

Preface

Organisms are morphologically complex and thus, studying their morphological response to environmental change over time and space can shed light on the tempo and modes of evolution. Identifying the various environmental parameters in deep time and additionally, determining the precise modes of evolution in extinct organisms still remains one of the greatest challenges in Earth's history.

In this book, evolutionary mechanisms in extinct organisms were described to understand how organisms evolved in deep time. Novel approaches were used in solving complex hypotheses in popular aspects of evolutionary biology, such as the theories of phyletic gradualism and punctuated equilibrium. A statistical analysis was carried out to see which of these evolutionary theories are dominant in extinct invertebrates. Such studies have implications in predicting future biodiversity, ecosystem conservation, and climate change. [Chapter 1](#) discusses the history of evolutionary theories and progressive advancements in this field of study. [Chapter 2](#) discusses the major findings of evolutionary patterns observed in a Devonian brachiopod fossil lineage. [Chapter 3](#) discusses the comparative morphologies observed in fossil brachiopod lineages across correlated geological strata in the Devonian time period and gauges the scope of environmental change in terms of local or regional aspect. [Chapter 4](#) discusses the implications of such studies in evolutionary biology and paleontology in both extinct and living forms in the context of future perspectives.

This book will be a valuable read to evolutionary biologists, paleontologists, ecologists, geologists, environmental, and climate scientists. It may be used in undergraduate classes but will certainly help post-graduate students and advanced professionals.

The first author is grateful to Prof. David Polly at Indiana University, Bloomington for his valuable suggestions. The foreword for the book has been written by Prof. Ashok Sahni (Elected Fellow of Indian National Science Academy and National Geoscience Lifetime achievement Awardee for Excellence-2009).