

Book Reviews

Deceptive Beauties: The World of Wild Orchids. Christian Ziegler; with an introduction by Michael Pollan. 2011. The University of Chicago Press, Chicago and London. 184 pages with extensive illustrations. \$45.00. Hardcover. ISBN-13: 978-0-226-98297-7

In his first edition of *Fertilization of Orchids by Insects* (1854), Charles Darwin wrote, “The object of the following work is to show that the contrivances by which Orchids are fertilized, are as varied and almost as perfect as any of the most beautiful adaptations in the animal kingdom; and, secondly, to show that these contrivances have for their main object the fertilization of each flower by the pollen of another flower.”

This object continues to be a focus of books such as *Deceptive Beauties: The World of Wild Orchids*. While it would be easy to describe this book as another coffee table book because of its many gorgeous photos, something Darwin was unable to include, author Christian Ziegler has managed to include a great deal of geographic, climatic, and evolutionary information, as well as anecdotes about his own collecting and photographing expeditions. His principal themes comprise the book chapters: Adaptation, Diversity, and Pollination.

Orchids are one of the largest and most diverse families of flowering plants with more than 25,000 species in 725 genera occurring across six continents in habitats as diverse as in tree canopies or underground, in rainforests or deserts, and from the tropics to remote mountaintops. Ziegler, a biologist-photographer who has written and photographed for *National Geographic*, has traveled to four continents for the photos presented in this book. He acknowledges the assistance of his resident institution, the Smithsonian Tropical Research Institute in Panama, for access to its canopy cranes to view epiphytic species, as well as numerous scientists and orchid enthusiasts who allowed him access to their collections. Photographs are identified by botanical name and location. As befits a professional photographer, the images are crisply in focus, well-composed, and varied in perspective. The index allows one to find photographs and text references to the genera/species quickly.

Natalie Angier writes in the foreword that Victorian critics called orchid flowers a form of “‘horticultural pornography’ that no proper woman should associate with, which only guaranteed that proper and sufficiently monied women wanted nothing but.” In the introduction by Michael Pollan, Darwin is referenced frequently; his *The Botany of Desire* is paralleled: “... plants were hard at work developing a whole bag of other tricks to advance their interests.” Pollan notes that orchids have evolved reproductive strategies

that attract animals (insects, chiefly) for food, shelter, and sex and that what he learned on trips with Ziegler forced him to revise his estimation of what a clever plant is capable of doing to a credulous animal.

Orchid distribution often is rather scattered, requiring rather specific pollinators that will seek them out. The secret of orchid success is sex—not just normal sex, but weird sex. Whether creating a labellum structure resembling a female bee to lure a male bee to try to copulate with it, thus removing its pollinia, or producing a scent that imitates a pheromone, or hiding its nectar deep within a long nectary tube that requires a long proboscis to extract nectar and, incidentally, the pollinia, or enticing a pollinator inside an enclosure that allows exit only past the pollinia-bearing structures, orchids have evolved a variety of means to attract their pollinators, which are often unique to that species. Ziegler’s photos well illustrate these adaptations as does his text describing how pollination among the orchids varies from the approaches of more common flowering plants.

Ziegler’s text is a good read, and it is supported by a bibliography that, while selective, introduces the reader to a variety of other books and scientific literature. One of his resources, John Alcock of Arizona State University, has his own book with similar emphases but not so gloriously illustrated: *An Enthusiasm for Orchids, Sex and Deception in Plant Evolution* (Oxford University Press, 2005). Although Alcock’s book is a more ecological and scientific study, both books are attractive for their discussions of plant-insect interactions, photographs, and summaries of updates to what so captivated Charles Darwin more than 150 years ago.

This book will be of use to the ever-increasing audience of orchid enthusiasts and also to those who have to give talks to local plant societies. The high quality of the photographs will serve as an inspiration to horticulturists whose hobby it is to capture the beauty of flowers. It is more likely to serve as a reference to university people than as a textbook and contains little that would be of use to a grower, although it may provide an introduction to genera/species beyond those in general culture. At \$45 (low cost because it was printed in China), this book is an affordable addition to a plant photographer’s collection.

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Planting and Maintaining a Tree Collection. Simon Toomer. 2010. Timber Press. 133 SW Second Ave., Suite 450, Portland, OR 97204-3527. 183 pages, with illustrations, \$39.95. Hardcover. ISBN-13: 978-0-88192-930-0

For guidance in starting a tree collection, searching for new ways to engage the public,

or enhancing species diversity at an arboretum or with performing other tasks dealing with trees, Simon Toomer’s *Planting and Maintaining a Tree Collection* is the tool for you. Toomer offers practical, straightforward advice relating to tree collections for a range of readers from the backyard hobbyist to the public horticulture professional. There are few, if any, other manuals on this subject currently in print.

Toomer sets the stage by outlining events leading from Queen Hatshepsut’s envoy of Egyptian collectors seeking incense in 1495 BC to the development of Boston’s Arnold Arboretum in the early 19th century. After a brief description of today’s collectors, Toomer launches into the meat of the book: the how-to. The approach is clear and concise. The author begins with basic information on how to choose a site, how to set goals, and how to establish a collections policy and eventually moves to practical tips for engaging visitors, raising funds, and interpreting collections.

The language and structure of the book are fairly cut and dry and, for this reason, may not appeal to the average reader. However, those who are engaged in cultivating tree collections would find *Planting and Maintaining a Tree Collection* a useful guide. Furthermore, at \$39.95, this selection would be most practical as a reference tool rather than a leisurely read. Toomer makes the collections and management process seem entirely unthreatening and achievable. Readers are provided with simple lists within each section for the various tasks. For example: Going on a collecting trip? There is a complete equipment list on page 84. Not certain how to record wild collections? Refer to the sample collection recording form on page 87.

The orderly tone of the book is imbued with Toomer’s passion for the subject. He has revamped the basic subject of tree collecting into an enduring project worth mastering. Toomer wastes little space within the 182 pages, while covering all of the bases involved in collection, management, and interpretation. The section of color photographs includes the classic pictures of trees in flower and fruit and advances to include instructional images on pruning, caging, and monitoring tree specimens. At any rate, *Planting and Maintaining a Tree Collection* would be a valuable guide for tree collecting on many levels.

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The Biology of Deserts. David Ward. 2009. Oxford University Press, Great Clarendon Street, Oxford, OX2 6DP, UK. 304 pages with 135 line and 90 black-and-white illustrations. \$55.00, Paperback. ISBN 978-0-19-921147.

The book gives a concise introduction to the ecology of deserts. Deserts are widespread on Earth and are defined by their arid

conditions and not by their temperatures. Rainfall can vary widely from 0 to 500 (20 inches) mm among deserts, but 250 mm (10 inches) of rainfall often is considered as an upper limit by some scientists. Temperatures of deserts vary from below 0 °C (32 °F) to over 50 °C (122 °F) and definitely affect desert ecology. The book includes a wide range of ecological and evolutionary issues affecting the adaptations and interactions of desert plants and animals. The author notes that the simplicity of desert ecosystems makes them amenable for biological studies.

The book has 11 chapters. The introduction covers general topics of creation and age of deserts and indexes of aridity. It is noted that most deserts lie between the Equator and Tropics of Cancer and Capricorn. The second chapter covers abiotic factors. Precipitation and water are addressed with discussions of amount and temporal distribution of rainfall, desert fog, runoff, soil salinity, and oases. The effects of sandy land and rocky land are contrasted with respect to effects on the desert environment. Short presentations are made for hot deserts and cold deserts and of the effects of fires on deserts. Geology of deserts with respect to landscapes of different types—sand, stone, rock, plateau, and mountain—is discussed. It is noted that only about 15% to 20% of deserts have sand landscapes. The third chapter addresses morphological and physiological adaptations of desert plants. Species are classed as drought-escaping plants that grow only when water is available; drought-evading plants that have deep roots, succulence, or morphology or metabolic processes (e.g., crassulacean acid metabolism, C-4 photosynthesis) that allow for survival; drought-enduring plants that lose leaves during drought; and drought-resisting plants that have stomates that close and other morphological features that help to ensure maintenance of turgor. An alternative classification system based on the strategies that plants use to protect growing points is reviewed also. The

chapter continues with details on adaptations of plants to the desert environment. The fourth chapter covers morphological, physiological, and behavioral adaptations of desert animals. Animals must be able to withstand the lack of water and the high or low temperatures to survive in deserts, using strategies of evading or enduring the adverse temperatures. Most of the discussion covers withstanding the heat. Evaders are animals that avoid the heat, and endurers tolerate the heat. Evaporators are a third class of animals that cool by evaporation of water from their bodies. Size of the animals is important in the strategy employed, with small animals generally being evaders or evaporators and large animals generally being endurers. The chapter discusses the strategies with regards to specific types of animals.

The next several chapters cover plant–animal interactions and the development of communities in deserts. The fifth chapter covers competition in desert plant and animal communities and discusses responses to availability of resources, density of organisms, priority of entrance into the system among other biotic factors controlling the structure of desert communities. The importance of predation and parasitism in structuring desert ecosystems is the subject of the sixth chapter. Animals are the subject of this presentation. The author describes how mortality and risk are affected by spatial homogeneity that provides protection to predator and prey and by sensitivity of predators to their own predators. Several cases of individual animal species are discussed. Parasites are discussed with respect to the effect that parasitism has on animals. Chapter 7 covers plant–animal interactions in the desert. The chapter begins with herbivory. Spatial and temporal variability in rainfall and other water resources result in variable plant availability and abundance to herbivores. This wide variability in space and time is thought to limit the impacts of animals on plants in deserts. The chapter also discusses the importance of animals in pollination and seed

dispersal and predation. Examples of interaction of plants and animals are presented. Desert food webs are covered in the eighth chapter. Models or laws to describe interactions are presented. The effects of precipitation, nutrients, and disturbances on ecosystem ecology are discussed.

Chapter 9 covers the biodiversity and biogeography of deserts. Most desert vegetation is considered to be contracted vegetation that exploits the water resources close to ephemeral rivers (wadis or arroyas) with rainfall below 70 mm annually. Diffuse vegetation occurs with rainfall above this value. Diversity of species richness, mostly with annual plants, can be very high in deserts and depends on the seasonal distribution of rainfall in particular. Animal diversity and geographic distribution is discussed with respect to ecological factors and community structures.

Human impacts and desertification are covered in Chapter 10. The author notes that deserts may or may not show negative impacts of heavy use by humans. Much attention is given to desertification or to the increase in desert lands. The author notes that desertification usually is caused by human intervention through global climate change, soil salinization, harvesting of plants for fuel and housing, and improper cropping or grazing and describes the contribution of each of these factors. Effects of military maneuvers, aquifer pumping, and oil extraction are assessed.

The last chapter addresses conservation of deserts. This chapter seems somewhat unfocused but emphasizes that deserts offer superb laboratories for the study of evolution. Additional reasons to conserve deserts are their unique features, their ecological benefits, and their pristine conditions.

This book will be of interest to horticulturists and ecologists who are interested in the biology of habitats.

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