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0521021197 - Evolution of Herbivory in Terrestrial Vertebrates: Perspectives from the Fossil Record

Edited by Hans-Dieter Sues

Frontmatter

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Evolution of Herbivory in Terrestrial Vertebrates Perspectives from the fossil record

Although herbivory probably first appeared over 300 million years ago, it only became established as a common feeding strategy during Late Permian times. Subsequently, herbivory evolved in numerous lineages of terrestrial vertebrates, and the acquisition of this mode of feeding was frequently associated with considerable evolutionary diversification in those lineages. This book represents the first comprehensive overview of the evolution of herbivory in land-dwelling amniote tetrapods in recent years. In *The Evolution of Herbivory in Terrestrial Vertebrates* leading experts review the structural adaptations for, and the evolutionary history of, feeding on plants in the major groups of land-dwelling vertebrates, especially dinosaurs and ungulate mammals. As such it will be the definitive reference source on this topic for evolutionary biologists and vertebrate paleontologists.

HANS-DIETER SUES is Vice-President for Collections and Research at the Royal Ontario Museum in Toronto, and Professor of Zoology at the University of Toronto. He is interested in the evolution of late Paleozoic and Mesozoic tetrapods, especially dinosaurs and their relatives, and patterns of ecosystem change through time. Professor Sues has co-edited two other volumes, *Evolution of Terrestrial Ecosystems Through Time* (1992) and *In the Shadow of the Dinosaurs: Early Mesozoic Tetrapods* (1994).

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Preface

This book presents a collection of paleontological perspectives on the origin and evolution of herbivory in various major taxa of terrestrial vertebrates. The complex interactions between plants and their animal consumers have long been the subject of much interest to evolutionary biologists. At the same time, most studies exploring coevolutionary relationships have focused on extant organisms, and generally little attention has been paid to the historical development of plant–animal interactions through time documented by the fossil record.

Most contributors to this volume review the nature and acquisition of structural features of the skull and dentition suitable for feeding on high-fiber plant material in various major lineages of herbivorous tetrapods. In some instances, they also discuss other lines of evidence (such as isotopic data) bearing on this issue as well as the possible impact of herbivory on the evolutionary diversification of that group. Traditionally, paleobiological studies have assumed a direct relationship between form and function, but current research on the functional morphology of extinct organisms is much more mindful of the inherent theoretical and practical difficulties in reconstructing the habits of ancient organisms. The present volume cannot and does not provide a comprehensive account of herbivory in extinct vertebrates. Rather, it is intended as a review of current research on some of the key issues for advanced students of evolutionary biology, historical ecology, and paleobiology and, it is to be hoped, as a stimulus for further work.

Most chapters are based on contributions presented at a symposium on the evolution of herbivory in insects and terrestrial vertebrates held during the Sixth North American Paleontological Convention (NAPC-96) at the Smithsonian Institution in Washington, D.C. in June 1996. Special

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As editor, I am indebted first to the contributors, for taking part in this project, for (in some cases) meeting deadlines, and for cheerfully putting up with my editorial efforts. At Cambridge University Press, I would like to thank Robin Smith, who first encouraged me to compile this collection of papers, and Tracey Sanderson for her continuing encouragement and support. During the editing of this volume, I have heavily relied on the expertise of many reviewers. I would like to acknowledge the generous assistance and thoughtful comments provided by Richard Beerbower (State University of New York, Binghamton), Robert L. Carroll (McGill University), Peter Dodson (University of Pennsylvania), Robert J. Emry (Smithsonian Institution), James O. Farlow (Indiana University–Purdue University, Fort Wayne), Mikael Fortelius (University of Helsinki), the late Nicholas Hotton III (Smithsonian Institution), John P. Hunter (New York College of Osteopathic Medicine, Old Westbury), Christine M. Janis (Brown University), Gillian King (University of Cambridge), Paul L. Koch (University of California at Santa Cruz), David B. Norman (University of Cambridge), Robert R. Reisz (Erindale College, University of Toronto, Mississauga), Richard K. Stucky (Denver Museum of Natural History), David B. Weishampel (The Johns Hopkins University), and Jeffrey A. Wilson (University of Chicago). I thank Janice Robertson for her careful copy-editing and especially Joan Burke (Royal Ontario Museum) for her meticulous proof-reading.

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