

Preface

Deserts are difficult to define. They vary greatly in their aridity, from close to 0 mm of rainfall annually to more than 500 mm. They range in temperature from more than 50°C to far less than 0°C. Most of all, they are distributed across the globe in so many places that it is difficult to define exactly where they are and what makes a desert what it is. I have used the term 'desert' in the broadest sense of the word, but have tried to keep away from neighbouring topics such as savannas and grasslands. I have usually used the term to include all 'arid' and 'semi-arid' habitats, or where the term 'xeric' seemed to fit. Most of all, I have tried to focus on the studies that use the term prominently, especially where I am familiar with the system.

The amount of research done varies greatly among deserts, and often there is a difference in the issues that are focused on in a particular region. North Americans have done more work of interest in terms of evolutionary studies and population and community ecology. Israeli scientists have done a lot of research on population and community ecology, as well as ecosystem and conservation ecology. Researchers in Russia (and allied states) and China have mostly been concerned with applied issues, as have researchers in many Arab states and Iran and India. Researchers in Australia have focused a lot on rangelands as well as on plant, lizard and small mammal diversity. Southern Africans have focused on a range of issues, especially on animal physiology and plant diversity, but very little has been done on plant physiology and population and community ecology. In contrast, German researchers have extensively studied desert plant physiology in the Sahara, Middle East and in the Namib and Kalahari deserts. South Americans have conducted studies on a wide range of desert issues, with a focus on population ecology. Clearly, if we each learned a bit from each other, we could gain a lot more insight into how desert systems work. It is not possible to assume that if a trend has been demonstrated elsewhere, it will work the same way in all deserts. I believe that we need to consider how we might replicate studies in different deserts (e.g. plant and animal physiology studies) and expand the number of deserts in which we study competition, facilitation, predation, parasitism and plant-animal interactions (as well as ecosystem studies).

In this book, I have decided to focus on an evolutionary approach to deserts because I believe that this is what makes them so interesting.

Deserts are indeed laboratories of nature. I realize that evolution means different things to different people. Here, I use the term very broadly, covering phylogenetic constraints, optimization, Evolutionarily Stable Strategy models, and convergence, among other things. This is not to say that there is no coverage of other issues. I believe that I would be doing a disservice if I were to focus on evolutionary issues alone, so I do cover ecosystem approaches, desertification and conservation issues, to name but a few. However, there are other excellent books published on community and ecosystem approaches such as Gary Polis' (1991) 'Ecology of desert communities', Walt Whitford's (2002) book on 'Ecology of desert systems', and many others covering specific deserts. I particularly like John Lowell's (2001) book titled 'Desert ecology: an introduction to life in the arid southwest'. Clearly, its focus is on North American deserts, but it covers a tremendous range of issues. These are all very good books; it will be hard to find a niche among them.

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