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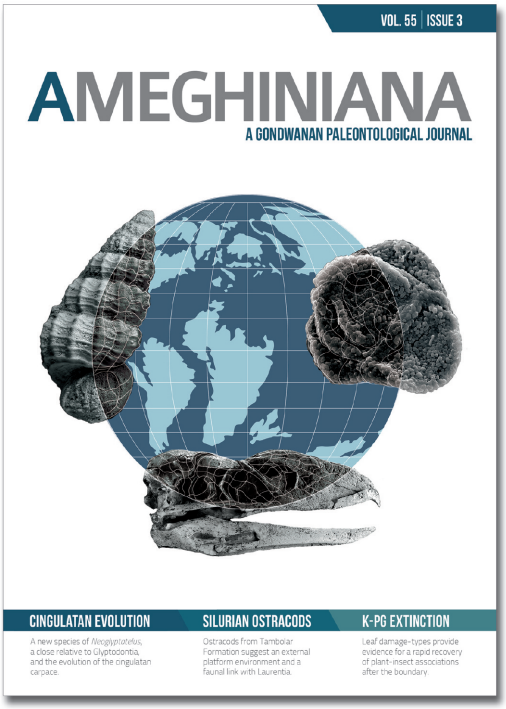

EVOLUTION OF SOUTH AMERICAN MAMMALIAN PREDATORS DURING THE CENOZOIC: PALEOBIOGEOGRAPHIC AND PALEOENVIRONMENTAL CONTINGENCIES

Francisco J. Prevosti and Analia M. Forasiepi. Springer Nature, 196 pp, ISBN 978-3-319-03700-4.

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EVOLUTION OF SOUTH AMERICAN MAMMALIAN PREDATORS DURING THE CENOZOIC: PALEOBIOGEOGRAPHIC AND PALEOENVIRONMENTAL CONTINGENCIES. *Francisco J. Prevosti* and *Analia M. Forasiepi*. Springer Nature, 196 pp, ISBN 978-3-319-03700-4.

Mammals that obtain nourishment from other vertebrates have come in many shapes and sizes throughout the Cenozoic. In the modern world these predators are almost exclusively members of the Carnivora, with the exception of Australia and some adjacent territories, where marsupial predators still hold on in the face of introduced carnivorans. In the not-too-distant past, however, the situation was quite different. Until only a few million years ago, the herbivores of South America were preyed upon by giant birds and by mammalian predators unrelated to those living today. This new book by Prevosti and Forasiepi is about these mammalian predators, their history, and the invaders from the north that replaced them during the Great American Biotic Interchange (GABI).

The book is divided into six chapters, with the first being an introduction to carnivores in general and the differences between various groups of carnivores, including Sparassodonta (the endemic South American carnivores), the Hyaenodonta ('Creodonta' in older terminology—an extinct group of predators distantly related to modern carnivores), and Carnivora, the globally dominant carnivores of today. The chapter also outlines carnivore biogeography and provides a necessary introduction to the South American Land Mammal Ages (SALMAs), as a backdrop to the following chapters.

The second chapter is devoted to the complex geological history of South America. In a series of sections, the chapter addresses the determinants of the changing South American climate, the complex tectonic history of the Andes, sea level changes, the dynamics of biotic change on the continent, and the GABI. All the sections are of necessity brief and each could form the topic of a separate book. Some of these topics, notably the tectonic history of the Andes, have been rather too summarily treated, especially because readers might be interested in South American predators without being particularly familiar with South American geology. Nevertheless, the sections fulfill an important function and the references included allow the reader to chase down the more detailed literature.

Chapter three is an encyclopedic review of the fossil record of the endemic South American sparassodont predators. For most readers this will be the most important chapter, replacing the reviews by Marshall from the late 70s and early 80s. The literature on sparassodonts is diverse and scattered and, at least for those of us based outside South America, not always easy to access and this makes the chapter invaluable for anyone even remotely interested in the topic. The chapter brings into focus the strikingly low species richness of Sparassodonta throughout the Cenozoic. This has been commented on many times in the past, including by me, but a compilation such as this brings it to the fore. Nonetheless, it was surprising to me how little material the majority of the sparassodont taxa is based on: in many cases just a specimen or two, often fragmentary. This raises several interesting questions by comparison with Carnivora. Judging purely by the numbers, it appears that sparassodont taxa are known from fewer specimens than most carnivoran taxa. Overall, the pattern for sparassodonts seems most consistent with that of felids among carnivorans. This is reasonable, given the hypercarnivore nature of sparassodonts (as judged by dental morphology), and if this could be verified it might shed some light on the ecological relationship between sparassodonts and their prey and the role of sparassodonts in the ecosystem.

Chapter four follows the same setup as chapter three but deals with the immigrant Carnivora. The first family of northern immigrants to reach South America was the Procyonidae, which arrived as early as the late Miocene, between 7 and 8 Ma, in the form of *Cyonasua*. Thus, Carnivora was one of the northern mammal groups to reach South America prior to the main GABI, at around 3 Ma. The remainder of carnivoran families present in South America today presumably arrived during or after the main GABI. The fossil record around the time of the main GABI is limited and

many groups and taxa appear to arrive around 2 Ma or later, which may be accurate or may reflect the biases of the fossil record. For those not familiar with the modern South American carnivoran fauna it should be noted that the vast majority of carnivoran species on the continent today evolved there; it is their ancestors that migrated from the north.

The fifth chapter is devoted to a discussion of biases in the record. I am pleased to see such a chapter, as biases are often forgotten in similar compilations. It is a short chapter, but important, especially in relation to chapter six, which deals with the evolution and context of predator presence in South America. This chapter ranges widely and includes discussions of diet and body size evolution, the relationship to other endemic predators, such as the 'terror birds' (Phorusrhacidae), and, most importantly for this commentator, the relationship between sparassodonts and carnivorans. This latter issue generally revolves around the GABI and whether sparassodonts became extinct prior to the major immigration of carnivorans from the north or whether they were outcompeted by immigrating carnivorans. This is a topic I have on occasion debated with the authors, who have taken the former standpoint and I the latter. However, given the data and analyses in this book, and taking the biases in the fossil record into account, I now believe that the data are not adequate to answer the question. The debate goes on.

In summary, this book contains a wealth of data and many insightful analyses. It is a must for anyone interested in the evolution of the South American biota, as well as anyone interested in the evolution of mammalian predators. Get it, read it, use it!

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