

Review of Field Guide to Forest and Mountain Plants of Northern Arizona
By Judith D. Springer, Mark L. Daniels, and Mare Nazaire
With forward by Bruce Babbitt

Editors of collaborative floras face a number of time-consuming challenges and our Arizona floras are shamefully dated as a result: In 1973 W. B. McDougal's *Seed Plants of Northern Arizona; with keys and detailed descriptions for the identification of families, genera, and species*, was published; and the Second Edition of Kearney and Peebles' *Arizona Flora* came out in 1960, so the need for modern treatments is acute. *Field Guide to Forest & Mountain Plants of Northern Arizona* is a welcome newcomer to the canon of regional floras of Arizona and the Southwest. Springer, Daniels, and Nazaire's *Field Guide* does not replace McDougal or K & P as a comprehensive flora, so there is some truth to the publisher's promo "First of its kind for the forested and higher elevation ecosystems of northern and eastern Arizona" since the authors attempt to "walk the line between field guide and flora." As a hybrid, this book is much more geared toward the professional botanist rather than informed lay audience, but does a fair job of appealing to both. As a botanical resource it works just fine. The layout is friendly and utilitarian. Plants are organized by recognizable form (the "field guide" character of the book) – "Conifers," "Flowering Trees and Shrubs," "Grasses, Sedges, and Rushes," "Wildflowers," "Cacti and Agaves," and "Aquatics." Of course, any artificial separation by form has its problems, and where things are filed is sometimes arbitrary. For example, partially woody species as *Argythamnia cyanophylla*, *Artemisia dracunculus*, *Brickellia brachyphylla*, *Galium microphyllum*, etc. are among the "Wildflowers" rather than "Flowering Trees and Shrubs", and *Ranunculus aquaticus* is found in the "Wildflowers" section rather than "Aquatics." In each category, species are alphabetized by family following a technical description. Species descriptions are detailed and thorough (the "flora" character of the book). With some variation among groups, most contain the headings "General," "Leaves," "Flowers," "Fruits," "Habitat/Range," "Notes," and often synonymy. The species descriptions are also loaded with botanical terminology specific to the group. Users who aren't familiar with a composite phyllary, a grass spikelet, or a fern sorus, will be glad there is a glossary. Dichotomous keys are also naturally technical but the jargon is necessary for a guide to be functional. The etymology appendix is a wonderful touch, I wish more authors would include this – definitions of Latinized and Greek words and/or explanations of the Latinized proper names. For example, "**bebbiana** – for Michael Schuck Bebb (1833-1895), American willow specialist;" or "**thelypodium** – for the Greek "thele" (female) and "podo" (foot)."

The "Notes" section typically contains the most text, and spans a variety of topics such as, ecology: "*Glycyrrhiza lepidota* aggressively colonizes disturbed riparian areas. It has good soil-stabilizing capabilities and may be used in restoration planting and for erosion control;" taxonomy: "Taxonomic confusion exists with regard to southern populations of *Abies bifolia*. Authorities in the southwestern U.S. treat the species as *A. lasiocarpa* var. *arizonica*. The Flora of North America (1993) suggests that the species should be a segregate of *A. bifolia*, but recognizes that the southern populations in its distribution have unique

characteristics. To date, the taxonomy is unresolved;" ethnobotany: "A poultice of the plant (*Descurainia sophia*) may be applied for toothaches, and the Paiute use a poultice of ground seeds to remedy burns and sores;" Relevant characters to distinguish similar taxa: "*Erigeron oreophilus* is very similar to *E. neomexicanus*, but the former may be distinguished by stalked glands on the stems, leaves, and phyllaries;" horticultural tidbits: "*Penstemon palmeri* is widely available as an ornamental and easily propagated by seed;" and important synonyms. The information in the "Notes" is anecdotal and lacking any references e.g., "pinyon pine is slow growing but long lived, easily surviving up to 500 or more years," but interesting and thorough.

The book is extensively illustrated. I loved the 288 color glossy inserts in the middle – not a dud in the lot. Some photo credits are a bit head-scratching though, for example, Kristin Huisinga is credited for *Asclepias subverticillata*, Max Licher for *A. speciosa*, and *A. tuberosa*, but the photo in the book is Mark Daniels' *Asclepias asperula*. Nevertheless, Licher and Daniels took much care with focus, composition, and color; and flower details are clear and informative, even in the tiniest species. The line drawings of species are for the most part well done and true to the plant, but there are shortcomings. The art is inconsistent in style, weight and detail, a result of being harvested by a number of different sources. There are no scale bars, there are a few nearly useless 'stick drawings' with very little information (e.g. *Drymaria* spp., several *Carex* spp.), and many are very old (grass nerds will recognize several Agnes Chase drawings from the 1950 Hitchcock Manual).

On the back cover of this book the publishers claim, "...comprehensive species coverage for the region with an easy-to-use format..." and Tom Whitham, a Regent's Professor at Northern Arizona University calls the book "A comprehensive and welcome field guide for the high elevation country plants of northern Arizona..." Even the author's claim in the Introduction, "This book is the work of numerous collaborators, who came together to create a comprehensive, up-to-date botanical resource for the northern Arizona forests in which we work and play." Similarly, four paragraphs later: "As written, the guide includes comprehensive coverage of species found in the high-elevation forests of the Mogollon Rim and White Mountains, the San Francisco Peaks, and associated mountains near Flagstaff, the Coconino Plateau near the south rim of the Grand Canyon, the Uinkaret Mountains and the Kaibab Plateau to the north of the Grand Canyon, the mountains of the Navajo Reservation in the northeastern corner of the state, and several small high-elevation 'islands' within the overall range." There are roughly 1400 taxa distinguished (including those that are only mentioned in the keys) and 785 taxa are treated with species descriptions and illustrations. This is where the book fails to live up to the publicity claims of comprehensiveness. A flora of the above mentioned areas would have many more taxa. In fact, this treatment does not achieve "comprehensive" species coverage of even one of the individual ranges mentioned. Are there only six orchids for the entire region? "Higher elevation forests" is never specifically defined, but in the White Mountain alone, we would expect to see *Corallorrhiza striata*, *Epipactis gigantea*, *Goodyera decipiens*, *G. repens*, *Malaxis ehrenbergia*, *M. macrostachya*, *Platanthera hyperborea*, *P. sparsiflora*, and *P. stricta*; none of which are included in any key or description. There are other

curious omissions. *Helianthus annuus* is the lone sunflower and there must be at least four others that occur within the flora region (*H. arizonensis*, *H. ciliaris*, *H. nuttallii*, *H. petiolaris*). The needlegrasses and grammas are also underrepresented. *Achnatherum hymenoides*, *A. nelsonii*, and *Hesperostipa comata* are treated, but *A. aridum*, *A. lettermannii*, *A. robustum*, *A. scribneri*, *A. thurberianum*, and possibly *H. neomexicana*, are all members of higher elevations of northern and eastern Arizona. *Bouteloua eriopoda*, *B. hirsuta*, and *B. simplex* are also common in the flora region, even *B. barbata* is likely to occur as a weedy annual, but only *B. curtispindula* and *B. gracilis* are listed. There are other problems: only four species of *Cyperus*, one species of *Physalis* are included. Some of the woody plants that stood out as missing were *Frangula californica*, *Garrya wrightii*, *Lycium andersonii*, *Platanus wrightii*, *Quercus chrysolepis*, and *Q. grisea*. Other larger genera are incomplete. For example, there are 19 *Astragalus* in the *Field Guide* key, and 8 are described and illustrated. A checklist of *Astragalus* generated from a SEINet search [<http://swbiodiversity.org/seinet/index.php>] in Coconino County alone brings up 134 taxa. While this is an over estimate because it includes subspecific taxa and collections from lower elevation areas such as the Grand Canyon, there are certainly more than the 19 distinguished. Perhaps a better format would have been to make it clear that all species are not included in the illustrations and descriptions, but species known to occur in this flora region are at least included in the keys. The point is, of course, you may have a plant in hand that is not in the book, especially if it is from a large genus such as *Brickellia*, *Bromus*, *Carex*, *Euphorbia*, *Packera*, etc.

The forward by Bruce Babbitt gives it instant credibility. However, he doesn't make much commentary on the book, but instead waxes historical about two early researchers in the area – C. Hart Merriam and Aldo Leopold. From these two giants, he jumps to recognizing recent research efforts at Northern Arizona University and thanking the authors for their contribution to the body of knowledge of the forest ecosystems. I commend the contribution as well, and appreciate the efforts of the authors. My criticism is with the omissions and ambiguities, not with the content. These collaborators put together a nice work of hundreds of plants known to occur “from the Mogollon Rim and White Mountains north,” and it is quite acceptable without the lofty claims. People in the botanical trenches around the world are begging for more keys, more manuals, more floras, more descriptions, more monographs; and though limited as a flora because of the lack of comprehensiveness, the target audience will not be disappointed by this positive attempt at a useful botanical resource.

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Review of Field Guide to Forest and Mountain Plants of Northern Arizona is published by the Ecological Restoration Institute, Northern Arizona University P.O. Box 15017, Flagstaff, AZ 86011-5017 USA and Available from the Northern Arizona University Bookstore for \$30 [<http://www.bkstr.com/>]