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1.1 General introduction

Deserts are defined by their arid conditions. A consequence of this aridity is that most of the area occupied by desert is barren and monotonous, leading many people to view it as a wasteland. In contrast, biologists have long seen deserts as laboratories of nature—where natural selection is exposed at its most extreme. Generations of scientists have focused on the numerous unique adaptations of plants and animals for surviving the harsh desert environment. Indeed, such studies have made the adaptations of desert organisms some of the best-known examples of Darwinian natural selection. In this book, I will introduce the reader to the major constraints facing organisms in desert environments and also consider how organisms have evolved to overcome these constraints. In this edition, I shall also stress the potential, and current effects, of global climate changes on desert environments. The effects of climate change are likely to be most extreme in deserts and on their peripheries (Noble and Ellis 2000; Sarin et al. 2005; Shachak et al. 2006; IPCC 2013).

Researchers are also very interested in the biotic interactions among desert organisms. I will attempt to convince the reader that, while the abiotic environment defines deserts and imposes strong selection pressure on the organisms that live there, the biotic interactions among the organisms in deserts are no less exciting or intricate than those of other environments. Indeed, it is the relative simplicity of desert ecosystems that makes them more tractable for study than more complex environments. This book emphasizes the myriad ways in which organisms exploit the enormous spatial and temporal variations in deserts, leading to the creation of unique assemblages with surprisingly high diversity.

Finally, this book will examine the sensitivity of the desert environment to disturbance and the effects that human beings have had on deserts. It will focus on the