

## THE CRATO FOSSIL BEDS OF BRAZIL

### Window into an Ancient World

This beautifully illustrated volume describes the entire flora and fauna of the famous Lower Cretaceous Crato Formation of Brazil – one of the world's most important fossil deposits, exhibiting exceptional preservation. For the first time, the entire fossil assemblage is brought together in a single volume.

Chapters on the fauna cover a range of invertebrates including arachnids, crustaceans and an immense number of insect groups, while vertebrates are treated in chapters on fishes, anurans, lizards, turtles, crocodiles, pterosaurs and birds. A diverse flora is described in chapters on macrophytes ranging from ferns to some of the earliest angiosperms, including eudicots. Palynomorphs are also considered. Virtually all species are illustrated, many for the first time and some in full colour, while numerous interpretative drawings add to the scientific value of this work. Many new species and higher taxa are described. The fossil descriptions are supported by detailed explanations of the geological history of the deposit and its tectonic setting. Each chapter also contains a comprehensive bibliography.

Drawing on expertise from around the world and specimens from the most important museum collections, this book forms an essential reference for all researchers and enthusiasts with an interest in Mesozoic fossils, and will provide a springboard for further research.

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Window into an Ancient World

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## Contents

<i>Contributors</i>	<i>page</i> viii
<i>Preface</i>	xi
<i>Acknowledgements</i>	xiv
<b>Part I The Crato Formation Konservat Lagerstätte</b>	
1 Introduction to the Crato Formation <i>David M. Martill and Günter Bechly</i>	3
2 The geology of the Crato Formation <i>David M. Martill</i>	8
3 Stratigraphy of the Crato Formation <i>David M. Martill and Ulrich Heimhofer</i>	25
4 The sedimentology and depositional environment of the Crato Formation <i>Ulrich Heimhofer and David M. Martill</i>	44
5 Commercial exploitation of the Crato Formation <i>José Artur Ferreira Gomes de Andrade</i>	63
6 Preparation techniques for Crato Formation fossils <i>Michael Schwickert</i>	70
<b>Part II The invertebrate fauna</b>	
7 Taphonomy and preservation of Crato Formation arthropods <i>Federica Menon and David M. Martill</i>	79
8 Chilopoda: centipedes <i>David M. Martill</i>	97
9 Arachnida: spiders, scorpions and allies <i>Jason A. Dunlop, Federica Menon and Paul A. Selden</i>	103
10 Crustacea of the Crato Formation <i>Günter Schweigert, David M. Martill and Mark Williams</i>	133

vi	<i>Contents</i>	
11	Insects of the Crato Formation	142
11.1	Introduction <i>Günter Bechly</i>	142
11.2	Apterygota: primarily wingless insects <i>Arnold H. Staniczek and Günter Bechly</i>	149
11.3	Persisting-type stem-group Ephemeroptera <i>Rainer Willmann</i>	154
11.4	Ephemeroptera: mayflies <i>Arnold H. Staniczek</i>	163
11.5	Odonata: damselflies and dragonflies <i>Günter Bechly</i>	184
11.6	Dermaptera: earwigs <i>Fabian Haas</i>	222
11.7	Mantodea: praying mantises <i>David A. Grimaldi</i>	234
11.8	'Blattaria': cockroaches and roachoids <i>Günter Bechly</i>	239
11.9	Isoptera: termites <i>Günter Bechly</i>	249
11.10	Chresmododea: fossil 'water striders' <i>Günter Bechly</i>	262
11.11	Orthopterida: grasshoppers, crickets, locusts and stick insects <i>Sam W. Heads and Rafael G. Martins-Neto</i>	265
11.12	Cicadomorpha: cicadas and relatives <i>Federica Menon, Sam W. Heads and Jacek Szwedo</i>	283
11.13	Fulgoromorpha: planthoppers <i>Jacek Szwedo</i>	297
11.14	Coleorrhyncha: moss bugs <i>Günter Bechly and Jacek Szwedo</i>	313
11.15	Heteroptera: bugs <i>Yuri A. Popov and Günter Bechly</i>	317
11.16	Neuropterida: snakeflies, dobsonflies and lacewings <i>Rafael G. Martins-Neto, Sam W. Heads and Günter Bechly</i>	328
11.17	Coleoptera: beetles <i>Karin Wolf-Schwenninger and Wolfgang Schawaller</i>	338
11.18	Hymenoptera: bees, wasps and ants <i>Till Osten</i>	350
11.19	Mecoptera: scorpionflies <i>Günter Bechly</i>	365

<i>Contents</i>		vii
11.20	Diptera: true flies, gnats and crane flies <i>Jana Willkommen and David A. Grimaldi</i>	369
11.21	Trichoptera and Lepidoptera: caddisflies and butterflies <i>Günter Bechly</i>	387
<b>Part III The vertebrate fauna</b>		
12	The Crato Formation fish fauna <i>Paulo M. Brito</i>	429
13	Anurans of the Crato Formation <i>Maria Eduarda C. Leal, David M. Martill and Paulo M. Brito</i>	444
14	Turtles of the Crato Formation <i>Darren Naish</i>	452
15	Lizards of the Crato Formation <i>David M. Martill</i>	458
16	Crocodylians of the Crato Formation: evidence for enigmatic species <i>Eberhard 'Dino' Frey and Steven W. Salisbury</i>	463
17	Pterosaurs of the Crato Formation <i>David M. Unwin and David M. Martill</i>	475
18	Birds of the Crato Formation <i>Darren Naish, David M. Martill and Ian Merrick</i>	525
<b>Part IV The flora</b>		
19	The macrophyte flora of the Crato Formation <i>Barbara A. R. Mohr, Mary E. C. Bernardes-de-Oliveira and Robert F. Loveridge</i>	537
20	Spores and pollen from the Crato Formation: biostratigraphic and palaeoenvironmental implications <i>David J. Batten</i>	566
<b>Part V Miscellanea</b>		
21	Miscellaneous biota <i>David M. Martill</i>	577
	<i>Appendix: species list for the Crato Formation</i> <i>David M. Martill, Günter Bechly and Sam W. Heads</i>	582
	<i>Systematic index</i>	608

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## Preface

In the late 1830s Scottish botanist, surgeon and explorer George Gardner (1810–1849) made his way on horseback from the picturesque spring-line village of Brejo Grande towards the now palaeontologically famous town of Santana do Cariri on the flanks of the Chapada do Araripe. In his published diaries (Gardner, 1846) it is noted that parts of the track were naturally paved in a slabby limestone. Some of these exposures still exist, although this picturesque country track has recently been resurfaced. What Gardner didn't record was that these limestones contain a wealth of fossils, some of which are spectacularly preserved and the *raison d'être* for this book. Although primarily a botanist, Gardner had a keen interest in fossils and, just a few weeks earlier, he had been exploring outcrops where carbonate nodules contained three-dimensionally preserved fishes: the so-called Santana Formation fish nodules, often seen for sale in fossil shops around the world.

Gardner shipped many of the fish-bearing nodules back to Scotland where they formed the basis of studies by the famous ichthyologist Louis Agassiz (1807–1873; Agassiz, 1841, 1833–1844a, 1844b), but the fossils in the slabby limestones seemed to pass him by. Perhaps it was because few quarries excavated the stone at this time, houses then being constructed mainly of mud and sticks or, for the wealthier, bricks made in the traditional style using locally dug alluvial clays.

Even 20 years ago fossils from the Crato Formation were still hardly known. Description of the fossil fish *Dastilbe*, the commonest macrofossil in the Crato Formation, didn't occur until 1947, over 100 years after Gardner's first mention of the rocks (Silva Santos, 1947). Shortly after the description of the fish the first fossil insects from the limestones were described (Costa Lima, 1950), but serious palaeontological research did not commence until the 1980s when Brito (1984, 1987), Campos (1986), Kellner and Campos (1986) and Martins-Neto and Kellner (1988) described elements of the fauna and Duarte (1985) described the first floral remains.

These announcements coincided with the commencement of a major increase in the commercial extraction of the Crato limestones or so-called *pedra de larje*. Today, specimens of *Dastilbe* can be purchased in fossil shops around the world or on the Internet, and the number of scientific papers describing Crato fossils is in the hundreds. From an initial faunal list of a single fish and an unnamed mayfly larva in the middle of the twentieth century, the faunal and floral list today includes over 100 insect species, nine species of fish and nearly a dozen arachnids. Turtles, lizards and even a bird are known, but among the vertebrates the formation is gaining prominence for the diversity and spectacular preservation of its pterosaurs.

The Crato Formation has the most diverse fossil assemblage for any non-marine Cretaceous locality in Gondwana, and perhaps Laurasia too. Museum collections around the world are full of new species of Crato insects, plants and even pterosaurs just waiting to be described. This book brings together the various components of the palaeobiota and attempts to describe the ancient environments represented by the formation. It is one of the clearest windows yet into the Mesozoic, and although its edges may still be misty, a picture of a Cretaceous low-latitude environment is becoming much, much clearer.

D. M. Martill, G. Bechly and R. F. Loveridge 2007

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*Preface*

xiii

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xv

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