

and national levels. In addition, professional scientists working as botanists, ecologists, foresters, and zoologists will find useful information related to their fields of study. Finally, educators should consider using "Forest Canopies" as a textbook for seminars or special topics courses offered at colleges and universities.

This book is well worth the price and is a bargain when the many color images are considered. Every library and person who values the importance of trees and forests to the future of our planet should buy this book.

-Harold W. Keller is a Professor of Biology at Central Missouri State University, Warrensburg, Missouri, 64093. Email: haroldkeller@hotmail.com.

Sonoran Desert Plants: An Ecological Atlas.

Raymond M. Turner, Janice E. Bowers, and Tony L. Burgess. 1995 [first paperback edition 2005]. ISBN 0-8165-2519-6. \$39.95. 501 pages, 332 maps and charts, 81 photos. University of Arizona Press, Tucson.

One of the problems with paperback versions of books is that instead of plastering endorsements on the dust-jacket (fly-leaf), these quotes are printed right on the front cover and cannot be easily ignored. For this book, those words read, "A goldmine of information that represents more than three decades of careful compilation." What a gross understatement. The lead author alone has put in over four decades of such work. Between the three authors and their litany of close colleagues, such as Rod Hastings, Reid Moran and Howard Gentry (to name just a few), there are centuries worth of careful work that have gone into this volume.

Sonoran Desert Plants is an atlas, showing the distributions of 339 species of Sonoran Desert plants in traditional maps. For each species (or occasionally groups of closely related species with muddled taxonomy), three maps are given (1) a thumbnail map showing whether the species occurs or not in each state of the U.S., each state in Mexico, and each country in Central America and the Caribbean, (2) an expanded map of the Sonoran Desert and much of the Mojave Desert, with state boundaries and degrees of longitude and latitude

demarcated showing all the documented locations of the species, and (3) a graph with elevation versus latitude, showing the same latitudes and the same documented locations as the previous map. Two types of data are distinguished on these maps: (a) herbarium voucher specimens and (b) sightings by one of the authors or by some other highly trusted authority. Various textual information is given for each species – taxonomy, range, and other items – although the scope of this information varies between taxa.

This book is limited in scope and idiosyncratic in its coverage. It also happens to be one of the best and most beautiful data sources for plant habitat information. Some day in the very distant future, when most herbaria digitize their holding – if they make these data open to the public – maybe such an ecological atlas will exist on-line. But for now, this book is invaluable for any natural historian of the Sonoran Desert. It required a remarkable amount of labor and expertise to compile even a single of these distribution maps, let alone the hundreds of maps produced herein.

The authors have not only put together an atlas showing the distribution of over 300 species in the Sonoran Desert. They have also included data on the biology, biogeography, ethnobotany, and other interesting facts for many species. In many instances, they have speculated as to the most likely cause for range limits, such as temperature, precipitation, fire, shade, salinity, other edaphic conditions, pollinators, grazing by livestock, competition, and introgression. Although these speculations on causes of range limits are just hypotheses, they are based on many years of field experience and are one of the most interesting aspects of the book. I was astounded by how in some genera (e.g. *Agave*), so many different factors appear to influence range limits, depending on the species in question. I was also impressed with how much the authors reported on the packrat midden work (especially by Tom Van Devender) showing historical distribution data over the past 20,000 years.

This book pleasantly surprised me with its reports of plants outside of the ranges that I knew, even for plants that I thought I knew quite well. For example, the elephant tree, *Bursera microphylla*, is well-known from South Mountain in Phoenix, Arizona, but I had never before heard of the Harquahala Mountain population roughly 15 km further to the north and 60 km further to the west.

The biggest idiosyncrasy of this volume is the choice of species. These largely reflect the authors' interests. How else could one hope to compile

such an enormous amount of data without choosing their favorite taxa? And, how else could the first 20% of the book cover plants whose genera start with the letter "A"? This atlas contains entries for many of the most common trees and shrubs of the Sonoran Desert, as well as a preponderance of agaves, cacti, and woody legumes. Walking through the desert in the dry season (i.e. much of the year), this is all you see. So, I find the coverage quite good. Only if your taste lies more with herbaceous plants – grasses, lilies, and little composites come to mind – will you be disappointed.

There are many other quaint idiosyncrasies throughout this volume. The erstwhile family names Leguminosae and Compositae are used instead of the more modern monikers Fabaceae and Asteraceae. Genus epithets are sometimes given two letter abbreviations, e.g. *Aesculus* = Ae. I suppose this could help distinguish *Aesculus parryi* from *Agave parryi*, but I could find no obvious places in this volume where such confusion might arise.

The authors provide us with many curious tidbits. They report matched photos/sightings taken roughly a century apart of the same individual of *Ambrosia dumosa*, *Atriplex canescens*, *Celtis pallida*, *Ephedra aspera*, *Opuntia kunzei* [*Grusonia kunzei*], and *Peucephyllum schottii*! Decent documentation on plant longevity is often hard to find, other than from cores of woody trees. I have always suspected that the Arizona *Grusonia* dog chollas (which the authors refer to as *Opuntia kunzei*, *O. emoryi*, and *O. parishii*) formed ancient clones that covered many square kilometers. At least this atlas provides some evidence for the old age of the smaller fairy rings of *Opuntia kunzei*. The authors report that pollen and nectar of *Aesculus californica* (not a Sonoran Desert native, but rather native to coastal and northern California) are poisonous to the non-native European and African honeybees (both are subspecies of *Apis mellifera*), but not to native bees. They report obvious sexual dimorphism in leaves and stems of desert populations of jojoba (*Simmondsia chinensis*). As a final example, they report that cuttings of *Ambrosia deltoidea* tied to other plants will deter herbivory by rabbits (citing Joe McAuliffe at Desert Botanical Garden in Phoenix, a place that is overrun with cottontails and jackrabbits). There is no way to predict when such idiosyncratic gems – and there are many – will be peppered throughout the text. These gems keep you reading, albeit preclude skimming.

The authors have cited an extensive literature. Their reference list is a very useful resource.

Sonoran Desert Plants is a great atlas. I hope that the authors and possibly others continue to update

this wonderful resource. On-line documentation exists for all the data that went into the distribution maps (<http://www.pwztcn.wr.usgs.gov/atlas/>). This on-line documentation was apparently not designed for external use, so is neither user-friendly nor aesthetic, but is publicly available. I highly recommend *Sonoran Desert Plants* to anybody who is interested in trees or shrubs of the Sonoran Desert, especially if interested in their distributions.

-Root Gorelick School of Life Sciences, Arizona State University



Waterlilies and Lotuses: Species, Cultivars, and New Hybrids. Slocum, Perry D. 2005. ISBN 0-88192-684-1. (Cloth US\$34.95) 328 pp. Timber Press, 133 S.W. Second Avenue, Suite 450, Portland, OR 97204-3527.

In *Waterlilies and Lotuses: Species, Cultivars, and New Hybrids* by Perry Slocum, the author clearly and effectively presents a review of the cultivated species and hybrids of the genera *Nymphaea* and *Nelumbo*, as well as species of other genera in the Nymphaeaceae.

Perry Slocum was one of the best known, perhaps the best known, waterlily and lotus breeder in the US. He bred hundreds of new varieties and ran his own nursery, in addition to writing books. He was the first person to be inducted into the Hall of Fame of the International Watergardening Society (now the International Waterlily and Watergardening Society), and he had just finished this work when he died in 2004, having contributed greatly to the renaissance in watergardening in the US.

This volume is really a modification of the earlier *Water Gardening: Waterlilies and Lotuses* by Perry Slocum and Peter Robinson with Frances Perry, also from Timber Press. In many ways this version is preferable, especially for botanists, since it is taxonomically more tightly focussed. The earlier volume dealt with all sorts of cultivated aquatic and marginal plants. This volume is also more compact—the earlier book was sized and priced