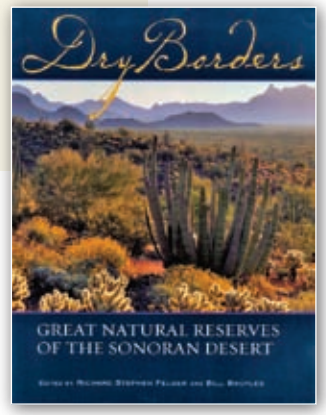
ROOT GORELICK

THE SONORAN Desert

Dry Borders, Great natural reserves of the Sonoran Desert edited by Richard Stephen Felger and Bill Broyles. 2007. University of Utah Press (Salt Lake City) in conjunction with the San Diego Natural History Museum, Fondo Mexicano para la Conservación de la Naturaleza, A.C., Instituto Nacional de Ecologia, and Arizona–Sonora Desert Museum. ISBN-13: 978-0-87480-819-3. PB. 799 pp. 21.6 × 28cm. $45



Dry Borders is a natural history of a bioregion: the huge, contiguous, federally-reserved areas of the Sonoran Desert straddling the Mexican and US borders. These six reserves are Organ Pipe National Monument, Cabeza Prieta National Refuge Area, Sonoran Desert National Monument, Reserva de la Biosfera El Pinacate y Gran Desierto de Alta, Reserva de la Biosfera Alto Golfo de California y Delta del Rio Colorado, and the Barry Goldwater Air Force Range. The last, a military installation, is largely protected and preserved because of its exclusion of development. (It remains to be seen how successful the Bush II administration is in federal court at weakening US environmental laws on military lands.) Kofa National Wildlife Refuge is not included because it is not contiguous with the other six reserves, although it is as close to the international border as the Sonoran Desert National Monument.

This is a beautiful book (despite the lack of spectacular pictures) with vivid prose describing all aspects of this border region, from plants to animals (including people), from the sky islands to low deserts, from rivers and coastlines to the depths of the Sea of Cortez. It is also, however, an odd amalgam of deeply personal writings alongside aseptic lists of things like species and place names. But the personal touch is both idiosyncratic and inspiring; many of the authors discuss their first love with the desert, and the editors have provided an opportunity for many eminent students, scholars, and dwellers of the Sonoran Desert border region to speak from their hearts. Imagine what it is like to discover the first Sonoran packrat middens (plants fossilized by being urinated upon by rodents) or figuring out how to exactly replicate a photo taken a century ago. The contributors to all 39 chapters are clearly obsessed and in love with the Sonoran Desert.

Someone who has never been in the Sonoran Desert border region may not appreciate the passion and detail of this volume. But those of us who have lived in it and traveled through it—and really tried to breathe it all in—will adore this book. Every page yields new, interesting, and unexpected insights. For instance, in reading about amphibians of the Vekol Valley, we learn that the great mesquite bosques in the valley floor probably originated with centuries-old earthen levees built along the wash. Previously, the areas along the wash were probably dominated by grasslands, as was much of this region before the introduction of cattle and invasive grasses. Of course, the resulting ephemeral tanks formed upstream of each levee provide nice habitats for frogs and toads.

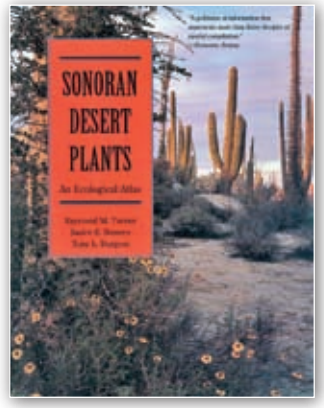
Cactus and succulent aficionados may be disappointed by lack of coverage in this volume of the plants they adore. Yet some relish being immersed in the rich background in which many of our favourite plants live. This is a great book, at a very reasonable price, which should be of interest to many *Journal* readers, despite its conspicuous absence of material on cacti.

Sonoran Desert Plants: An Ecological Atlas by 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 endorsement on the dust-jacket, these quotes are printed right on the front cover and cannot easily be ignored. In the paperback edition of *Sonoran Desert Plants: An Ecological Atlas*, 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, and among its three authors and a litany of close colleagues (Rod Hastings, Reid Moran, and Howard Gentry, to name just a few) centuries-worth of careful work have gone into this volume.

Truly an atlas, the book is packed with traditional maps and accompanying text outlining the distributions of 339 species of Sonoran Desert plants. For each species (or occasionally groups of closely related species with muddled taxonomy),

three maps are drawn: 1) a thumbnail map showing occurrence in each US and Mexican state and each country in Central America and the Caribbean; 2) an expanded map of the Sonoran Desert and much of the Mojave Desert showing all documented sightings of the species; and 3) a graph with elevation versus latitude plotting the mapped localities by altitude, a clever and fascinating way to present this information. Two types of data are distinguished on these maps: herbarium voucher specimens and sightings by one of the authors or by some other highly trusted authority.



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 habit information. Some day in the very distant future, when most herbaria digitize their holdings—and if they make these data open to the public—maybe such an ecological atlas will exist online. 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 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 (for instance, *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.

Among the pleasant surprises in this volume were 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 west.

The biggest idiosyncrasy of this volume is the choice of species covered. 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 (that is, 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, or little composites, for instance—will you be disappointed.

There are many curious tidbits to keep you reading, such as 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*, or *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 subspecies of *Apis millifera*), but not to native bees. They report obvious sexual dimorphism in leaves and stems of desert populations of Jojoba (*Simmondsia chinensis*). And 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).

I hope that the authors and others continue to update this wonderful and highly recommended resource. For now, online documentation exists for all the data that went into the distribution maps (wwwpaztcn.wr.usgs.gov/atlas), and an affordable paperback of the book is a most welcome addition to my library. ❖

This review originally appeared in Plant Science Bulletin.