

## REVIEW

*The Jepson Manual Vascular Plants of California, Second Edition.* EDITED BY BRUCE G. BALDWIN, DOUGLAS H. GOLDMAN, DAVID J. KEIL, ROBERT PATTERSON, THOMAS J. ROSATTI, AND DIETER H. WILKEN. 2012. University of California Press, Berkeley, CA. 1600 pp. ISBN 9780520253124, \$100.00, hardcover.

It has been 19 years since the Jepson Herbarium at UC Berkeley produced the last flora of California, *The Jepson Manual, Higher Plants of California* (Hickman 1993). During that time, the way that taxonomists work has changed substantially, with phylogenetic analysis and the use of molecular sequence data becoming standard procedure. It was time to bring the *Jepson Manual* up to current taxonomic standards, and the Jepson Herbarium (led by convening editor Bruce Baldwin) stepped up to the plate once again, publishing the second edition of *The Jepson Manual* in January, 2012. The book, available from the University of California press, is also available in electronic form, for those who want to use it on a Kindle or iPad.

Three hundred and thirty two authors or editors are listed as contributing to the 1568-page, revised edition, which treats more than 6500 species, subspecies, and varieties. Some taxonomic treatments are unchanged from the 1993 edition, but many have been totally overhauled or at least changed enough to accommodate the approximately 310 additions to the California flora recognized in the manual.

The book design is handsome, with a hard-back glossy cover, a handy ruler, and extra pages in the back for taking notes, web addresses and a geographic map inside the front cover, and a revamped list of conventions, including a useful section called “Things to Remember When Using this Book.” Rare plants are now designated with a star, invasives with a diamond, flowering times have been added (hurrah!), and horticultural information deleted (but is available online at the Jepson Herbarium website). The section on past climates and vegetation of California is completely rewritten by Constance Millar, and the geographic subdivisions section has been revised with a finessed map.

If you open the back cover, you are greeted with a recent classification of the vascular plant families in the manual, including a phylogenetic tree. The plant families are divided into eight major groups: Lycophytes, Ferns, Gymnosperms, Nymphaeales, Magnoliids, Ceratophyllales, Eudicots, and Monocots. Within the body of the book, families, genera, and species are arranged

alphabetically within these major groups, which differ greatly in size (from Ceratophyllales with 1 species to Eudicots with 4723). Part of the philosophy of the manual is to recognize monophyletic taxa as much as possible, which is why the 1993 separation of flowering plants into Dicotyledons and Monocotyledons had to be changed. The paraphyletic nature of the Dicots (at least in studies based on chloroplast DNA sequences) has resulted in their break-up into Nymphaeales, Magnoliids, Ceratophyllales, and Eudicots. Although the plant families and their page numbers are shown at the tips of the branches of the phylogenetic tree on the endpaper, the listing is not alphabetical. A shortcut index, like that inside the cover of *A California Flora and Supplement* (Munz 1973), would be a useful feature for locating family treatments dispersed among the major groups.

This more fine-grained monophyletic taxonomy is echoed throughout the manual; evidence has accumulated that some prominent genera from earlier treatments are paraphyletic or polyphyletic. Many of these have been divided into smaller monophyletic genera. *Lotus*, for example, has been split into three genera with the name *Lotus* now restricted to Old World species; native species are assigned to *Acemisson* and *Hosackia*, names resurrected from the 19th century. *Camissonia* has been divided into nine genera, *Rhamnus* into two, *Gilia* into five, *Polygonum* into five, and *Potentilla* into four. *Linanthus* has been split into *Leptosiphon* and *Linanthus*, but *Leptodactylon* is merged into *Linanthus*. The genus *Aster* has been broken up into seven genera, none of which is called *Aster*, while *Gnaphalium* has been broken up into four genera, *Hemizonia* into three, and *Madia* into six. There are a lot of new taxonomic concepts and names to learn.

One of the curious problems with this monophyletic taxonomy in an alphabetically arranged book is that it is hard to figure out where a species has gone, since its new genus is not situated near its old genus and other close relatives. However, there is always the index. Unlike the 1993 manual, which had a “name change” section in the back of the book, the index serves that purpose in the new edition. Like the 1993 edition, not every species name is in the index (because the book is arranged alphabetically), but you will find 1993 species names that have changed and the pages where they are listed in synonymy. As a space-saving measure, names already synonymized in the first edition are not included in the second, but the website for the



Index to California Plant Names is provided inside the front cover.

Following a monophyletic philosophy did not always lead to the splitting of taxa in the new manual. The grass treatment by J. Travis Columbus and James P. Smith resulted in the lumping of *Vulpia* and *Lolium* into *Festuca* and the lumping of all the needle grasses back into the genus *Stipa*. Many Californians are doing a happy dance now that their state grass is once again called *Stipa pulchra*. The downside of this monophyletic treatment of the grasses is that it no longer agrees with the Flora North America grass treatment, which was edited by Mary Barkworth and did not follow a monophyletic philosophy.

Lumping and splitting and wholesale reconfiguration occurred in the circumscriptions of some flowering plant families in the new edition. Hydrophyllaceae and Lennoaceae have been lumped with Boraginaceae, Asclepiadaceae is merged into Apocynaceae, Sterculiaceae into Malvaceae, and Lemnaceae into Araceae; Aceraceae and Hippocastanaceae have been lumped into the mostly tropical Sapindaceae. However Portulacaceae has been divided into two families, Liliaceae into 12 families, and the Scrophulariaceae, Orobanchaceae, and Plantaginaceae have been totally reconfigured, with *Mimulus* now in the family Phrymaceae. These changes are in line with the flowering plant classification currently taught in up-to-date taxonomy classes and follows the Angiosperm Phylogeny Group classification that is continually updated at the Missouri Botanical Garden website.

The number of taxon changes (including family/genus assignments, specific epithet changes, and author changes) are substantial, leading a friend of mine to lament, "Since I no longer know the name of any plant in California, I have decided to give up botany and switch to the classification of bagels." However, the new genus segregates actually highlight how endemic and special our flora is. We now have more endemic genera, which is a good thing when trying to protect them. For those who need to translate an existing plant list from 1993 names to 2012 names, Dick Moe of the University and Jepson Herbaria has developed a handy tool called the Jepson Online Concordance available at The Jepson Online Interchange [of] California Floristics

(make sure to capitalize genus names and correct misspellings).

The content of the revised edition is not a big surprise to most active California botanists. The editors of the new Manual have been posting submitted taxonomic treatments online for public review for at least the past three years. Nearly all of the treatments had been posted by last spring. Comments on the treatments were well-received and many changes were made.

The online review copy of the manual was replaced by the new Jepson eFlora in November, 2011, allowing anyone to use the new manual without purchasing the hardcopy book. The online version has handy links to other resources of the Jepson Online Interchange including species distribution maps based on the Consortium of California Herbaria dataset. In addition, the eFlora treats more taxa than the hardcopy. Users will note that in some keys in the hardcopy version, a taxon name appears in brackets. These taxa are waifs (not considered fully naturalized), and their species description only appears in the online version.

The plan for the future is to add newly described taxa, revised nomenclature, range extensions, and other discoveries to the eFlora so that they become available to the public in a timely fashion. This public service to the botanical community keeps the Jepson Herbarium at the center of the botanical wheel in California, even as university funding continues to ebb away. California botanists have no idea how spoiled they are – so many states lack this commitment from their herbaria and therefore lack any type of state flora. The second edition of the *Jepson Manual* is a monumental work, one that every California botanist will use, and we thank the editors, authors, and the Jepson Herbarium for a job well done.

—ELLEN DEAN, Department of Plant Sciences, University of California, Davis, CA 95616; eadean@ucdavis.edu.

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