

Introduction

Usually authors write introductions for their books, although they know that not many readers will read it. Despite this, authors insist on writing an introduction and no publisher will publish a book without one.

I would like to inform my dear readers that I have spent almost all of the first quarter of my life in a village in the Nile Delta, 65 km north of Cairo. The everyday scenery there was the beautiful green landscape dissected with canals full of running water. All of these were bordered with the huge sycamore, mulberry and acacia trees. The desert was something unknown to me at that time, except for the very basic information given in geography books, which explained that the desert is a place without water or cultivation. Some of my ideas about the desert came to me from the stories in the history of Islam and the desert lands where Islam originated.

My real attraction to the desert developed in the last year of my undergraduate studies. This was during the field courses in Ecology (Prof. A.M. Migahid and Prof. A.A. Abdel Rahman) and Desert Flora (Prof. V. Taeckholm). With this background, I came to believe that the vast desert, which occupies about 96 % of my country, is the best field of study for a biologist. I also firmly believed that Egyptians should contribute to scientific studies of the deserts, which represent the main gate to their future in view of the ever-increasing population in the narrow Delta and Nile Valley.

From 1956 until now, I have been engaged in studies of the deserts of Egypt and of other countries in the Middle East. When I received the Alexander von Humboldt fellowship, I made use of the facilities in the laboratories of the Technical University in Munich to investigate the ecophysiology of desert plants. This reminds me of an interesting story: When, in 1971, the Alexander von Humboldt fellows were invited to visit the President of the German Federal Republic in Bonn (Dr. Dr. Heinemann). I introduced myself as an Egyptian botanist and he was pleased to tell me that his wife loved flowers, especially roses. He was astonished when I told him that I study desert plants, and exclaimed: but we have no deserts in Germany! My answer was: "*Ich habe die Samen mitgebracht.*"

All my life, I have roamed the deserts of the world with the desert ecology in my mind and the desert plants in my heart. So, when I was invited by Springer-Verlag and Prof. J. Cloudsley-Thompson to contribute to the series on the adaptation of desert organisms, I realised that it was an opportunity to put my personal experience and life-long studies of the desert into this book. I cannot claim that it is a complete text on the subject, but I hope that it becomes a useful addition to the scientific knowledge in this field.

Water is a paramount factor in determining the distribution of species on a global basis. The responses and adaptations of a species to water stress are critical for its success in any environmental niche. Numerous studies have reported a myriad of changes elicited by water stress. The changes observed are dependent on the species under study and on the severity, duration, and time course of the stress. The deserts of the Middle East provide a good example of the harsh conditions to which plants are subjected. This book is an attempt to elucidate the adaptations of these plants in order to sustain their life and reproduce to continue their survival.

It should be noted that the first field studies on the relationship to water of desert plants in the countries of the Middle East were carried out in Egypt (Stocker 1928a; Seybold 1929; Montasir and Migahid 1934; Migahid 1938; Migahid and Abdel Rahman 1953; Abdel Rahman and Batanouny 1964a,b, 1965a,b; Batanouny 1974). Many years ago, A.M. Migahid, Professor in the Department of Botany, Faculty of Science, Cairo University, established a school of botanists who were concerned with the study of the relationship to water of desert plants. The staff at the Hebrew University, Jerusalem, had begun studies in this area over 60 years ago (Evenari and Richter 1937; Oppenheimer 1951; Zohay 1962). Contributions to the study of the water economy of desert plants and the ecophysiology of these plants have been concentrated mainly in Egypt and Israel (Palestine). Successive generations of scientists in these two countries have continued this work. The author of the present book is among the former students of Professor A.M. Migahid. It is significant that the authors of two other books in the present series are among the former students of Prof. M. Evenari. After universities were established, in the 1960s to 1970s, in Arab countries of the Middle East, many Egyptian professors were appointed to m. The present author has been appointed at various times to Baghdad (Iraq), King Abdul Aziz (Saudi Arabia), and Qatar (Qatar) Universities. The studies of the staff of the Egyptian University have contributed to our knowledge of plant life in these countries. They have published books about the vegetation and plant life of this region, e.g. *Ecology and Flora of Qatar* (1981), and *Plant Life and Environment in Qatar* (1986a) by Batanouny, and *Flora of Saudi Arabia* by Migahid (1988–1989).

This book consists of 12 chapters. The first three chapters cover topics dealing with the deserts of the Middle East, climate aridity and topographic influence on plant life in the deserts. There is also an interesting chapter on

the role of plants in the lives of the Bedouins. It is a well-known fact that Bedouins have an intimate relationship with their desert environment and its components, especially the plants. The Arabic heritage is full of information about and knowledge of desert plants, and the Bedouins in particular have a tremendous amount of indigenous knowledge of their native plants. Another chapter is devoted to discussing the concept of adaptation, its purposes, and causes. Three chapters describe the adaptations that promote increased water uptake and reduction of water output, as well as those which help the plants to tolerate and/or resist the drought. Escaping drought and adaptation to desiccation are two subjects treated in two chapters.

Salinity, being another major constraint to plant life in the deserts of the Middle East, is considered in a separate chapter. It discusses the adaptations and mechanisms by which halophytes can tolerate and/or resist salinity.



<http://www.springer.com/978-3-540-52572-1>

Plants in the Deserts of the Middle East

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2001, XII, 194 p., Hardcover

ISBN: 978-3-540-52572-1