear species concept, fossil species may be sufficiently robust for meaningful paleobiological analyses. Indeed, they demonstrate that the species concept, if more refined, could unearth a wealth of information about the interplay between species origins and extinctions, between local and global climate change, and greatly deepen our understanding of the evolution of life.

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Customer Reviews

“Core to evolution are the species concept and the origin of species, with ramifications in biology, paleobiology, and philosophy. These thoughtful essays place the questions in a rich

historical context and integrate modern statistical and computational approaches with molecular data to reach a consensus position, with important recommendations in several chapters of key research questions and model assumptions. (Michael J. Benton, University of Bristol, author of "When Life Nearly Died: The Greatest Mass Extinction of All Time")

Species are THE fundamental unit for evolutionary studies, but many aspects of their recognition and definition get tossed around without really being examined. Allmon and Yacobucci are trying to change that, having encouraged their chapter authors to be explicit about their own approach to defining and recognizing species, and to discuss how their approach trickles down into their research. A significant project that will be valuable to working paleontologists and biologists, *Species and Speciation in the Fossil Record* will serve its purpose nicely. (Dana Geary, University of Wisconsin-Madison)

"Darwin's famous title, *On the Origin of Species*, implies that the very issue of biological evolution centers on species. But what are species? Darwin began his evolutionary explorations agreeing with early naturalists, like Giambattista Brocchi, who thought species, just like their component individual organisms, are discrete entities, with naturally caused births, histories, and eventual deaths, strung together into ancestor-descendant lineages. But, after discovering natural selection in the late 1830s, Darwin switched his concept of species, adopting instead the other great evolutionary pioneer Jean-Baptiste Lamarck's vision of species as arbitrarily defined segments of a smoothly evolving evolutionary continuum. These dual concepts of species as seen in the fossil record have survived in variant forms down to the present day. Allmon and Yacobucci's book traces all the nuances of discord that have continued to plague the meaning of the term species, bringing the best minds together to produce a succinct overview of the nature of species and the role species play in the evolutionary process, especially as seen in the fossil record. Thanks to this book, much of the disparities historically seen between paleontological and neontological species melt away—and the strong role that speciation plays in the history of life comes to the fore in a unified and coherent manner. (Niles Eldredge, curator emeritus of paleontology, American Museum of Natural History)

Warren D. Allmon is director of the Paleontological Research Institution in Ithaca, New York, and professor in the Department of Earth and Atmospheric Sciences at Cornell University. Margaret M. Yacobucci is professor of geology at Bowling Green State University.

I've been teaching "Principles of Systematics" in the University of California for many years. The

course is oriented toward neontologists--folks who work on extant organisms, not fossils--but I have always touched on the applicability of taxonomic concepts in paleontology. The treatment has been brief; I've told the students "In paleo we almost always have nothing to work with but morphology. The only workable paleospecies concept is that if two fossils look sufficiently different that if they were coexisting today and all we had to go on was morphology we would call them separate species, we should do so in the fossil record." We--a group of paleontology and paleoanthropology and evolutionary biology grad students, a faculty colleague who is a paleontologist, and me-- just concluded a quarter-long seminar on this book and correlated readings. Guess what our take-home from the book is? Bingo. If you already knew that you needn't read the book.

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