



# THE JEPSON GLOBE

A Newsletter from the *Friends of The Jepson Herbarium*

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Beginning in 2012, *The Globe* will be published twice a year.

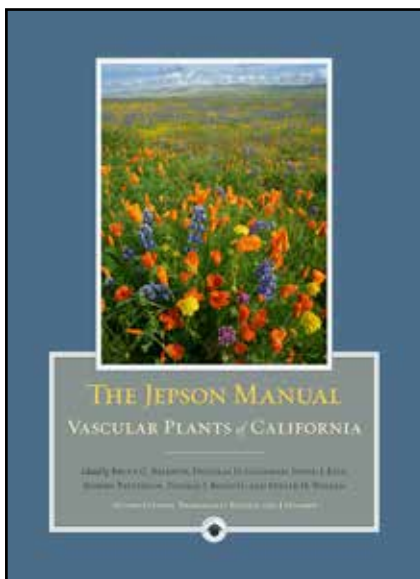
## Director's Column: Herbaria Data Go Mainstream

By Brent D. Mishler

The University and Jepson Herbaria (UC/JEPS) has long been a leader in the nationwide effort to make data from herbarium specimens available online, an effort that is rapidly gathering steam here and globally. The increased attention being paid to collections digitization across the United States and around the world stems from several related crises impacting natural biodiversity. Habitat loss through development, pollution of the environment, and human-caused climate change have all greatly impacted native plants and animals. To conserve biodiversity in a rapidly changing environment, it is ever more essential to know the precise makeup of taxonomic groups (including internal variation) and their past and current geographic ranges. Tools for ready identification, understanding variation within and among species, and mapping predicted distribution changes are needed more than ever. National efforts such as the US Virtual Herbarium (<http://www.usvirtualherbarium.org/>), and international efforts such as GBIF (<http://www.gbif.org/>), depend on local initiatives to generate and curate high-quality data.

Digitization efforts at UC/JEPS began with the SMASCH project that had its roots back in the 1980s. Virtually all the California specimen records of vascular plants in UC/JEPS were digitized in the 1990's, supported by an NSF

(Continued on page 4.)



## Wonderful News!

*The Jepson Manual, Second Edition* is at the printer and will be published this winter! It reflects major improvements to plant taxonomy from phylogenetic studies and includes treatments of newly described or discovered taxa and recently introduced plants. Nearly two-thirds of the 7,600 species, subspecies, and varieties described are illustrated. Geographic distributions, elevation ranges, flowering times, nomenclature, and the status of non-natives and native taxa of special concern have been updated throughout. The *Second Edition* also allows for identification of 240 alien taxa that are not fully naturalized but sometimes encountered. A new chapter on geologic, climatic, and vegetation history of California is also featured. Pre-orders (at a 20% discount) can be made via the UC Press web site. We thank all of the *Friends of the Jepson Herbarium* for their loyal support during this project! 🌱

## The Seed Plant Tree of Life: An Update

By Anna Larsen, Outreach and Education Specialist for the Gymnosperm Tree of Life Project

Gymnosperms are an ecologically and evolutionarily diverse group of about a thousand species of plants that bear seeds but, unlike flowering plants (angiosperms), they do not produce flowers or fruits. Gymnosperms thrive in some of the world's most physiologically stressful environments: alpine and subalpine zones, swamps, deserts, and boreal forests. To Californians, the temperate conifers like pines and redwoods are familiar gymnosperms but these trees represent only a small fraction of gymnosperm diversity. There are many other gymnosperm groups. There are tropical conifers with fleshy cones that are dispersed by birds and bats. There are about 300 species of insect-pollinated cycads, many of which are threatened or endangered. *Ginkgo biloba* is a familiar street tree, but is also the lone representative of an ancient lineage now known in the wild only from plants growing near ancient Buddhist monasteries in China. The gnetophytes are a particularly odd branch of the gymnosperm tree, which comprises

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### ALSO IN THIS ISSUE

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## GRAD STUDENT NEWS


Ben Carter, a graduate student in the Mishler lab, has been awarded a prestigious Doctoral Dissertation Improvement Grant (DDIG) from the National Science Foundation. His study, *Niche differentiation among cryptic moss species*, is just part of his dissertation work that focuses on the molecular systematics, taxonomy, biogeography, and ecology of the moss genus *Scleropodium*.

Ben's study will examine a pair of sympatric, cryptic moss species in the genus *Scleropodium* that are hypothesized to occupy different niches along a strong ecological gradient (terrestrial-aquatic). To test whether habitat partitioning is taking place, Ben's work will include field collections in an area of known sympatry, sequencing of molecular markers, and collection of ecological data.

Learning more about cryptic species is important because a substantial fraction of the world's biodiversity is

comprised of species that are morphologically indistinguishable from other species (i.e., "cryptic species"). Efforts to preserve and protect global diversity rely on an understanding of how and why these cryptic species evolve and coexist.

Additionally, most bryological studies are focused on deep clades and there are only very limited examples of studies like Ben's that incorporate fine scale phylogenetic and ecological data to understand recent and ongoing evolution and diversification.

Ben's interest in mosses is in part based on his belief that people's environmental awareness and connection to conservation is in part facilitated by scientific research conducted in their own backyards. Because mosses are common throughout local regional wild lands, they can be a powerful tool for scientists to engage students and the public. 



Ben Carter on Santa Catalina Island, collecting *Didymodon tophaceous* and other mosses. Photo by Linda Farley



## NEWS FROM THE ARCHIVES

The archives of the University and Jepson Herbaria preserve and make accessible information related to the Herbaria and the history of botany at UC Berkeley. The archives uniquely complement the specimens held in the University and Jepson Herbaria and contain a wealth of materials. The archives are managed by Amy Kasameyer, Archivist, and Richard G. Beidleman, ecologist, author, and volunteer archivist. In this and future *Globe* issues, we'll be bringing you stories that have been discovered in the collection.


One of our most diverse collections are historical field books from over 60 botanists. The field books are a valuable resource to botanists revisiting historical collections or verifying a collection record.

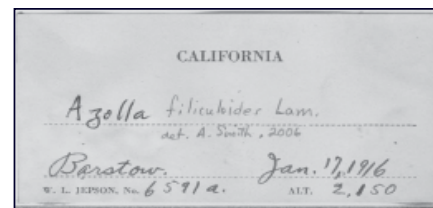
There are countless examples of ways that field books have been used to provide more information about a specimen. The following is one that

highlights how using the field books can often help archivists connect seemingly unrelated events.

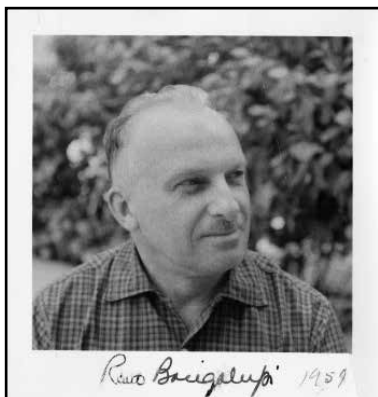
In the Jepson Herbarium, there is odd specimen of a single plant, an *Azolla* (Mosquito Fern) collected by Willis Jepson in Barstow, California, on January 17, 1916 (Jep. No. 304, which was not to be identified to species until 2006!). We wondered why on earth Jepson would collect just one plant in the desert in the middle of winter. The answer was found in his field books (Volumes 31 and 32).

That winter, Jepson was on leave at the Waterman Ranch, hosted by former Governor Waterman's daughter, Abby (which might explain, in part, why Volume 2 of his *Flora of California* was dedicated to her); and actually discovered that with no flowers to speak of (and hence only a single collection of a fern during this trip), The Botany Man essentially decided to watch birds!

When we realized this, it explained the French binoculars in our Jepson archives—the Chevalier Opticien model used by French soldiers during World War I, rumored to resemble those used at the infamous Battle of the Little Bighorn. Jepson birded with these in Barstow. 



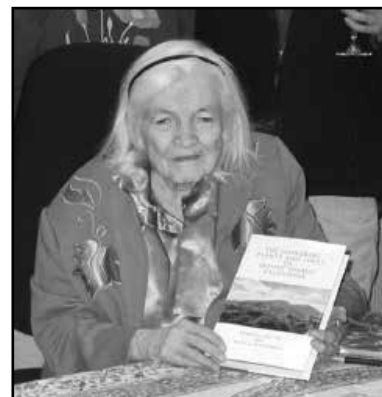
## *The Importance of Planned Giving*



*Rimo Bacigalupi*



*Helen-Mar Beard*



*Mary Bowerman*

Production of the second edition of *The Jepson Manual* was made possible in part due to the foresight of Rimo Bacigalupi, Helen-Mar Beard, Mary L. Bowerman, Lawrence R. Heckard, Willis Linn Jepson, and Robert Ornduff, whom, with estate gifts, established endowment funds that benefit the Jepson Herbarium.

These visionaries knew the impact of planned gifts; they can ensure that the work that is important to the donor is continued in perpetuity. With their gifts, Bacigalupi, Bowerman, Heckard, Jepson, and Ornduff have all continued to support California floristics, a field they were deeply dedicated to.

With no support from the State of California, endow-

ment revenue is especially critical to the Jepson Herbarium, where it is a major component of the annual budget and can provide funding for projects that cannot be fully supported with external funds.

A planned gift may enable you, too, to make a more significant contribution than you thought possible while at the same time allowing you to achieve your financial, philanthropic, and estate planning goals.

If you would like to discuss these possibilities, please contact Staci Markos ([smarkos@berkeley.edu](mailto:smarkos@berkeley.edu) or 510-643-7008) or the Office of Gift Planning ([ogp@berkeley.edu](mailto:ogp@berkeley.edu) or 510-642-6300).



*Larry Heckard*



*Willis Linn Jepson*



*Robert Ornduff*

*Photo credits: Staci Markos (Bowerman), Jepson Herbarium archives (Bacigalupi, Beard, Heckard, Jepson, Ornduff)*



We are halfway to our goal of purchasing a full class set of Leica EZ4 zoom microscopes and their carrying cases. We are looking forward to using these amazing new tools in our 2012 workshops.

Many, many thanks to our latest donors:

Anonymous  
Frank Ellis  
Mary Ann Hannon  
Alan Kaplan  
Donald Lepley

Karen Markos  
Wendy McClure  
Tom Schweich  
Yulan Tong  
Desi & Karen Zamudio



(Director's Column, cont. from page 1.)

grant, yet many specimens remained to be digitized at other institutions across the state and a portal was needed to allow searching across them all.

The Consortium for California Herbaria (CCH; <http://ucjeps.berkeley.edu/consortium/about.html>) was formed in 2003, initially with major support from the California Digital Library of the system-wide UC Office of the President. The first major NSF support for this regional network did not come until 2010, but when it came it was a large, multi-institutional grant: nearly \$2 million dollars to database 300,000+ specimens that were not yet digitized and to georeference many more specimens that had already had their basic data captured digitally. The plants targeted in this NSF grant include dominants in California habitats (i.e., woody plants and grasses) and those most imperiled by threats to biodiversity, including climate change (i.e., alpine plants and those listed because of conservation concern). Georeferencing is locating specimens on a map and putting their coordinates in a database; such data are the most useful for the mapping studies mentioned above. About half of the CCH specimens are now georeferenced.

The next grant received to digitize UC/JEPS collections came in April, 2011, and extended the effort to a new habitat and new taxonomic groups of organisms. This project will image, database, georeference, and curate over 100,000 specimens of Pacific Coast seaweeds that are known to grow in California, Oregon, or Washington, wherever in the world they occur. These data will provide a major resource to those interested in the effects of climate change on coastal environments, fisheries, invasive organisms, and water quality (*The Jepson Globe*, 21(1), 2011).

We have just received word of yet another large grant, awarded through the new Advancing Digitization of Biological Collections program at NSF. We received funding as part of a large

consortium whose goal is to digitize bryophyte and lichen collections across the nation. This project will digitize the label information for about 2.3 million specimens across the United States. Although unrelated, lichens and bryophytes share many biological traits (see my column on "Bryophyte Biology" in *The Jepson Globe* 17(3), 2007), which make them some of the most sensitive indicators of air quality and environmental change. The specific goal of this project is to provide high quality data to address how species distributions change with regards to major environmental events across time and space. New online presentation techniques will allow interested members of the public to get involved and to learn about biodiversity alongside the professionals. The new data will be added to the following portals, which already provide access to hundreds of thousands of specimens: <http://symbiota.org/nalichens/> and <http://symbiota.org/bryophytes/>.

The data generated by these digitizing projects, and the portals in which they are made available to scientists and the public alike, have already been used for important studies, for example the famous 2008 Loarie et al. study investigating threats to California endemic vascular plants arising from different predictive models of climate change (available freely online at: <http://www.plosone.org/article/info%3Adoi/10.1371/journal.pone.0002502>). Future studies of that type will be much better informed by additional data, and new types of biodiversity and conservation studies will now be possible once geographic coverage by digitized collection data is robust enough.

I am on sabbatical in Australia (through December 2011) working on phylogenetic biodiversity analyses made possible by the advanced state of herbarium digitization in that country—Australia's Virtual Herbarium (<http://www.chah.gov.au/avh/>) has nearly complete coverage. I'm both

learning and developing techniques that I hope to apply next in California when we are ready. I will report my results in a future column. 📷



Jonathan Baio and Catherine Wang using the light box and camera in room 1066. Photo by Andrew Doran

### ***The Jepson Manual, Second Edition, is now in press!***

**To celebrate the release of the *Manual*, we are planning two events:**

1) A reception and book signing at the CNPS conference Wednesday, January 11th, from 7:00 PM – 9:00 PM. Details about the conference can be found on the CNPS web site. <http://www.cnps.org/cnps/conservation/conference/2012/>

Advance registration for the reception is requested. If you would like to attend the reception and/or purchase a book, please send your reply to Staci Markos ([smarkos@berkeley.edu](mailto:smarkos@berkeley.edu)) no later than December 15, 2011. Your reply will help ensure enough books are available for those who want a copy.

2) A release party at the Jepson Herbarium, April 14th. While the full details have yet to be developed, we are hoping for a day-long event that will include book signing, tours of the herbaria, a presentation about the new *Manual*, and a silent auction featuring duplicate books from the Jepson Library. Details will be sent early in the New Year.

(Tree of Life, cont. from page 1.)



the angiosperm-like *Gnetum* of tropical forests, the desert shrub *Ephedra* (Mormon tea, ma huang), and *Welwitschia*, a plant bearing only two gnarled leaves that sprawl on the sands of the Namib Desert.

Despite the many advances in our understanding of the evolutionary history of the green plants, the relationships among the major groups of gymnosperms and a clear picture of how angiosperms are related to these other seed plants have remained elusive. A major challenge is that as many as eighteen major groups of gymnosperms that have been identified from the fossil record have no living representatives; an estimated 70–80% of the seed-plant lineages that evolved over the last 400 million years are extinct. With so many missing pieces, the puzzle of seed plant evolution is difficult to reconstruct. Analyses that focus on comparisons of morphological features have suggested that angiosperms are most closely related to the gnetophytes (the anthophyte hypothesis). In contrast, comparison of DNA sequences has indicated that gnetophytes are most closely related to conifers (the gnetifer hypothesis) or even that they evolved from within the conifer lineage (the gnepine hypothesis). Botanists are still actively debating this controversial issue, as much of the evidence has been obscured with the passage of time.


Over the last four years, botanists from more than a dozen institutions, including the University and Jepson Herbaria, have been involved in a collaborative effort to understand how the different types of seed plants are related to each other. To this end, the Gymnosperm Tree of Life project (part of the National Science Foundation's Assembling the Tree of Life Program) has focused on assembling data sets that capture a comprehensive picture of gymnosperm diversity and include both living and extinct plants. The experts associated with the Gymnosperm Tree of Life project have collaborated to create data sets that include DNA sequences from nearly every living species of gymnosperms. Of course, the lack of

DNA from extinct gymnosperms means that DNA alone can't tell the whole evolutionary story; this is where plant morphology and anatomy are critical. Using morphological features like the arrangement of leaves on a stem or the pattern of leaf venation, comparisons among living and fossil plants can be made across the gymnosperm lineage. Patterns in DNA sequences, morphological traits, and anatomical features provide the foundation for inferring hypotheses about the evolution and diversification of seed plants. Variation in DNA sequences provides one lens for looking back through time to see how plants have diversified; variation in physical traits provides a second. When the two lenses are used together, they provide a much more resolved picture of how—and ultimately why, where, and when—seed plants diversified.

Over the lifetime of the project, researchers associated with the Gymnosperm Tree of Life project have dedicated time and resources to sharing information about gymnosperms and the findings of the project with the public. In 2010, these efforts culminated in a series of teacher-training workshops held around the country. The workshops were designed to help teachers integrate local resources, like the gymnosperms in their local botanical gardens or schoolyards, into their science curricula in order to teach key ecological and evolutionary concepts. Dean Kelch, a UC/JEPS research associate and primary investigator on the project, co-taught one such workshop at the San Francisco Botanical Garden with Matt Parks, a postdoctoral researcher at Oregon State University, and Nathalie Nagalingum, a postdoctoral researcher at UC Berkeley. "Gymnosperms represent more than a lens through which to examine the past evolution of life on earth," said Kelch. "They also illustrate the challenges that organisms face as they adapt to changing ecological conditions today."

In addition to touring the Garden's living gymnosperm collections while Kelch introduced gymnosperm ecology, teachers who attended the San Francisco workshop had a first hand opportunity to look at plant diversity from 300 mil-

lion years ago as it was preserved in coal balls. Coal balls are rocks from the Carboniferous Period (354–290 million years ago) that contain fossil plant materials embedded in a calcium carbonate matrix. Coal balls are useful because they contain three dimensional plant structures that were infused with minerals as the rocks were forming, a process called permineralization. Of all the techniques available to paleobotanists, the so-called "coal ball peel" is one of the easiest and most informative about the anatomical structures of extinct plants that existed in a known time and place. The coal ball peel technique transfers a thin section of the fossilized plant material from the prepared surface of the rock to a clear cellulose acetate sheet, which students can examine using a microscope in the classroom.

The Gymnosperm Tree of Life project concluded this year. As a result of the project, four years of data collection and analysis will be directed toward the unanswered questions about the evolutionary history of seed plants. The major findings were presented at the International Botanical Congress in Melbourne, Australia. To learn more about the project, please visit the project website: <http://www.huh.harvard.edu/research/mathews-lab/atolHTMLSite/index.html>. 



A close-up of *Podocarpus macrophyllus* showing the fruit-like seed cone.

Photo by Dean Kelch



## Field Work in Southernmost Chile



Typical scenery in a seno (fiord), Isla Grande, Tierra del Fuego, Chile

Photo by Jim Shevock

*Excerpted from letters sent by Jim Shevock*

Earlier this year (Jan 5 to Feb 7, 2011), I was fortunate to be one of the bryologists participating in an NSF funded expedition to the Antártica Chilena Province. The only way to access nearly all of this area is by boat; there are no roads on the Chile side of Isla Grande de Tierra del Fuego.

For the duration of the expedition, we lived on a seaworthy ship and were hosted by a very experienced crew. Life on the boat was cramped but was offset by interesting colleagues, good food, fresh baked bread each day, and drinking water collected from melting glaciers. The hold of the ship, normally containing king crabs, was retrofitted into a bryophyte drying facility.

We attempted to visit two collection sites per day but our ability to do so depended on the sometimes unforgiving, cold, and wet weather. Each day, we disembarked in a new area, going ashore via zodiacs to explore and collect. Once ashore, hiking in the forested areas was slow going—the bryophytes can be up to waist-high! While hiking in the ‘rushlands,’

dominated by the perennial juncaceous *Marsippospermum*, and countless shallow marsh-like pools, the footing was somewhat unstable; it often rippled beneath my feet as I bounced across it. Upslope were granitic, open landscapes but these, too, were slow going because the peaks were steep and covered by glaciers. The highest elevation I reached was 125 meters!

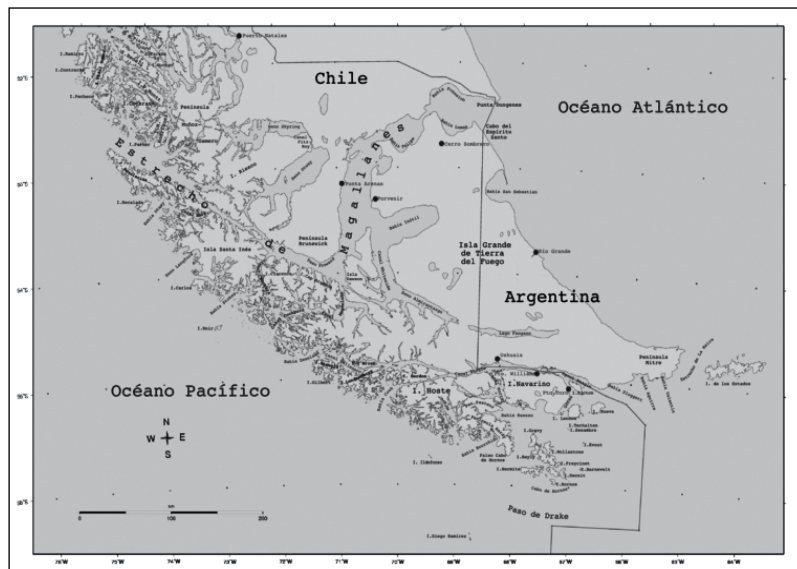
Despite these difficult collecting conditions, I was able to collect 30-40 specimens per day. I focused on the species occurring in streams and rivulets, especially those bryophytes called rheophytes (seasonally submerged then exposed on boulders). In total, I collected 621 bryophyte numbers in multiple sets, and collectively the team obtained over 3000 numbers.

The scenery we encountered was amazingly beautiful—glaciers were ever-present and streams cascaded down in all directions to the sea. The vegetation was dominated by bryophytes in both numbers of species and biomass. The tree-cover occurred primarily right along the fiords and bays. Occasionally, trees were seen in small pockets higher up slope but the ever-present snow and ice on the higher slopes kept the forests restricted



Making our way to shore on a zodiac. Kimmie Mighill (graduate student), Bill Buck (NYBG), crew member, & Jim Shevock

Photo by Blanka Shaw



Map of Tierra del Fuego, courtesy of Wikipedia Commons



Close-up of the ship with us getting drinking water from melting glacier  
Photo by Jim Shevock

mostly to the coastline. The dominant tree was *Nothofagus betuloides* and another common tree was the small but handsome *Drimys winteri*. *Pilgerodendron* was the only member of the Cupressaceae and in many areas it is only a ground cover.

In the *Nothofagus* and *Drimys* pockets of forest, the bryophytes carpeted everything. Most of the understory shrubs appeared to be members of Ericales, quite heath-like and with many shrubs in full flower. The other important and fairly common shrub was a species of *Berberis* with

large fruits. This species is used in a type of local beer called 'calafante,' a nice darker colored beer with the juice of the *Berberis* as part of the ingredients. One small shrub has spectacular magenta-colored tubular-bell-like flowers about 3–4 inches long (*Philesia magellanica*, Philesiaceae). There was also a spectacular shrub in the Proteaceae, *Embothrium coccineum*, with whorls of red tubular flowers. Although it is a timber tree in Chile much farther north, it grows here as a small shrub (to 2 meters) or prostrate over wind-swept rocks. Herbaceous flowering plants were basically absent.

This trip took us to glacier-filled mountains, far away from shipping lanes and civilization. It was by far

the most adventurous expedition I have ever been on. I have never seen anything that wild and pristine. No one lives there and from the look of the land, it is also very rarely visited. Our collections from the areas we visited are likely to be among the first made by bryologists. 📷

Jim Shevock is a research associate at the California Academy of Sciences and the University of California Herbarium



*Philesia magellanica*  
Photo by Jim Shevock



Mountain scenery with Magellanic grassland.

Photo by Jim Shevock



## ***Kurdish Delegation Visits UC/JEPS***

*By Barbara Ertter*

On April 21, 2011, the University and Jepson Herbaria were visited by a botanical delegation from the semi-autonomous Kurdistan Regional Government (KRG) in northeastern Iraq. The delegation is working to establish botanical gardens in Erbil and Suleimaniah (both in northern Iraq), and they will also oversee a new regional herbarium that will be contributing to a new Flora of Iraq project. According to KRG prime minister Barham Salih, “The KRG places a great deal of emphasis on improving the standards of higher education, as well as giving students the chance to go and continue their studies abroad, a right denied to them by the dictatorial regime of Saddam Hussein”.

Members of delegation were Dr. Sarbagh Salih, Dr. Bahram K. Maulood, and Dr. Bushra Ahmed Hamdi. Dr. Salih, in addition to being a human rights activist and wife of KRG prime minister, is a horticulturalist who has worked at the Agricultural Research Center in Beltsville, Maryland. Dr. Maulood wears an even greater number of hats, including research limnologist,



*Collecting team trudging up mountain in Iraqi Kurdistan*

Senior Science Consultant for The American University of Iraq–Sulaimani, and former KRG Deputy Minister of Agriculture & Irrigation. His equally accomplished wife, Dr. Hamdi, is a zoologist and Chair of the Department of Laboratory Analysis at Hawler Medical University. Accompanying the delegation were Dr. Barbara Ertter (UC/JEPS), Dr. Christopher Davidson, and his wife Sharon Christoph.

The delegation represented the latest spin-off of the American-Iranian Botanical Program (AIBP), established by Dr. Fosiee Tahbaz (coordinator, AIBP) and Barbara Ertter after their joint trip to Iran in 1999. Among the more successful accomplishments of the AIBP has been an expedition to Iran in 2004, which included participants from various institutions in the United States

and Iran. One of the participants in that expedition was Dr. Ihsan Al-Shehbaz of the Missouri Botanical Garden, an Iraqi-American who was a former colleague of Dr. Maulood’s at Salahaddin University in Iraq. This connection led to both Al-Shehbaz and Ertter being invited to participate in the inaugural floristic survey of a mountain range in the KRG in June 2010. Davidson and Christoph took advantage of the opportunity as well, furthering their ambitious goal of photographing all plant families in the world ([floraoftheworld.org](http://floraoftheworld.org)).

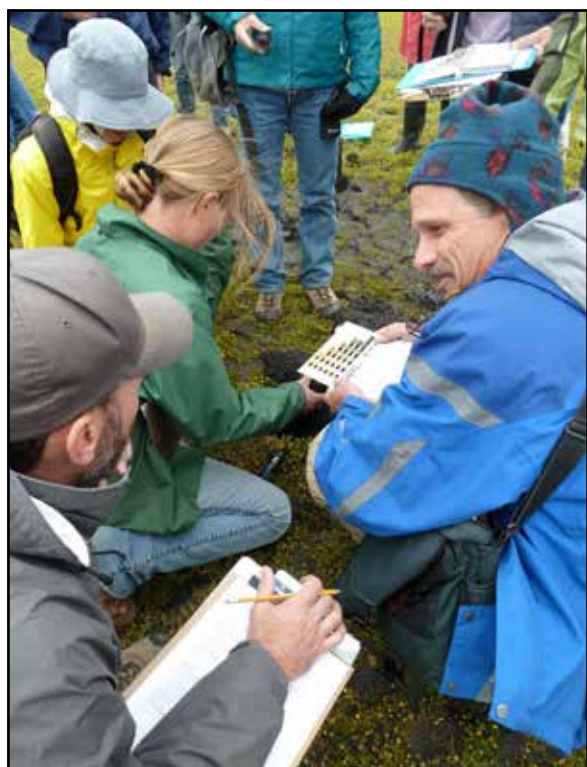
The visit by the Kurdish delegation in April 2011 provided an opportunity for the American participants to reciprocate the outstanding hospitality they were given in Iraq, with the added potential of broadening future collaborations. A guided tour of the University and Jepson Herbaria was only one of many during a 3-week whirlwind tour that included botanical gardens, herbaria, museums, and experiment stations in Texas, Arizona, California, Idaho, and Missouri. Time in the herbaria included a sumptuous reception hosted by Dr. Tahbaz, which allowed the delegation to interact with interested faculty, staff, and students. 🌿



*Bahram Maulood, Barbara Ertter, Brent Mishler, Sarbagh Salih, Fosiee Tahbaz, and Bushra Ahmed Hamdi in the herbarium.*



## 2011 WORKSHOP YEAR IN REVIEW



*Clockwise, from top left: Removing Cholla spines in transit on San Clemente Island, Little Duck Lake at sunrise, a pack mule carries gear to camp, intensive Asteraceae keying, examining hydric soils for Wetland Delineation, Mimulus pulchellus, and Linda Beidleman in the field.*

*Photos by Jeanne Marie Acceturo*



## In Memory of Dr. Isabelle Tavares



Dr. Isabelle Tavares died on May 21, 2011. Dr. Tavares had been associated with the University Herbarium for 59 years. Her academic career began at City College of Los Angeles, was interrupted by service in the Women's Army Corps during World War II, and continued at Berkeley after the War. She received B.A., M.A., and Ph.D. degrees from the University of California. For her doctoral dissertation, under the guidance of Professor Lee Bonar, she investigated the

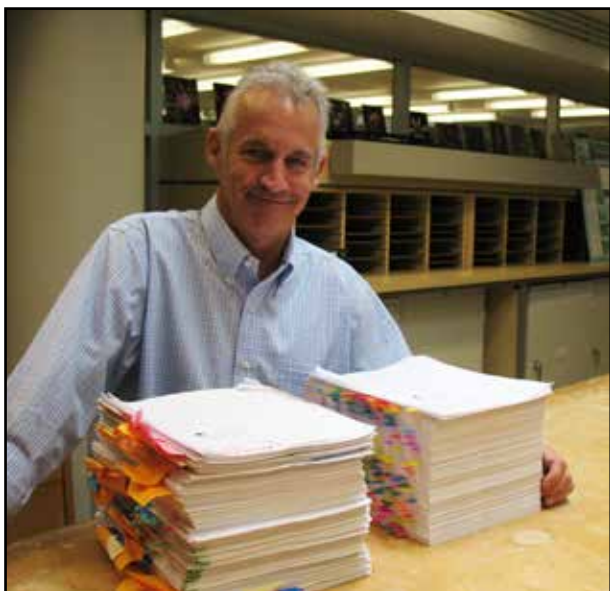
Laboulbeniales, an order of minute fungi that parasitize insects. This research continued after her dissertation and eventually resulted in her magnum opus: *The Laboulbeniales*, published in 1985. She began working in the University Herbarium while still in graduate school, and continued uninterruptedly until long past her retirement in 1993. She curated the fungi (including lichens) and the bryophytes, and participated

in all day-to-day operations of the Herbarium. Curating lichens led her to her second major research interest: the taxonomy of *Usnea*, a widespread and notoriously taxonomically difficult genus of lichens. Dr. Tavares was extensively involved in the California Botanical Society, especially in editing its journal *Madroño*. She was a founding member of the California Lichen Society, and an active promoter of California lichenology. 🌿

## What took so long?

Some of you may have wondered why it took so long to produce the second edition of *The Jepson Manual*. There are many reasons: a huge flora

(over 7600 terminal taxa), a large group of authors (over 300 from around the world), a concise format (treatments were edited to adhere to conventions), a small staff (equivalent to about four positions), a dispersed editorial board (members from various regions of California and beyond), and an extensive proof process. Pictured here is Tom Rosatti, one of the scientific editors, with the first and second sets of proofs (there were five sets in total). Each tab represents at least one change to the manuscript. We made hundreds of changes to the proofs, a process that took about six months! 🌿



## THE JEPSON HERBARIUM PROJECTS & RESOURCES

### The Jepson Flora Project

*The Jepson Manual & Jepson Desert Manual*  
Online Interchange for California Floristics  
*A Flora of California* (electronic)

### Educational Services & Resources

Botanical Workshops & Courses  
Plant Identification  
2,200,000+ Worldwide Plant Specimens  
Botanical Library & Archives

### Publications & Research Projects

*Constancea*: U.C. Publications in Botany

**Director:** Brent D. Mishler

Deep Green Plant Phylogenetics: Novel  
Analytical Methods for Scaling Data from  
Genomics to Morphology

Moorea Biocode Project (a complete inventory  
of an island ecosystem)

Systematics and ecology of *Syntrichia*

**Curator:** Bruce G. Baldwin

Systematics and Evolution of Calif. tarweeds  
and relatives (tribe Madieae, Compositae)

Unravelling the dynamics of mating-system  
evolution in tribe Collinsieae

**Curator of Ecology:** David Ackerly

Niche conservatism, functional trait evolution,  
and the diversification of the California  
vernal pool flora

Ecological Flora of California

**Curator of Monocots:** Chelsea D. Specht

Evolution and biogeography of Calif. alliums  
Systematics and evolution of *Heliconia*  
Floral developmental evolution in the tropical  
gingers (Zingiberales)

**Curator of W. N. Am. Botany:** Barbara Ertter  
*Flora of Mount Diablo & Flora of the East Bay*  
North American Potentilleae

**Trustees:** Vice Chancellor Emeritus Roderic  
Park, Chairman; Vice Chancellor Emeritus  
Beth Burnside; UC Botanical Garden Director  
Paul Licht; Professors John Taylor and  
Brent D. Mishler (ex officio)

**Administrative Curator:** Andrew Doran

### Jepson Flora Project Staff:

Project Research Specialist: Scott Simono

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Manager of Collections Data: Richard Moe

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### Jepson Herbarium Public Programs

We're still hard at work planning our 2012 workshop season, and it's shaping up to be a great one!

The following workshops are confirmed, with more on the way:

- 🕒 Wetland Restoration
- 🕒 Death Valley's Endemic Flora
- 🕒 Flora of San Luis Obispo County
- 🕒 Seaweeds of Central California
- 🕒 Bees and Pollination Ecology of Spring Wildflowers
- 🕒 Late-Season Flora of the White Mountains
- 🕒 Introduction to Bryophytes



The full 2012 schedule will be available in late fall. Stay tuned for updates!

For more information, contact Jeanne Marie Acceturo  
510-643-7008, [jmarie@berkeley.edu](mailto:jmarie@berkeley.edu) or visit our Web site: <http://ucjeps.berkeley.edu/workshops/>