



THE JEPSON GLOBE

A Newsletter from the *Friends of The Jepson Herbarium*

VOLUME 24 NUMBER 1, Spring 2014

Director's column: Phylogenetic Diversity and Phylogenetic Endemism in the California Flora: A new NSF-funded initiative

By Brent D. Mishler

Understanding patterns of biodiversity on the landscape is important for conservation planning, given the need to prioritize efforts in the face of rapid habitat loss and human-induced climate change. Bruce Baldwin, David Ackerly, and I have received a 3-year National Science Foundation grant to apply novel phylogenetic methods [discussed in my 2012 column in *The Jepson Globe* 22(1): 1-4] to better understand the distribution of plant diversity across both space and time in California. Biodiversity is not just about species—even though it is almost always studied in a species-centric way. Instead, the full set of nested clades representing phylogenetic relationships among organisms at all levels makes up biodiversity. Likewise, endemism is not just about species, even though virtually all studies on endemism to the present focus solely on species. Clades at all levels can be endemic to a greater or lesser extent, and all levels are relevant to discovery and evaluation of centers of endemism. Our perception of the patterns of biodiversity and endemism becomes more complete when phylogenetic methods are added to traditional species-based methods.

This new project takes advantage of the rapidly expanding Consortium
(Continued on page 6)



The Jepson Herbarium Workshop Program turned 20 in 2014!

By Jeanne Marie Acceturo

This year, the Jepson Workshop program celebrates its 20th season, an accomplishment we could not have anticipated when the program began. In 1994, the 1993 edition of *The Jepson Manual* had just been published—a remarkable achievement, which drew on dozens of experts in the California Flora. Californians now had an updated reference for identifying their state's native plants. Herbarium Director Brent Mishler realized we had an incredible opportunity to take the book, the experts, and the clamoring potential students, put them together in a room, and let them learn from each other. So the public programs were born, and the
(Continued on page 6)

The California Seaweed eFlora

By Kathy Ann Miller

We are pleased to announce a new initiative, the *California Seaweed eFlora*! Brent Mishler and I have received a three-year grant from the David and Lucile Packard Foundation to produce a new resource that will both update Abbott and Hollenberg's *Marine Algae of California* (1976) and add a new dimension: a web portal designed for all interested people to identify, learn about, and enjoy California seaweed species. We intend that the treatments will be comprehensive enough for seaweed experts, but also immediately accessible for students, naturalists, managers, and ecologists. The Seaweed eFlora will supply information, rich in photos and illustrations, for each of the ~750 species of seaweeds on our coast, more than 100 of which were not included in Abbott and Hollenberg.

For the past two years, funding from the National Science Foundation has provided support for UC Berkeley students and staff to scan and database seaweed collections from the Pacific
(Continued on page 7)

ALSO IN THIS ISSUE

- UC NRS project
- Quillwort diversity
- California lichen catalog
- NSF grant digitizing macroalgae
- Herbaria Alumni
- Congratulations to Benito C. Tan
- Bryophyte studies in Wyoming
- In Memoriam Roderick Park

Cover photo: Jim Morefield and Jeff Greenhouse at White Mountains workshop in 2002.

Connecting the dots: Linking UC resources to better understand future climatic change

By Erin C. Riordan

Over the next century, climate change is expected to significantly impact California's environment, threatening biodiversity, ecosystem services, and human systems across the state. Protected areas, such as those maintained by the University of California Natural Reserve System (NRS), are essential for conserving the state's rich biodiversity, but face growing challenges under mounting environmental change. The magnitude of projected climate change this century could dramatically impact the conservation value of protected areas, including their ability to provide suitable habitat supporting the key species and ecosystems they are intended to protect.

The NRS is the largest university-operated reserve system in the world with 39 reserves encompassing over 750,000 acres and spanning 12 major ecoregions in California. The system's future role in protecting California's biodiversity and natural resources is uncertain in the face of global climate change. In order to assess the future effectiveness of the NRS, I am working at UC Berkeley as a postdoctoral researcher with professors Phil Rundel (UCLA) and David Ackerly (UC Berkeley) in collaboration with Dr. Peggy

Fiedler (NRS director) on a project that will model the potential impacts of climate change on key California plant taxa in NRS reserves.

Using information on species locations from herbarium records of the Consortium of California Herbaria (CCH) and species lists from the California Native Plant Society (CNPS), I am modeling future climate-driven changes in suitable habitat for rare plant taxa across the NRS reserve network. The Consortium, which compiles digitized herbarium records from nearly 30 participating herbaria and institutions throughout California, provides a wealth of information on plant specimens in the state and was an essential resource for mining geographic data for rare plant species models.

Our project will create a number of useful maps and products for both research and management communities. Maps of current suitable habitat can be used as exploratory tools to guide surveys for rare taxa that may not currently be listed in reserves but could occur within reserve boundaries. Future habitat suitability maps will identify priority taxa within reserves that may be at high risk for climate-driven habitat losses. They can also identify taxa and reserves that may be relatively insensitive to projected climate change. Stable reserves could serve as important refugia that may buffer climate change impacts for a number of species.

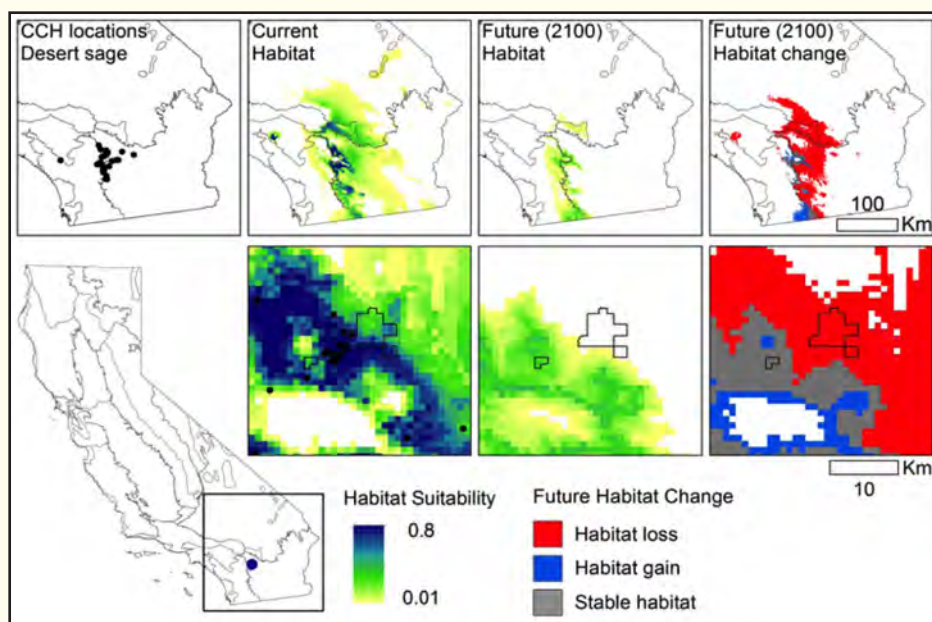


Erin Riordan enjoying the spring bloom in Briones Regional Park in the East Bay.

For example, desert sage (*Salvia eremostachya*) in the Lamiaceae is a California Rare Plant Rank (CRPR) List 4 species of limited distribution in California that occurs on the NRS's Boyd Deep Canyon Desert Research Center in Riverside County. Its status corresponds to a 'watch list' from CNPS that contains plant taxa that cannot be classified as rare but are sufficiently uncommon to warrant monitoring. Desert sage is one of the species that could be at risk of climate-driven habitat loss by the end of this century, both from within the Boyd Deep Canyon Desert Research Center as well as statewide.

This project provides a comprehensive, system-wide analysis of potential climate change impacts on critical California plant taxa that will complement a variety of monitoring and research studies already in progress at individual reserves. It marks a critical step in developing system-wide adaptive management strategies to help ensure the future role of the NRS in preserving California's biodiversity.

Left: Maps of desert sage (*Salvia eremostachya*) locations from CCH, climatically suitable habitat, and projected changes in climatically suitable habitat for the end of the century (2100), assuming a future of high greenhouse gas emissions. The black boundary outlines Boyd Deep Canyon Desert Research Center, one of the largest NRS reserves.



Exploring quillwort diversity of the Sierra

By Jeff Benca

I am pursuing my graduate studies in paleobotany to interpret how plant communities may have responded to major environmental changes in the past. My current work focuses on isoëtalean lycophytes, a group of poor competitors that somehow became dominant in the aftermath of Earth's largest mass extinction, at the end of the Paleozoic Era, 252 million years ago.

I am studying what environmental conditions in the present support isoëtalean-dominated plant communities. The only living representatives of this group are quillworts (*Isoëtes*), a genus of small, rush-like plants associated with aquatic and riparian habitats of persistent and seasonal water bodies.

Researchers have extensively studied *Isoëtes*' evolutionary history, species concepts, and physiological plasticity. The life history and phytosociology of members of this genus in nature is not well understood. In western North America and, notably, California, several counties containing suitable habitats (e.g., highland lakes) have few documented occurrences of *Isoëtes*. Targeting herbarium sampling

efforts in such regions would not only help fill gaps in the genus's distribution across California, but also may set new maximum known elevations for some species. For this reason, I went on a prospecting trip to Eldorado National Forest in September with fellow graduate students Seth Kauppinen and Adam Schneider and colleague Susan Fawcett. During this trip, populations of *Isoëtes* were discovered in three lakes having no previous herbaria records. Furthermore, two of these three lakes yielded almost pure *Isoëtes* monocultures. During prior fieldwork in this region, Seth discovered *Isoëtes* in abundance in many other lakes and small pools—all of which would be new distributional records of the genus for Eldorado County.

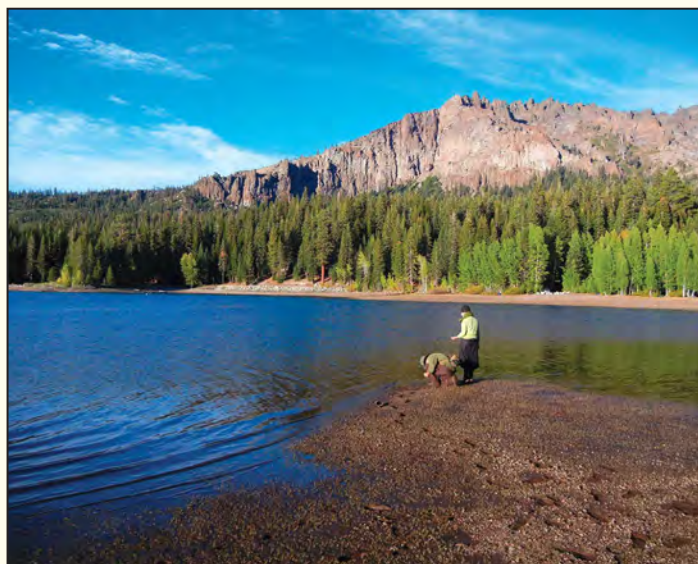
With support from the Lawrence R. Heckard Fund, I will begin surveys of *Isoëtes* diversity in lakes and pools across under-represented counties in the Sierra above 2100m elevation. This summer, survey efforts will concentrate on Eldorado and Lassen counties, which have eight and two locality records of the genus above 2100m elevation respectively in the Consortium of California Herbaria. From each site, voucher specimens will be collected,

pressed, and identified (using mega- and microspore morphology) and spores extracted, preserved, and photographed for the University and Jepson Herbaria physical and digitized collections. In addition, terrestrial and aquatic habitats will be photographed for herbaria and CalPhotos archives using standard and underwater digital cameras. With both imaged and described habitat data, I will attempt to identify common habitat characteristics of *Isoëtes* today to interpret what conditions may have fostered prolonged dominance of isoëtalean floras during the end-Paleozoic extinction.

In addition to surveying *Isoëtes* biology and phytosociology in the field, I am working on testing and developing repeatable cultivation and propagation techniques for the genus in laboratories, greenhouses, and outdoors. The aim of this work will be to provide a framework for researchers and *ex situ* conservation programs working with endangered members of this genus. I am also building a teaching and research reference collection of living voucher specimens from all localities sampled in California at the Valley Life Sciences Building, UC Berkeley. 📷



Isoëtes growing as emergents on the shoreline of Silver Lake, Eldorado National Forest, Eldorado Co. Photo: J. Benca.



Seth Kauppinen and Susan Fawcett collecting *Isoëtes* sp. in habitat, shore of Silver Lake, Eldorado National Forest. Photo: J. Benca.

(Workshops, cont. from page 1.)

herbarium's mission was expanded to include instructional programs.

The first brochure is titled "The Jepson Herbarium Weekend Workshops: A Series of Intensive Workshops on the Systematics of Botanical Groups." The cover features illustrations of oak leaves and acorns. Inside, the program is described thusly:

The Jepson Herbarium has organized a series of intensive weekend workshops on the systematics of selected taxonomic groups of particular interest in the California flora. There will be one or two workshops per month during the 1994-1995 academic year. We are especially emphasizing those groups whose taxonomy is considered difficult.

The level of instruction will assume that participants have the equivalent of an undergraduate (or above) biology degree. The workshops are designed to appeal to biological consultants, federal and state agency biologists, conservationists, educators, and others who have a desire to better understand these special groups of plants...

These workshops will fill a niche not otherwise filled by classes offered by the college/university community.

The first Jepson Workshop was September 17-18, 1994: a Compositae class with Bruce Baldwin and John Strother. Other offerings in the inaugural season included *Quercus*, Ferns and Fern Allies, Poaceae, California Seaweeds, and Polemoniaceae. Four



Bruce Baldwin at Compositae workshop spring of 1996, Clark Mountain Range in the eastern Mojave Desert.



Dan Norris and James Shevock, Central Sierra workshop, 2003. Photo by Staci Markos.

of the 14 workshops were held at field stations; the rest were on campus at UC Berkeley.

In 1996, the Workshop program expanded to 20 workshops, and included its first Floristic workshop—an Alpine Flora class in the White Mountains with Steve Jessup—as well as its first "Basic Botany" introductory-level workshops. The first Santa Cruz Island trip was in April 1997 (led by Dieter Wilken); the first trip to "Baja" with Jon Rebman was in 1999. As the years passed, offerings continued to evolve, with additions such as the grant-funded "Tree of Life" series in 2004, and collaborative workshops with other members of the Berkeley Natural History Museums, beginning in 2007.

Since 1994, we've offered more than 500 workshops, covering topics from *Allium* to Wildflower Photography (and everything in between). Flora and taxa have been studied in over 50 locations across California, nearby states, and three foreign countries! The workshop program is now an important statewide resource for technical training in botanical subjects.

In 2012, we published the second edition of *The Jepson Manual*. Today, many of our prestigious instructors also use *The Jepson eFlora* in their courses. Regardless of location, references, or technological advances, the workshops maintain the same underlying principles of the 1994-1995 workshop program; excellence, collaboration, and a sense of adventure.

Now in our 20th year, we're not content to rest on our laurels. We're expanding and growing the program to include our first offering of the UC California Naturalist Training. This UC-developed 40-hour course combines classroom and field experience in science, problem-solving, communication training, and community service to explore the unique ecology and natural history of the San Francisco Bay Area. In addition to the coursework, California Naturalists will be encouraged to complete 40 hours of volunteer service in one of four areas: program support, interpretation/education, restoration/conservation, and/or citizen science. Four UC Davis Extension undergraduate academic credits are available upon course completion for an additional fee.

The Jepson Herbarium's California Naturalist classes will meet at UC Berkeley on Thursday evenings beginning September 4. Complete schedule details and application forms will be available in mid-2014. If you would like to receive this information when it becomes available, send an email to jepsonworkshops@berkeley.edu with the subject "Interested in California Naturalist Training." You can also submit ideas for future workshop topics, instructors, or locations to that address.

Here's to another 20 years of discovering and sharing California's unique natural heritage! 🌿



Suzanne Swedo at Polemoniaceae in 2013. Photo by Jeanne Marie Acceturo.

Over the years, workshop program participants have grown and changed with us. Some have used the training they've received in our workshops as a springboard to careers in botany, or as assistants in botanical projects around California. Others have made lifelong friendships, and even found their life partners on Jepson Workshops! We asked three longtime workshop participants about the workshop program. Here's what they had to say:

Q: What does the workshop program mean to you?

Jeff Greenhouse: The workshops have given me the opportunity to rub elbows with leading California field botanists, get out into special botanical areas with them, and learn about the special plants in those places. On 68 Jepson workshops so far I've seen over 950 new plants. It has been the greatest public field trip program in the state in my opinion.

Kate Mawdsley: I remember being intimidated before I signed up for my first workshop. A total amateur, I wasn't sure I could keep up. Happily, I was wrong: I've learned a tremendous amount both from the instructors and observing other participants and, very important to me, was introduced to some great places to see plants. Now, probably two dozen or more workshops later, I still look for great locations and for my favorite plant groups. I also look forward to the camaraderie of other participants.

Neal Kramer: Workshops provide a wonderful learning opportunity, as well as a chance to expand my botanical

bandwidth, interact with topic experts, explore new places with the experts, and spend time and network with other enthusiastic botanists!

Q: Do you remember your first Jepson Workshop? If so, what do you remember about it?

JG: I started off slowly with a single workshop on campus in April 1995. Teresa Sholars shared her knowledge of California lupines in a lab setting in VLSB. We noshed on bagels and soft drinks while she reviewed hints and tricks on how to work through her lupine key. I use her approach to this day when I have a lupine to key. We had a short outing on Sunday to the UC Botanical Garden where Terry imprinted our minds with her quick way to ID *Lupinus albifrons*, "woody hairy banner back."

KM: The first folder on my shelf is for Southern California Vernal Pools in April 1996. I'd studied Northern California pools for a number of years, and was struck by two things: there are almost no vernal pools left in SoCal, and they typically occur in scrub communities, rather than the grasslands I was familiar with.

NK: *Astragalus* in Bishop and the White Mountains, July 1995, was a wonderful experience. It was my first time in the White Mountains, and it sparked a keener interest in alpine vegetation. I came away with a much greater appreciation of the genus *Astragalus* and how it fits with other members of the Fabaceae family.

Q: Could you name a favorite workshop? What makes it your favorite?

JG: I usually decline to name one favorite anything. Dieter Wilken's 1997 Santa Cruz Island workshop comes to mind for the most new plants (59). Also all of Steve Junak's Island workshops for the peaceful and remote island setting and his expert leadership. And I can't forget all the White Mountain outings led by Jim Morefield, for his knowledge

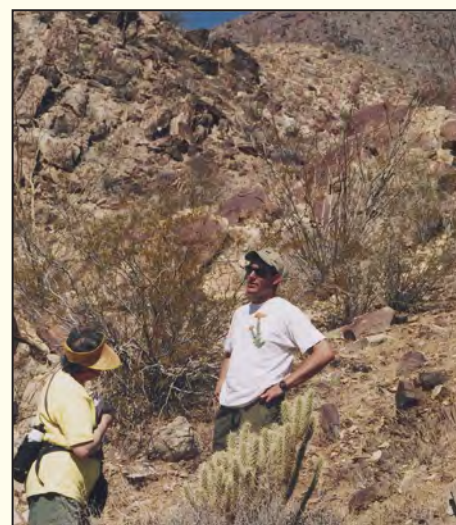
of the flora and his personable manner. (Sorry I can't limit myself to just one or two!)

KM: Favorites....Last year's Tejon Ranch was great: many new plants for me, a wide range of habitat types, and the special privilege of botanizing in a restricted, undisturbed place. The mix of veteran and newer participants was very congenial, and the food was outstanding. The Warner Mountains trip several years ago was also memorable for the plants and the isolated location, somewhere I could never have gone on my own. I've gone back any number of times to the field locations we visited on Peggy Fiedler's *Calochortus* class many years ago, even led a local group there on a field trip. And Jim Reveal's *Eriogonum* class at Yuba Pass gave me hope that I could tackle the genus—although I can't do it with just a hand lens, as he said we should be able to.

NK: After more than 40 different Jepson Workshops, it's difficult to pick a favorite! Can't say I've ever been disappointed in those I've attended, but I especially enjoy those that take me to places I have not been, and that have plenty of "outside, boots on the ground" time. 📷



Marty Wojciechowski, Betsy Ringrose, Margriet Wetherwax (holding the Jepson Desert Manual) at the Sweetwater Mountains workshop in 2002. Photo by Staci Markos.



John Rebman at the Flora of the Anza Borrego Desert workshop in 2002. Photo by Staci Markos.

Second revision of the California lichen catalog

By Richard L. Moe

Whether they are aware of it or not, California biologists encounter lichens practically everywhere they look. The trunks of most species of trees look the way they do because of bark-inhabiting lichens. An *Aesculus* would look strange without its complement of lichens. Rock outcroppings are painted (and degraded) little-by-little by lichens. The surface of desert soil is held together by lichens. In the highest alpine regions lichens grow on (and even in) what would seem to be the most hostile rock surfaces.

Although lichens are ubiquitous in California, they are not nearly as well known as vascular plants. There is no lichen analogue of *The Jepson Manual* or *The Jepson eFlora*. There is however a statewide group of enthusiasts in the California Lichen Society, and increased interest among agency botanists and other California biologists to build such resources.


Enthusiasts and professionals alike will benefit from the *Catalog of California Lichens* that was recently revised by Dr. Shirley Tucker of Santa Barbara for the online publication, *Constancea* (ucjeps.berkeley.edu/constancea/).

After retiring from her position as a professor of Botany specializing in plant anatomy at the University of Louisiana, Tucker concentrated on California lichenology. She published the first



Slate rocks with lichens. From Merced Falls, Sierra Nevada foothills, California. Photo by Sylvia Sharnoff

version of a lichen catalog with William Jordan (University of San Francisco) in 1979. In 2006, she and Bruce Ryan revised and greatly expanded that catalog in *Constancea*. Since 2006, interest in lichens worldwide has stimulated California lichenology, increasing the number of species known from California and revising understanding of relationships. The new online catalog lists 1,869 accepted names, numerous synonyms, and provides a bibliography of 1,158 publications.


The catalog does not by itself help to identify species, but it is an important resource for anyone researching California lichens. For each accepted name, complete literature references are given, and for some species, original records are provided with herbarium citations. All taxonomic names are hyperlinked to Index Fungorum, the taxonomic clearinghouse of fungi. Nearly half of the accepted names are hyperlinked to the images maintained by Stephen Sharnoff (the images illustrate Sharnoff's encyclopedic work which has had a lot to do with increased interest in lichens). The catalog can be downloaded as a PDF, or it can be used online. 



Below: *Pilophorus acicularis* on mossy rock, from the northern Coast Range, California. Photo by Stephen Sharnoff.

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

of California Herbaria database, the constantly updated *Jepson eFlora* for California, and the wealth of phylogenetic studies that have accumulated for many plant groups. A comprehensive phylogeny for California plants will be built, using existing data from Genbank as well as newly generated molecular data generated from fresh material gathered via an innovative collaboration with citizen scientists from the California Native Plant Society. We will then apply a suite of phylogenetic measures including Phylogenetic Diversity (i.e., the portion of the overall phylogeny that is present in a local place) and Phylogenetic Endemism (i.e., the geographic rarity of that portion of the phylogeny), using novel randomization tests to judge the statistical significance of departures from random expectations.

The results will be valuable for academic concerns such as understanding evolutionary and ecological processes acting on the California flora, for example by using the new distinction that can be made between centers of neoendemism and paleoendemism. The results will be valuable as well for practical concerns such as the conservation decision-making process by allowing assessment of conservation reserve coverage that is not limited by reliance on species distributions alone and can identify complementary areas of biodiversity that have unique evolutionary histories in need of protection. 



Lichens on bark: *Teloschistes flavicans* (fertile form), *Usnea* sp., etc., from western Sonoma County, California. Photo by Stephen Sharnoff

(Seaweeds, cont. from page 1.)

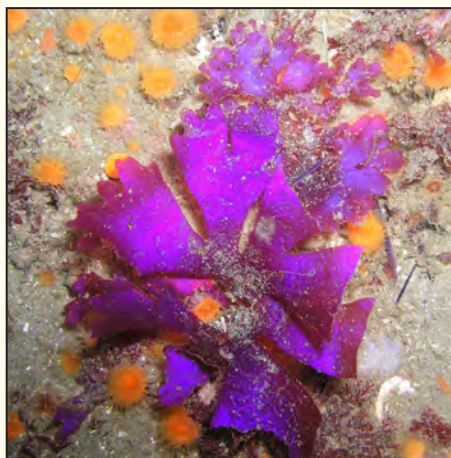
coast that are housed in the University Herbarium. Richard Moe is augmenting the records by providing geographic coordinates that will allow these specimens to demonstrate the range of each species. When fully integrated into the Seaweed eFlora, users will be able to click on a map and see specimen images that represent the full range of morphological variation that is a function of habitat and latitude. The flora will be available from the home page of the Silva Center for Phycological Documentation (ucjeps.berkeley.edu/CPD/algal_research.html).

If you would like to learn more about seaweeds or contribute to the *Seaweed eFlora*, please consider joining me for a Jepson Workshop, "Seaweeds of Northern California", at Point Arena, a wonderfully wild and rich area on the north coast. The workshop will be held 15-18 May 2014. We will explore the seaweed flora and gather material for the *eFlora*. Photographers are especially welcome! 📷

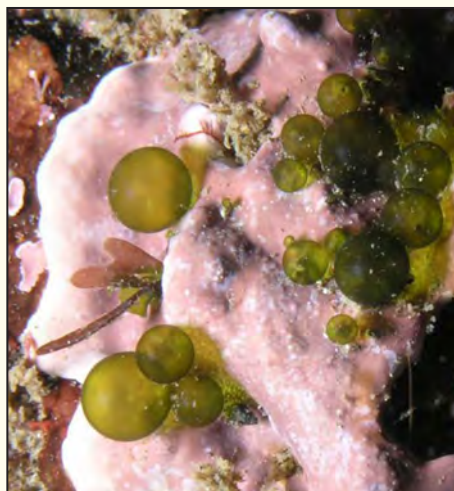


Above: *Macrocystis pyrifera*. The giant kelp forms magnificent forests offshore of Baja California, Mexico, through Alaska, as well as South America, Australia, and New Zealand. Photo by Dan Richards.

Right: Kathy Ann Miller aboard the R/V *Cormorant* on a collecting trip in the California Channel Islands. Photo by Jessie Alstatt.



Above: *Fryeella gardneri*. The beautiful magenta iridescence is caused by thin layer diffraction due to layers of protein in cuticle (outer layer) of the blade. Photo by Dan Richards.



Above: *Derbesia marina*. These little bubbles grow obligately on pink crustose coralline algae. They are haploid; the diploid phase is a tuft of fine threads. Photo by Jessie Alstatt.



NSF Grant Received for Digitizing Macroalgae

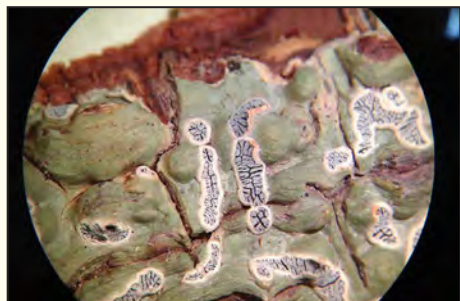
The University Herbarium is part of another successful Thematic Collections Networks (TCN) award from the National Science Foundation (NSF). The title of the two-year project is *The Macroalgal Herbarium Consortium: Accessing 150 Years of Specimen Data to Understand Changes in the Marine/Aquatic Environment*. The project has two primary objectives:

- 1) To establish a Macroalgal Herbarium Consortium (MHC), a network of 48 U.S. institutions that will collectively develop and share tools, workflows, knowledge, and experiences resulting in streamlined specimen digitization and data access.
- 2) To digitize the more than 1.1 million macroalgal herbarium specimens in the MHC collections, and to make the specimen data easily accessible in a way that will:
 - a) facilitate ecological research, documenting biodiversity as well as spatial and temporal changes in marine, estuarine, and freshwater environments
 - b) inform environmental managers and regulatory agencies
 - c) engage the public and promote an appreciation of the importance of macroalgae and natural history collections

**Ekaphan (Bier) Kraichak**

Since leaving Berkeley in May 2013, I have been a postdoctoral scientist at the Field Museum of Natural History in Chicago where my time is divided between two major projects. The first project focuses on molecular systematics of a large (2,000+ species) tropical family of lichens called Graphidaceae. We use data from DNA markers (from Sanger sequencing) to reconstruct phylogenetic relationships within the family and incorporate morphological, anatomical, and chemical data to revise the classification within the family. We have also taken advantage of these datasets to address larger questions in evolutionary biology, including cryptic diversity, character evolution, trait correlation, and diversification processes.

The second project addresses problems and challenges of ancestral state reconstruction from an extant phylogeny. These methods rely on character states of extant taxa to infer ancestral states. Due to the lack of fossil evidence, very few methods can incorporate, or even consider, character states of extinct taxa in reconstruction of ancestral states. This work employs different approaches—both theoretical and empirical—to investigate the effects of excluding extinct taxa from ancestral state reconstruction. The results from this research will allow evolutionary biologists to better understand a tool that is largely taken for granted. After my current position at the Field Museum, I will be moving back to Thailand to start my lecturer position (equivalent to the rank of assistant professor in the U.S.) in botany at Kasetsart University in Bangkok. 🌿



The lichen genus *Sarcographa*. Photo: E. Kraichak

Abigail Moore

I worked with Bruce Baldwin and graduated in 2010, with a dissertation entitled “Phylogenetic and Population Genetic Studies in *Grindelia* (Asteraceae: Astereae).” I looked at gene flow among populations that grew in different habitats and were classified as different species. I found that there was actually little or no gene flow between populations, even when they were growing right next to each other, as *G. stricta* var. *angustifolia* (salt marsh) and *G. camporum* (grassland) do at Point Pinos. I also looked at the relationships of all species of *Grindelia*, and found that the genus was divided into two groups, one that was endemic to North America and one that was endemic to South America. The species in the California and the Pacific Northwest appeared to be derived from desert plants.

After graduating, I had a postdoc position with Joachim Kadereit at the University of Mainz, Germany, until mid 2013. We looked at ecological diversification, specifically substrate tolerance, in a group of plants in the genus *Minuartia*, in the Caryophyllaceae. I got to collect the plants throughout their range in the Alps, northern Apennines, and on the Balkan Peninsula. We found that the species from the Alps that grew on different substrates (two on calcareous substrates and one on granitic substrates) were actually not that closely related, even though they looked very similar to each other. Instead, their ancestors dispersed independently from the Balkan Peninsula.

In July 2013, I started a second postdoc with Erika Edwards, at Brown University. We are looking at *Anacampseros* and other succulent plants that are related to cacti in order to understand the evolution of different photosynthetic types and to figure out which plants are most closely related to the cacti. We are using next-generation sequencing technology to sequence a very large number of genes, including those involved in photosynthesis, in the species in this group. 🌿



Minuartia langii near Vernár in Slovakia, July 2011. Photo: A. Moore

Congratulations to Benito C. Tan

This past October, Dr. Tan was honored at the California Academy of Sciences and inducted as a new Academy Fellow. The Fellows are a governing group of around 300 distinguished scientists who have made notable contributions to one or more of the natural sciences.

Dr. Tan, Research Associate, University Herbarium, is one of the few world authorities on the taxonomy and systematics of South East Asian and East Asian moss floras. A university professor and researcher in plant biodiversity for many years, he is also a member of the Committee of Plant Nomenclature in Bryophyta of the International Association of Plant Taxonomists, a member of the Committee of Endangered Bryophytes of the International Association of Bryologists, and a member of the IUCN. Dr. Tan has had more than 250 technical scientific publications in international and local botanical and bryological journals, including chapters of books, on the taxonomy, molecular systematics, biogeography, and conservation of Asiatic mosses. 🌿



Benito C. Tan studying a moss specimen from the Indonesian rainforest (National University of Singapore, 2010).



NOTES FROM OUR FRIENDS

Modern herbarium resource for bryological studies in Wyoming

By Yelena Kosovich-Anderson

Research Associate, University of Wyoming Rocky Mountain Herbarium (RM)

For over 10 years, I have been collecting mosses and liverworts in the Rocky Mountains and Great Plains regions of Wyoming. Much of my work has been dedicated to developing a bryophyte inventory of two nationally protected areas of Wyoming, Shoshone National Forest and Medicine Bow National Forest. To date, I have collected over 17,000 bryophyte specimens (all with GPS location data); this collection is the largest Wyoming bryophyte herbarium in existence. Voucher collections are being transferred to the Rocky Mountain Herbarium (RM), Laramie.

Through my work, a great deal of new information on the distribution and

ecology of many species was revealed. The first annotated checklists on the bryophytes of the Shoshone National Forest (in the Beartooth Mountains, and the southeastern portion of the Wind River Range) and the Medicine Bow National Forest have been completed. Up to the present, my investigations have documented 4 moss genera and 14 species that are additions to Wyoming flora; one species is new to the North American continent, one variety is newly described.

My collections are included in the nationwide database of the bryophytes from major herbaria (bryophyteportal.org/portal/) and the online database of the Rocky Mountain Herbarium (www.rmh.uwyo.edu/data/search.php).

For more information about some of my collections, please see: phytoneuron.net/PhytoN-BTmosses.pdf.



The bryophyte flora of the alpine zone is the most poorly known in Wyoming. Y. Kosovich-Anderson in the Snowy Range of WY, elev. 3350 m. Photo: R. Anderson. August 2012.



HECKARD AWARDS

The Lawrence R. Heckard Fund of the Jepson Herbarium was established with a generous bequest from Larry Heckard, former Curator of the Jepson Herbarium. The program supports systematic research on vascular plants (tracheophytes) of California and their close relatives in North America. The program is open to UC Berkeley faculty, staff, students, and visitors with formal appointments. Research that contributes information pertinent to advancing Jepson's *Flora of California* and *The Jepson Manual* is considered of particular importance.

This year, the Heckard Committee was pleased to award grants to the recipients listed below.

Jeffrey Benca

Barbara Ertter

Will Freyman

Shih-Yi Hsiung

Stephen Sharnoff and Joanna Clines

Chelsea Specht

Isoëtes diversity in the Sierra Nevada

Infrataxa of *Rosa gymnocarpa*

Chylismia phylogenomics & reticulate evolution

California pollen collection

Sierra Plants Project

Species delimitation and population genetics in *Calochortus venustus*



Left: *Asclepias californica*. Photo by Steve Sharnoff.

Right: *Chylismia brevipes* subsp. *pallidula*. Photo by Will Freyman.



In Memoriam – Roderick Park: A Personalized Remembrance


By Brent D. Mishler

This past fall, Rod Park, Chair of the Jepson Trustees and long time supporter of the Herbaria, died at his home at the age of 81. Rod and I first met when I came to Berkeley from Duke for my job interview in late 1992. At that time, Rod was acting as Director of the University and Jepson Herbaria and leading the search for a new Director (the position I accepted).

I was completely new to administration when I arrived on campus for my interview (up until then I was just a regular professor who kept as far away from administrative duties as possible!). In all the interview stress, the one visit I remembered the most distinctly was the one with Rod. He calmly took me under his wing, explained the status of the Herbaria funds and personnel, and gave me a frank evaluation of all the staff that was extremely useful for

a newcomer. I vividly remember him driving me back to the Shattuck Hotel (in a rather beat-up old car as I recall!) following a great dinner at the Faculty Club, and giving me one of the first of many lessons in how to deal with people and money in administration—lessons which fortunately continued until his death.

From serving as Acting Director during a challenging transition to being Chair of the Jepson Trustees, Rod was a wise and guiding force for the Herbaria as a whole and for me personally. I can truly say that Rod has been my main mentor and role-model as I try to figure out how to be an active professor and administrator in less than 16 hours a day. Maybe some day I'll figure it out as well as he did! The university's memorial tribute can be found here: newscenter.berkeley.edu/2013/09/11/roderic-park-dies-at-81/

The Herbaria and I will greatly miss him. 



Rod Park, (center) with Brent Mishler (herbarium t-shirt), Bruce Baldwin (on left) and others during the Herbarium visit to Rockpile Vinyard, June 2006. Photo by Tom Rosatti.

SUPPORT THE JEPSON HERBARIUM

Name(s) _____ Amount \$ _____ Visa ___ Mastercard ___
Address _____ Card # _____
City, State Zip _____ Signature _____
Telephone/ Email _____ Exp. Date _____

☐ **Basic Membership (\$35 individual, \$50 family)**

Basic members receive *The Jepson Globe* and discounts on Weekend Workshops.

☐ **Sustaining Membership (\$200)**

Receive basic membership benefits plus acknowledgement in the Jepson eFlora.

☐ **Lifetime Membership (\$5,000 total, or pledge a minimum of \$250/year)**

Demonstrate your dedication and commitment to the Jepson Herbarium with a lifetime membership. Gain recognition for your support in *The Jepson Globe* and *The Jepson eFlora*. Share your ideas with the Director and Curator at special, invitation-only events.

☐ My or my spouse's employer will match this gift. (Please enclose company form.)

☐ This gift is ___ in honor of / ___ in memory of _____

☐ Please send me information about including the Herbarium in my will.

Please make your check payable to the UC Regents, charge your gift, or give online at: <http://givetocal.berkeley.edu/browse/?u=71>

Jepson Herbarium, 1001 Valley Life Sciences Building #2465, University of California, Berkeley, CA 94720-2465

For more information call (510) 643-7008, or visit our web site: <http://ucjeps.berkeley.edu/>

All gifts are tax deductible as prescribed by law.

Thank you for supporting the Herbarium and its programs!

THANK YOU TO OUR LIFETIME MEMBERS!

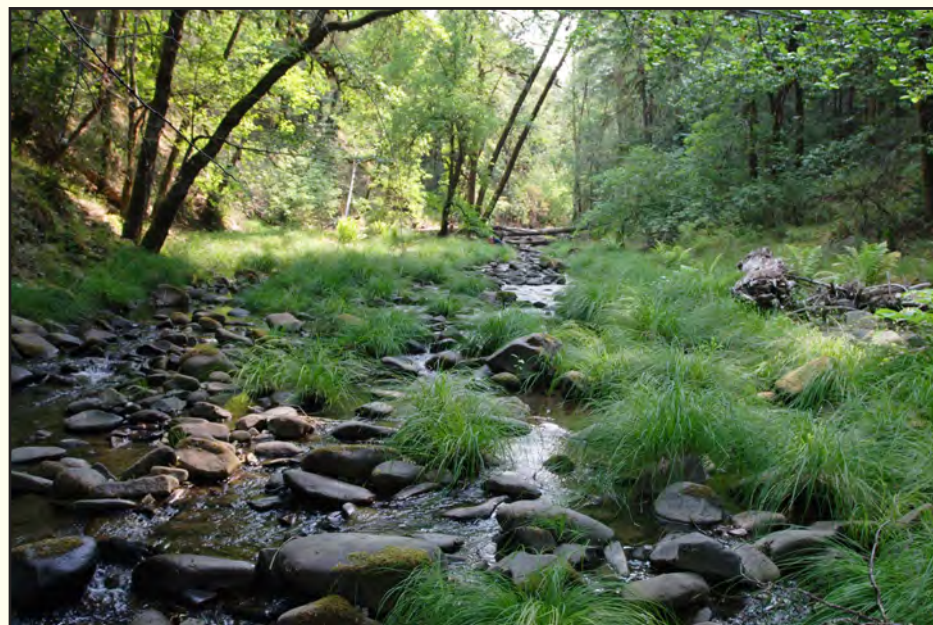
Lowell Ahart
Bruce G. Baldwin
Central Coast Wilds
Christopher Davidson
Frank W. Ellis
Wilma and William Follette
Kenneth Fuller, in memory of
Thomas C. Fuller
Jeffrey and Judy Greenhouse
Kenneth R. Himes
Dwight L. Johnson
Alan I. Kaplan, in honor of Dr. Job
Kuijt
Neal Kramer
Ann Lambrecht
Staci Markos
Steve Matson

Mary Ann Matthews
Brent D. Mishler
L. Maynard Moe
Richard Moe
Jan Nachlinger
Roderic and Cathy Park
Stephen P. Rae
Betsy Ringrose and Edward Adasiak
Thomas J. Rosatti, in memory of
Jean Ann (Seely) Rosatti and
Edward James Rosatti, Jr.
Steve Schoenig
Jake Sigg
James P. Smith, Jr.
Norm and Cathy Weeden
Marcia H. Wolfe

We extend our deepest gratitude to the Lifetime Members of the Jepson Herbarium. These supporters ensure continuation of fundamental programs.

Thinking of becoming a life member?

Join before our special invitation-only event on May 18, 2014.



Angelo Coast Range Reserve located on the South Fork of the Eel River in Mendocino County. Photo by Lobsang Wangdu

THE JEPSON HERBARIUM PROJECTS & RESOURCES

2,200,000+ Worldwide Plant Specimens

Director: Brent D. Mishler

Deep Moss: Reconstructing the early evolution of mosses from comparative genomics
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), *Chaenactis* (Chaenactidiaceae, Compositae), and *Collinsia* (Plantaginaceae).

Curator of Ecology: David Ackerly

Ecology and evolution of California flora;
Climate change impacts and conservation strategies

Curator of Monocots: Chelsea D. Specht

Evolution and biogeography of Calif. monocots (including *Allium*, *Nolina*)

Systematics and evolution of Heliconiaceae, Costaceae, and Zingiberaceae

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 Beth Burnside;
UC Botanical Garden Director Paul Licht;
Professors John Taylor and Brent D. Mishler
(ex officio)

Asst. Director for Collections: Andrew Doran
Cultivated plants, UK flora

Asst. Director for Development & Outreach:
Staci Markos, *Jepson eFlora*, CCH & *Globe* editor

Manag. of Collections Data: David Baxter

Collections Staff & Plant Identification:

Kim Kersh, Clare Loughran, Ana Penny, &
Margriet Wetherwax

***Jepson eFlora* & Online Interchange for
California Floristics**

Scientific Editor: Tom Rosatti

Project Research Specialist: Scott Simono

***Constancea*:** UC Publications in Botany (online)

Archivist: Amy Kasameyer, Botanical
Library & Archives

Public Programs: Jeanne Marie Acceturo,
Botanical Workshops & Courses

Membership, workshop enrollment, and

***Globe* design:** Edith Summers

Staff Research Associate: Bridget Wessa



University of California, Berkeley
FRIENDS OF THE JEPSON HERBARIUM
1001 Valley Life Sciences Building # 2465
Berkeley, CA 94720-2465

ADDRESS SERVICE REQUESTED

Nonprofit Organization
U.S. Postage PAID
University of California,
Berkeley

Upcoming Botany Lunches

Apr. 11: Kerry Knudsen, Curator of Lichens, Herbarium of U. C. Riverside, University of California, Riverside

Lichens of Joshua Tree National Park

Apr. 18: Dr. Kathryn Davis, Director, Global Studies, San Jose State University

At Home in the Wild: The Botanical Adventures of Ynes Mexia

Apr. 25: Andrew Doran, Assistant Director for Collections, University & Jepson Herbaria

Digitization at UC/JEPS, History, People, Plants, and Projects

May 2: Heath Bartosh, Senior Botanist, Nomad Ecology, Research Associate, University & Jepson Herbaria

Botanizing Jepson's Backyard, The Solano County Flora Project

May 9: Alan Smith, Curator of Pteridophytes, University & Jepson Herbaria,

Botanizing southwestern Australia, a biodiversity hotspot

*Botany Lunch meets Fridays at noon during the academic year.
Presentations are in 1002 Valley Life Sciences Building.*