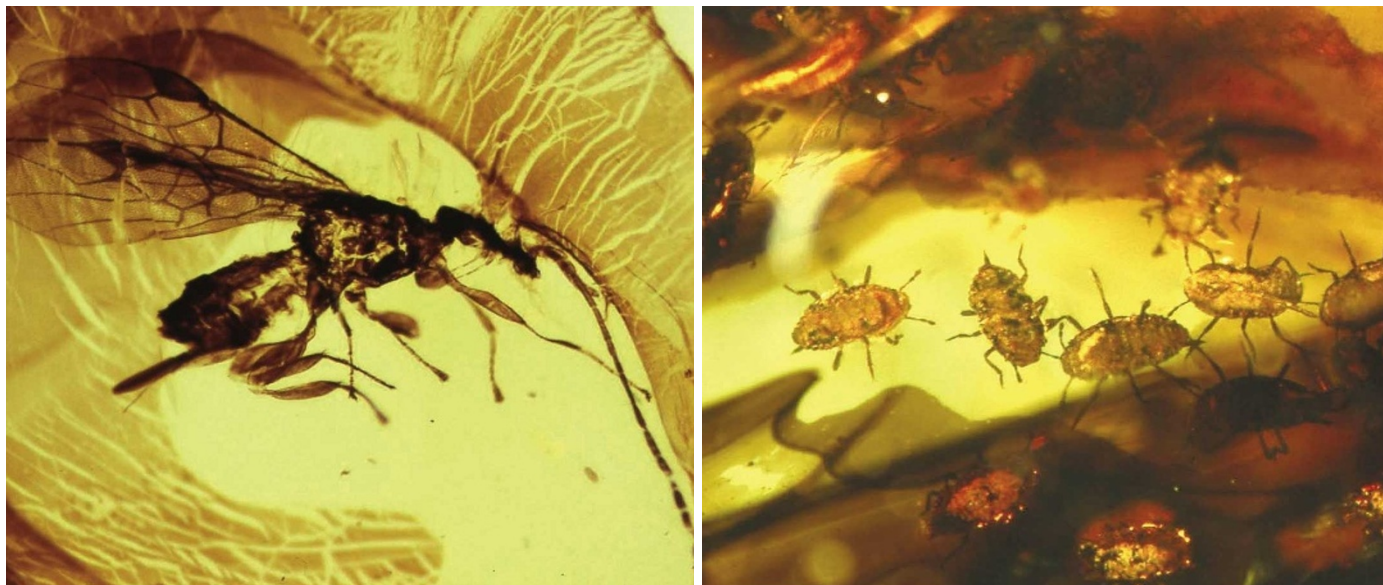


BOOKS & ARTS



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Pest friends in the Cretaceous

Fossils preserved in amber hint at surprising links between dinosaurs and their insect contemporaries.

What Bugged the Dinosaurs? Insects, Disease, and Death in the Cretaceous

by George Poinar Jr and Roberta Poinar
Princeton University Press: 2008. 296 pp.
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Karen Chin

Dinosaurs are usually portrayed as the pristine masters of the Cretaceous. George and Roberta Poinar's new book presents a different view — dinosaurs besieged by swarms of insects; dinosaurs with oozing, infected bites; dinosaurs weakened by parasite-induced illnesses.

What Bugged the Dinosaurs? draws on the Poinars' many studies of fossils in amber to show how dinosaurs interacted with their more abundant invertebrate contemporaries. Amber preserves a serendipitous selection of soft-bodied or lightly skeletonized organisms that were small enough to be mired in tree resin (pictured). The Poinars focus on exquisitely preserved fossil organisms from three key deposits: 135-million- to 130-million-year-old Lower Cretaceous Lebanese amber; 105-million- to 97-million-year-old Middle Cretaceous Burmese amber; and 79-million- to 77-million-year-old Upper Cretaceous Canadian amber.

Many of these fossils are insects, the most diverse group of multicellular organisms on Earth. Familiar creatures such as biting midges, aphids and black flies were common in the Cretaceous alongside bizarre specimens with

odd features as well as less charismatic invertebrates, such as ticks and nematodes.

The authors make the case for regular contact between numerous different invertebrates and dinosaurs. Bloodsuckers, scavengers, dung-eaters and parasites would have been particularly interested in the resources in and emanating from the dinosaurs' large bodies. Such opportunists would then have been ideal vectors for diseases. Just as close relationships between vectors and pathogens are common today — for example, diseases such as anthrax, malaria and plague can all be transmitted by insects — so dinosaurs might have contracted diseases.

In a few cases the evidence for interactions is strengthened by rare fossils such as insect borings in bone and dung-beetle burrows in fossil faeces. Most striking are the blood- and pathogen-filled sand-fly guts that support the spectre of bloodsucking insects dining on dinosaurs.

Other relationships can be predicted by considering the body structure of Cretaceous organisms together with the behaviour of their modern relatives. The often surprising and complex examples of interactions between modern organisms (such as lizards, which can acquire parasitic stomach worms by eating infected ants) expand our perceptions of how ancient ecosystems may have been structured. The authors create vivid images of the Cretaceous in which dinosaurs browsing in lush forests disturbed plant-eating insects and were, in turn, set upon by hordes of biting insects.

Reconstructing ancient ecosystems is an ambitious undertaking. We scarcely understand the intricacies of modern ones, much less those for which we have spotty fossil evidence. Limiting palaeontological studies to simple lists of fossil organisms diminishes our ability to comprehend the complex interrelationships of past ecosystems. Integrative approaches such as those in *What Bugged the Dinosaurs?* help us build up more sophisticated visions of the past.

But terrestrial life on Earth has evolved since the Cretaceous, and some ecological interactions may have changed as well. Thus, as new fossil evidence helps fill in our picture, we should be on the lookout for patterns in resource utilization that are different from today's. After all, the dinosaur-dependent insects that survived the Cretaceous/Tertiary mass extinction certainly had to adjust to life without the big guys.

To paraphrase John Donne, no dinosaur is an island. Although vertebrate palaeontologists acknowledge the ubiquity and abundance of insects, we are often vertebrate chauvinists. This book reminds us to consider the profound influence of insects and other invertebrates. We have much to learn about and from them. ■ Karen Chin is an assistant professor of geological sciences and curator of palaeontology at the Museum of Natural History, University of Colorado, UCB 265, Boulder, Colorado 80309, USA.