



# THE JEPSON GLOBE

A Newsletter from the *Friends of The Jepson Herbarium*

VOLUME 29 NUMBER 1, Spring 2019

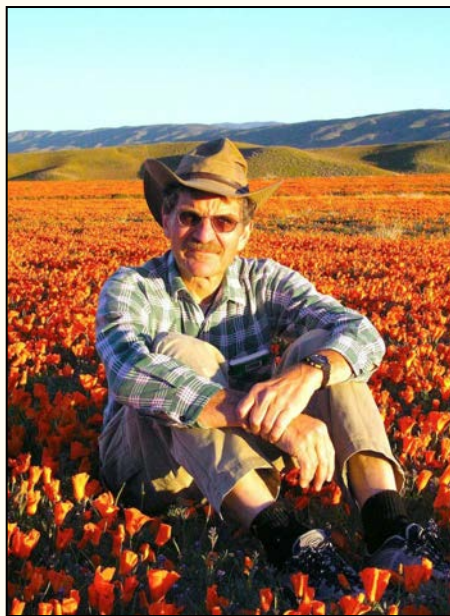
## Curator's column: Don Kyhos's legacy in California botany

By Bruce G. Baldwin

In early April, my Ph.D. advisor, Donald W. Kyhos (UC Davis) turns 90, fittingly during one of the California desert's most spectacular blooms in recent years. Don's many contributions to desert botany and plant evolution in general are well worth celebrating here for their critical importance to our understanding of the California flora. Those old enough to have used Munz's *A California Flora* may recall seeing the abundant references to Raven and Kyhos's chromosome numbers, which reflect a partnership between Don and Peter Raven that yielded a tremendous body of cytogenetic information about our native plants. Don's talents as a cytogeneticist were put to excellent use during his long career in studies of evolutionary diversification of Californian composites such as *Chaenactis*, *Encelia*, and the tarweed subtribe Madiinae. The insights that came from those studies are too numerous to detail here, but some highlights must be noted.

Don's studies of *Chaenactis* (pin-cushions) began when he was a graduate student at UCLA working under Harlan Lewis and Henry Thompson, both luminaries in 20<sup>th</sup> Century plant evolution and systematics. Don found that two widespread desert annuals, *C. fremontii* and *C. stevioides*, descended from ancestors referable to *C. glabriuscula* in the California Floristic Province and represent evolutionary

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Rudi Schmid at Antelope Valley California Poppy Reserve on 7 April 2003. Photo by Ray Cranfill.

## In Appreciation: A new endowment fund established by Rudi Schmid

By Staci Markos

Toward the end of 2018, Rudolf Schmid established a new endowment fund for the University and Jepson Herbaria. The principal of Rudi's gift will be invested in the UC Berkeley Foundation and an annual distribution from the corpus will support research and curation, with an emphasis on conifers, including activities focused on systematics, evolution, phylogenetics, floristics, curation, fieldwork, and publication of research in these fields. Funds may also be used to support graduate student appointments in the Herbaria.

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## Upcoming changes in the Consortium of California Herbaria

By Jason Alexander

In January, the Northern California Botanists Association hosted their 9th Botanical Symposium in Chico, California. The Consortium of California Herbaria (CCH) was invited to present on upcoming changes. The CCH began as a data aggregator for California vascular plant specimen data and that remains its primary purpose to date. From 2003 until 2017, the CCH grew in size to over 2.2 million specimen records from 36 institutions. Responding to requests from participants to display specimen data from all groups of plants and fungi, from all locations (including those outside California), we have developed a new Symbiota portal (CCH2). The development of this new portal has been funded by the California Phenology Thematic Collections Network (CAP-TCN). The CAP-TCN was made through the Advancing Digitization of Biological Collections program of the National Science Foundation, and all data resulting from this award will be available through the national resource iDigBio.org ([www.nsf.gov/award-search/showAward?AWD\\_ID=1802312&HistoricalAwards=false](http://www.nsf.gov/award-search/showAward?AWD_ID=1802312&HistoricalAwards=false)). Twenty-two

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- 🔍 Lifetime Member special event
- 🔍 25<sup>th</sup> anniversary celebration
- 🔍 *Jepson eFlora* revision 6
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Don Kyhos at Paliku, Haleakala, East Maui, September 1979. Photo by Gerald D. Carr.

shifts into desert conditions associated with reduction in chromosome number by rearrangement of genetic material onto fewer chromosomes. Those findings remain a textbook example of G. L. Stebbins's idea of selection for increased genetic linkage associated with specialization, e.g., to harsh environments. Recent molecular phylogenetic work in my lab, in collaboration with Don, has corroborated and extended Don's findings, including the origin of lineages he discovered that currently are being described as new species.

Through careful field, greenhouse, and cytogenetic investigations, Don marshalled an increasingly strong case during his career for the ability of natural selection imposed by a plant's environment to override other evolutionary factors, including potential for gene flow between taxa that grow in proximity and share pollinators. In *Encelia* (brittlebushes and relatives), Don discovered complete interfertility between desert taxa that commonly occur in adjacent habitats and frequently set hybrid seed that is highly viable and yields vigorous, highly fertile individuals in cultivation. He found that such hybrids are rarely successful in nature, however, except in highly limited, unusual settings where the parent taxa are not as successful, such as human-caused disturbances. One of Don's most compelling examples of the strength that natural selection can impose to

limit gene flow between interfertile species was recently corroborated and quantified by experimental field studies and genetic analyses, conducted by Ph.D. student Chris DiVittorio at UC Berkeley, involving a coastal-dune taxon, *E. ventorum*, and a plant of arid plains, *E. palmeri*, in Baja California.

Don also saw great potential in carrying forward the classic experimental systematic work of the famous Clausen, Keck, and Hiesey research team that was based in the Bay Area and had recently concluded its work when Don was a postdoctoral researcher with Peter Raven at Stanford in the early 1960s. In particular, Don was taken with the team's investigations of California tarweeds and encouraged me and other graduate students, such as Gerry Carr, to study their evolution. Following Sherwin Carlquist's anatomical findings of a close relationship between California tarweeds and the Hawaiian silversword alliance, Don initiated experimental work on the silverswords, which blossomed into a major collaboration with his graduate student Gerry Carr upon Gerry's hire as a faculty member at the University of Hawaii, Manoa. Their studies laid a major foundation of cytogenetic data on silversword relationships and were a huge inspiration that led to my phylogenetic work on the silverswords and relatives,



*Encelia farinosa*, Palo Verde Mountains, California. Photo by James M. Andre.

including California tarweeds, such as his namesake genus, *Kyhosia*.

As one of the lucky students who had the privilege of being part of Don's lab, I also celebrate him for being a superb mentor and human being. He exemplifies the best qualities of a scientist—motivated by curiosity, love of nature, and the joy of trying to solve evolutionary puzzles, rather than a desire for recognition. His compassionate nurturing of students through thick and thin is something for which I will always be grateful and he will always be one of my most treasured and dear friends. Happy birthday, Don! 🕒



*Kyhosia bolanderi*, taken at Yuba Pass, Sierra County, California. Photo by Neal Kramer.



*Chaenactis stevioides*, East Mojave Preserve, California. Photo by Michael Charters, calflora.net.

## Conservation of the California flora: New insights from big data

By Matthew Kling, Ph.D. student, Ackerly Lab, UC Berkeley

California is home to an exceptionally large number of unique and threatened plants—a combination of diversity and peril that makes it an officially designated “world biodiversity hotspot” or global conservation priority. But what does it actually mean to say that a particular plant taxon is unique or that a particular site is diverse? And how can we operationalize these concepts in a way that may actually be of practical use to conservation planning? Those are some of the questions at the center of an NSF-funded research initiative here at Berkeley, aimed at leveraging the rich biogeographic and phylogenetic data found in herbarium collections, including data from the Consortium of California Herbaria, to uncover what patterns of evolutionary heritage can tell us about the history, ecology, and conservation value of plant communities across the state.

In the most recent installment of this project, we combined detailed data on the conservation status of every parcel of land in the state, high-resolution species distribution models for all 5,221 native species of vascular plants, and a new phylogenetic tree representing the entire native flora to estimate which locations across the state should be prioritized for increased land protection (Kling et al. 2018. *Philos. Trans. Royal Soc. B* 374(1763), <https://doi.org/10.1098/rstb.2017.0397>). We identified priority conservation sites in pockets of the coast, the Coast Ranges, and the Sierra foothills (Figure 1). These key sites are ecologically intact but poorly protected landscapes that contain concentrations of plant taxa that are evolutionarily unique, geographically rare in California, and poorly protected across their ranges. We’re now actively working with the Nature Conservancy and the California Native Plant Society

to roll these detailed data into conservation planning frameworks to help inform land protection and resource management decisions across the state.

One of the most exciting and challenging aspects of this project has been exploring the huge, rich, multi-faceted biodiversity dataset that underlies our final results. To facilitate this exploration both for ourselves and for all of you, we’ve created an interactive web app called the California Plant Phylo-diversity Atlas ([ucjeps.berkeley.edu/phylodiversity](http://ucjeps.berkeley.edu/phylodiversity)). The tool visualizes connections between the evolutionary tree, the geographic range of every native plant taxon, and the local flora of every plant community across the state, helping to answer questions like: *What is the geographic distribution of the genus Quercus or the family Asteraceae across the state? How is conservation status patterned on the phylogenetic tree? Which plant species and clades are most likely found at a particular field site? What is the spatial distribution of different measures of phylo-*

*genetic diversity?* The app is up and running but still being refined—poke around and let us know what you think!

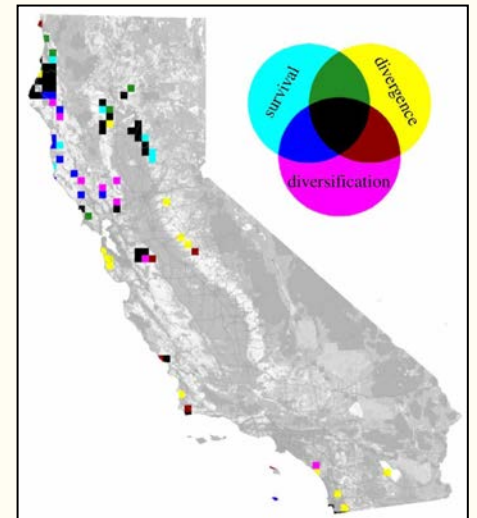
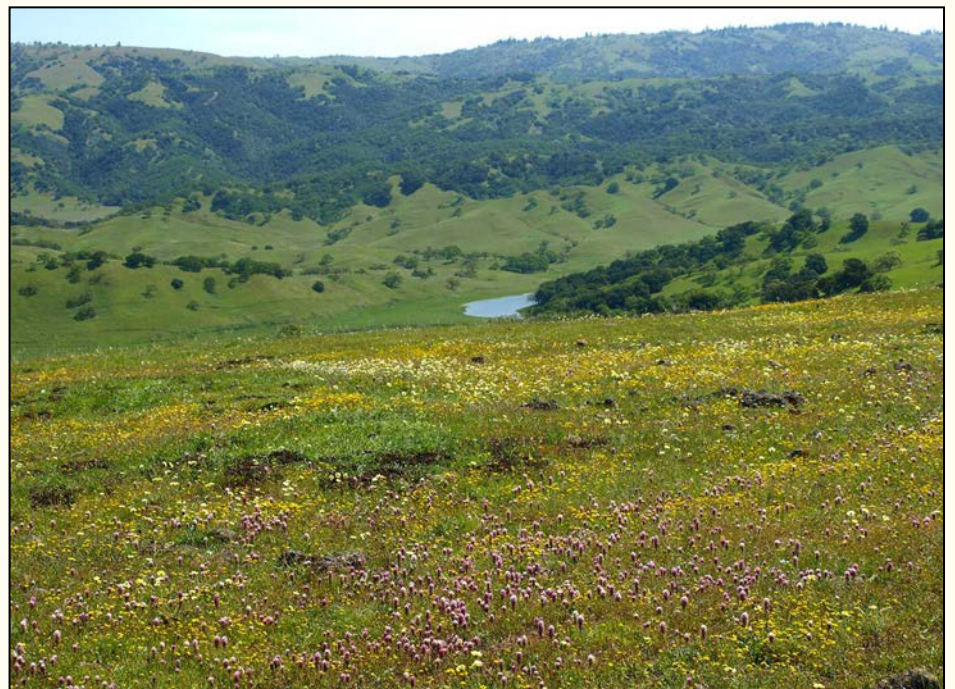


Figure 1. The top 50 highest-priority sites for preserving California’s native plants under three measures of biodiversity: genetic uniqueness (divergence, yellow), historic speciation rate (diversification, fuchsia), and independent evolutionary history (survival, sky blue). Areas high in all three measures are in black, from Kling et al., 2018.



The Mt. Hamilton Range east of San Jose is one of the very highest priority areas for preservation in the state. This photo was taken in the spring of 2010 from Coyote Ridge east of Morgan Hill in Santa Clara County. Photo by Ron Horii.

## SPECIAL EVENT FOR LIFETIME AND SUSTAINING MEMBERS

### SUNDAY, APRIL 7<sup>TH</sup>

Become a **Lifetime Member** and join us for a special tour through the The Cedars with Roger Raiche and Dave McCrory. This area is a little known peridotite and serpentine canyon system in northwestern Sonoma County, combining rare geology and unusual and unique plants. To become a Lifetime Member, see our gift form on page 10.

### *Lifetime Members*

<p>Lowell Ahart Bruce G. Baldwin Robert &amp; Evelyn Berman Linda Brodman Central Coast Wilds Alison Colwell Gerald and Buff Corsi Susan Crocker and Lee Gallagher Christopher Davidson Frank W. Ellis Barbara Ertter Sue J. Etsey Wilma and William Follette Kenneth Fuller, in memory of     Thomas C. Fuller Lawrence Giles Jeffrey and Judy Greenhouse Danica Harbaugh Reynaud Kenneth and Dee Himes Terry Huffman Dale &amp; Marie Johnson Dwight L. Johnson Alan I. Kaplan, in memory of     Dr. Lewis A. Coveler Julie Kierstead Robert W. Kirby, Jr.</p>	<p>Stefan Kirchanski and Ann Hirsch Timothy &amp; Joan Kask Kori Kody &amp; Steve Jackson Shelby Kolstad Neal Kramer Ann Lambrecht Anna Larsen, in honor of     John Game &amp; Jeff Greenhouse David Lennette Paul Licht Park L. Loughlin Staci Markos Steve Matson Mary Ann Matthews Brent D. Mishler Michael Mitchell L. Maynard Moe, in memory of     Larry Heckard Richard Moe Nancy Morin Dennis Mudd Jan Nachlinger Julie and Jim Nelson Richard O'Donnell Roger Overstreet Catherine Park</p>	<p>Stephen P. Rae Betsy Ringrose &amp; Edward Adasiak Lynn Robertson Thomas J. Rosatti, in memory of     Jean Ann (Seely) Rosatti and     Edward James Rosatti, Jr. Stephen Rosenthal Steve Schoenig Jake Sigg Cristian Singer James P. Smith, Jr. John C. Stebbins Delia &amp; John Taylor Sara Timby &amp; John Rawlings Chris Walden, in honor of     Bob Haller and Nancy Vivrette Norm and Cathy Weeden Jennifer Whipple Marshall and Jenny White Marcia H. Wolfe, in memory of     Dr. James Hickman Stella Yang &amp; Stephen Buckhout Desi &amp; Karen Zamudio Thomas Zavortink</p>
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### MEMORIAL, HONORIFIC, AND ENDOWMENT GIFTS

**In memory of Larry Abers**

Britt Thorsnes

**In honor of Catherine Brown**

Jeffrey Bradley

**In memory of Larry Heckard**

Susan Cochrane Levitsky

**In memory of James C. Hickman**

Carole S Hickman

Linda Ann Vorobik

**In memory of Alfred R. Kaznowsk**

Martin Wojciechowski

**In memory of Paul Mitchell**

Susanne Haffner

**In memory of Randy Morgan and  
Patrick Elvander**

Janell Hillman

**In memory of Robert Ornduff**

Ellen A Dean & Thomas Starbuck

**In memory of Michiko Rusk**

John Rusk

**In memory of William and Genevieve  
Sattler**

Alfred & Barbara Sattler

**In memory of John O. Sawyer**

Peter Stekel

**In memory of Benito Tan**

David Hutton

**Alan R. Smith Fern Research and Curation Fund:**

Beth Alexander, Susan Fawcett, John Game, Donald Lepley,  
Joan & Milton Gottlieb, Tom Lemieux, Dana Luis, and Alan  
& Joan Smith

**Herbaria Futures Endowment Fund:**

J. Giles Waines and Wendy McClure

**Bryophyte Curation fund of the University Herbarium:**

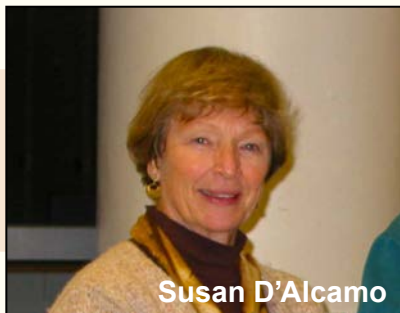
William & Glennie Doyle, Brent Mishler, and Paul Wilson

## A SPECIAL NIGHT CELEBRATING OUR MEMBERS

Since 1994, The Jepson Herbarium has offered nearly 500 workshops, attended by over 9,000 participants who love to learn about California's incredible flora. On September 22, 2018, we had a special members' night celebrating the 25<sup>th</sup> anniversary of the Jepson Workshop Program, with special guest speakers, Julie Kierstead, Neal Kramer, Jon Rebman, and Dana York. Bruce Baldwin presented the keynote address. The workshop program has served as an education, research, conservation, and social anchor for the botanical community throughout California, and we look forward to many more years together.



Above, participants at the 25<sup>th</sup> Anniversary event. Below, in chronological order, current and previous workshop coordinators and Edith Summers, administrative assistant.



## Jepson eFlora Revision 6

Revision 6 involves treatments that have changed taxonomically (e.g., taxa added or deleted) since Revision 5 of the Jepson eFlora. A summary of the changes incorporated in the eFlora is presented below and online ([ucjeps.berkeley.edu/eflora/supplement\\_summary.html#rev6](http://ucjeps.berkeley.edu/eflora/supplement_summary.html#rev6)).



*Erythronium shastense* at the Southwest Slope of Bollibokka Mountain, Shasta County, California. Photo by Len Lindstrand.

### ANGIOSPERMS

#### Liliaceae:

*Erythronium shastense* newly described, added, as native.

#### Phrymaceae:

All taxa of *Mimulus* except *Mimulus ringens* transferred to *Diplacus*, *Erythranthe*, or *Mimetanthe*.

- Diplacus australis* added, as native
- Diplacus calycinus* added, as native
- Diplacus cusickioides* newly described, as native
- Diplacus graniticola* newly described, as native
- Diplacus linearis* added, as native
- Diplacus thompsonii* newly described, as native
- Erythranthe acutidens* added, as native
- Erythranthe arenaria* added, as native
- Erythranthe arenicola* added, as native
- Erythranthe arvensis* added, as native
- Erythranthe barbata* added, as native
- Erythranthe calcicola* newly described, as native
- Erythranthe carsonensis* newly described, as native
- Erythranthe corallina* added, as native
- Erythranthe cordata* added, as native
- Erythranthe diffusa* added, as native
- Erythranthe discolor* added, as native
- Erythranthe erubescens* newly described, as native
- Erythranthe filicifolia* added, as native
- Erythranthe geniculata* added, as native
- Erythranthe grandis* added, as native
- Erythranthe hardhamiae* newly described, as native
- Erythranthe marmorata* added, as native
- Erythranthe microphylla* added, as native

- Erythranthe nasuta* added, as native
- Erythranthe pardalis* added, as native
- Erythranthe percaulis* newly described, as native
- Erythranthe ptilota* newly described, as native
- Erythranthe rhodopetra* newly described, as native
- Erythranthe sierrae* newly described, as native
- Erythranthe taylorii* newly described, as native
- Erythranthe trinitiensis* newly described, as native
- Erythranthe utahensis* added, as native
- Mimulus alsinoides* changed to *Erythranthe alsinoides*
- Mimulus androsaceus* changed to *Erythranthe androsacea*
- Mimulus angustatus* changed to *Diplacus angustatus*
- Mimulus aurantiacus* var. *aridus* changed to *Diplacus aridus*
- Mimulus aurantiacus* var. *aurantiacus* changed to *Diplacus aurantiacus*
- Mimulus aurantiacus* var. *grandiflorus* changed to *Diplacus grandiflorus*
- Mimulus aurantiacus* var. *parviflorus* changed to *Diplacus parviflorus*
- Mimulus aurantiacus* var. *pubescens* changed to *Diplacus longiflorus*
- Mimulus aurantiacus* var. *puniceus* changed to *Diplacus puniceus*
- Mimulus bicolor* changed to *Erythranthe bicolor*
- Mimulus bigelovii* var. *bigelovii* changed to *Diplacus bigelovii* var. *bigelovii*
- Mimulus bigelovii* var. *cuspidatus* changed to *Diplacus bigelovii* var. *cuspidatus*
- Mimulus bolanderi* changed to *Diplacus bolanderi*
- Mimulus breviflorus* changed to *Erythranthe breviflora*
- Mimulus brevipes* changed to *Diplacus brevipes*



*Diplacus calycinus* at Indian Wells Canyon, Kern County, California. Photo by Naomi Fraga.



*Erythranthe rhodopetra* and *E. microphylla* at Red Rock Canyon State Park, Kern County, California. Photo by Naomi Fraga.

*Mimulus breweri* changed to *Erythranthe breweri*  
*Mimulus cardinalis* changed to *Erythranthe cardinalis*  
*Mimulus clevelandii* changed to *Diplacus clevelandii*  
*Mimulus congdonii* changed to *Diplacus congdonii*  
*Mimulus constrictus* changed to *Diplacus constrictus*  
*Mimulus dentatus* changed to *Erythranthe dentata*  
*Mimulus douglasii* changed to *Diplacus douglasii*  
*Mimulus evanescens* changed to *Erythranthe inflatula*  
*Mimulus exiguus* changed to *Erythranthe exigua*  
*Mimulus filicaulis* changed to *Erythranthe filicaulis*  
*Mimulus floribundus* changed to *Erythranthe floribunda*  
*Mimulus fremontii* var. *fremontii* changed to *Diplacus fremontii*  
*Mimulus fremontii* var. *vandenbergensis* changed to *Diplacus vandenbergensis*  
*Mimulus glaucescens* changed to *Erythranthe glaucescens*  
*Mimulus gracilipes* changed to *Erythranthe gracilipes*  
*Mimulus guttatus* changed to *Erythranthe guttata*  
*Mimulus inconspicuus* changed to *Erythranthe inconspicua*  
*Mimulus johnstonii* changed to *Diplacus johnstonii*  
*Mimulus kelloggii* changed to *Diplacus kelloggii*  
*Mimulus laciniatus* changed to *Erythranthe laciniata*  
*Mimulus latidens* changed to *Erythranthe latidens*  
*Mimulus latifolius* changed to *Diplacus brandegeei*  
*Mimulus layneae* changed to *Diplacus layneae*  
*Mimulus leptaleus* changed to *Diplacus leptaleus*  
*Mimulus lewisii* changed to *Erythranthe lewisii*  
*Mimulus mohavensis* changed to *Diplacus mohavensis*  
*Mimulus montioides* changed to *Erythranthe montioides*  
*Mimulus moschatus* changed to *Erythranthe moschata*  
*Mimulus nanus* var. *jepsonii* changed to *Diplacus jepsonii*  
*Mimulus nanus* var. *mephiticus* changed to *Diplacus mephiticus*  
*Mimulus nanus* var. *nanus* changed to *Diplacus nanus*  
*Mimulus norrisii* changed to *Erythranthe norrisii*  
*Mimulus nudatus* changed to *Erythranthe nudata*



*Erythranthe barbata* (bearded monkeyflower) Southern Sierra Nevada, Kern Plateau, Tulare County, California. Photo by Naomi Fraga.

*Mimulus palmeri* changed to *Erythranthe palmeri*  
*Mimulus parishii* changed to *Erythranthe parishii*  
*Mimulus parryi* changed to *Diplacus parryi*  
*Mimulus pictus* changed to *Diplacus pictus*  
*Mimulus pilosus* changed to *Mimetanthe pilosa*  
*Mimulus primuloides* var. *linearifolius* changed to *Erythranthe linearifolia*  
*Mimulus primuloides* var. *primuloides* changed to *Erythranthe primuloides*  
*Mimulus pulchellus* changed to *Diplacus pulchellus*  
*Mimulus pulsiferae* changed to *Erythranthe pulsiferae*  
*Mimulus purpureus* changed to *Erythranthe purpurea*  
*Mimulus pygmaeus* changed to *Diplacus pygmaeus*  
*Mimulus rattanii* changed to *Diplacus rattanii*  
*Mimulus rubellus* changed to *Erythranthe rubella*  
*Mimulus rupicola* changed to *Diplacus rupicola*  
*Mimulus shevockii* changed to *Erythranthe shevockii*  
*Mimulus suksdorfii* changed to *Erythranthe suksdorfii*  
*Mimulus tilingii* changed to *Erythranthe tilingii*  
*Mimulus torreyi* changed to *Diplacus torreyi*  
*Mimulus traskiae* changed to *Diplacus traskiae*  
*Mimulus tricolor* changed to *Diplacus tricolor*  
*Mimulus viscidus* var. *compactus* changed to *Diplacus compactus*  
*Mimulus viscidus* var. *viscidus* changed to *Diplacus viscidus*  
*Mimulus whitneyi* changed to *Diplacus bicolor*



*Diplacus graniticola* Stanislaus National Forest, California. Photo by Naomi Fraga.

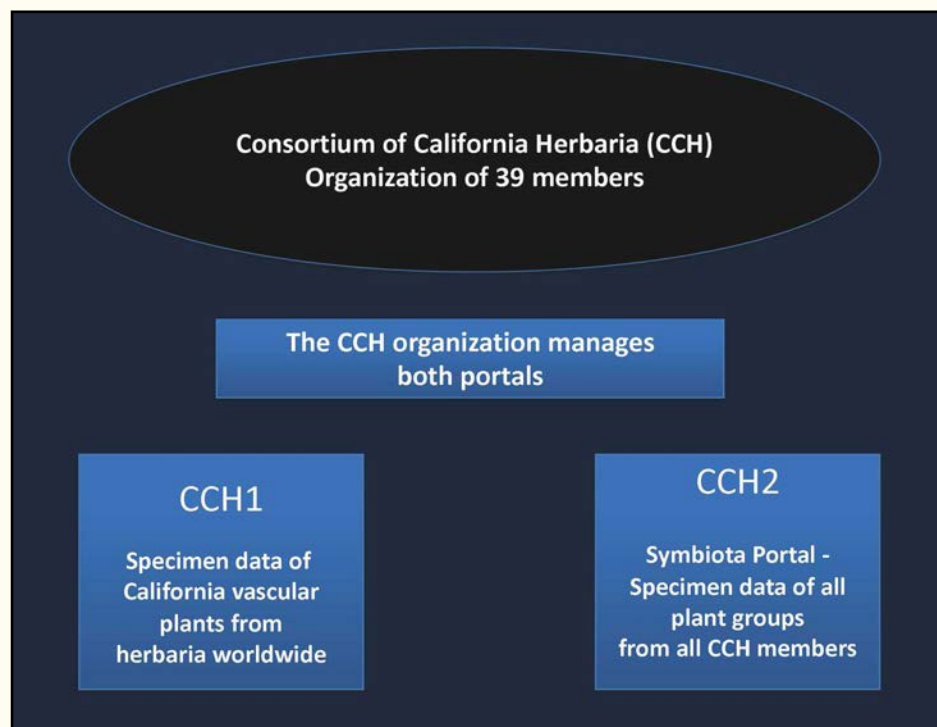
(Consortium, continued from page 1)

California universities, research stations, natural history collections, and botanical gardens are funded through the CAP-TCN to capture images, label data, and phenological data (e.g., flowering time) from nearly 1 million herbarium specimens by 2022.

The CCH continues to grow due, in part, to the CAP-TCN grant. In 2018, three participants were added as new members of CCH: California State University, Long Beach (LOB), California State University, Los Angeles (CSLA), the herbarium of the Colorado Desert District, California Department of Parks and Recreation (BSCA). In 2019, as a result of the presentation at the Northern California Botanists Symposium, four additional herbaria are preparing to join the CCH: Sierra Pacific Industries (SPIF), the Pepperwood Preserve (PPWD), College of the Redwoods (CRMC), and Pinnacles National Monument (PINN). This will bring the total number of members in the CCH to 43.

With the addition of the new CCH2 symbiota portal, there are now two CCH portals and each has a special purpose. The original CCH portal is not being retired. It is being re-purposed and is now referred to as CCH1. CCH1 is a specialized portal for presenting highly curated specimen data about the California vascular flora, tightly linked to the *Jepson eFlora* ([ucjeps.berkeley.edu/eflora/](http://ucjeps.berkeley.edu/eflora/)). It is restricted to vascular plant specimens of native and naturalized taxa from California. This portal will include California specimen records from many sources worldwide. The Index of California Plants Names (ICPN; [ucjeps.berkeley.edu/db/icpn/](http://ucjeps.berkeley.edu/db/icpn/)) will continue to be developed and will be used for both the *Jepson eFlora* and CCH1.

Some features of the original CCH will no longer be supported when the new CCH1 has been completely overhauled. Since CCH1 is restricted geographically to California, specimens



from Baja California, Mexico will be removed. CCH2 will be the portal for querying specimens from outside of California.

Next, a major feature that has been a significant tool for past grants, the Georeference Cloning Page and Georeference Buffer Database, will be retired. The ability to clone coordinates to sets of geographically similar specimens is being transferred to the new CCH2 portal. Georeferencing additional California specimen records is a focus of year 3 and 4 of the CAP-TCN grant. All new georeferences will be first added to CCH2. Then after each update from CCH2, these new georeferences will appear in CCH1.

Lastly, with regard to the comments interface and links (the far right-side 'Feedback' column of the CCH search results table), no additional comments will be posted to the original CCH comments database, accessible from top section of the Curatorial Tools page ([ucjeps.berkeley.edu/consortium/curatorial.html](http://ucjeps.berkeley.edu/consortium/curatorial.html)). Instead, comments will be sent to the comments interface for the new CCH2 portal. The old comments database will remain as a viewable archive on the CCH1 Curatorial

Tools page.


The new CCH2 portal will be a general Symbiota portal and serve all specimen data from all participating CCH members. It will be worldwide in scope and have a broad taxonomic coverage of land plants, algae, lichens, and fungi. Unlike the original CCH database, some members will use CCH2 for data entry and collections management directly. In the next 4 years, CCH2 will add nearly a million images of specimens from California Herbaria (these images will also be linked to from CCH1). People interested in the out-of-state holdings of vascular plants in California herbaria will find this portal to be another useful resource. Additionally, the portal will capture phenological data: information about the timing of, e.g., flowering or fruiting. These images and phenological data will increase our understanding of changes in flowering patterns over time, which is valuable to researchers studying climate change in California.

All new data and images for California species being added to CCH2, will be visible in CCH1 after each regular update. In the past, CCH members

(Continued on page 9)



(Consortium, continued from page 8)

provided new data sets periodically directly to the CCH data manager, who then cleaned and uploaded the data directly to CCH1. Some members sent new data files one or more times a year. Other members have sent only a single update in the past decade. Since most members of CCH manage their own data within CCH2 (either live or as a snapshot database), updates to CCH1 are no longer dependent upon the timing of member submissions. When the development of both portals is complete later this year, updates to CCH1 will occur at regular intervals, possibly 2-4 times per month. For the next 3-4 years, CCH1 and CCH2 will grow significantly as another million specimens are added by the participants of the CAP-TCN. 

CCH1	CCH 2
<ul style="list-style-type: none"><li>- California ONLY specimens</li><li>- Vascular plants only<ul style="list-style-type: none"><li>• CA specimens only</li><li>• Other worldwide portals</li><li>• CCH2 portal</li></ul></li><li>- Taxon Names<ul style="list-style-type: none"><li>• tightly linked to <i>Jepson eFlora</i></li></ul></li><li>- Data Cleaned and Filtered<ul style="list-style-type: none"><li>• counties corrected</li><li>• collectors standardized</li><li>• all steps currently done at loading process still done</li></ul></li></ul>	<ul style="list-style-type: none"><li>- Worldwide Scope<ul style="list-style-type: none"><li>• like other Symbiota Portals</li></ul></li><li>- All specimens in member Herbaria</li><li>- California Herbaria ONLY</li><li>- Live Databases<ul style="list-style-type: none"><li>• immediate posting to Portal</li><li>• database management</li><li>• georeference posted live</li></ul></li><li>- Snapshot Databases<ul style="list-style-type: none"><li>• local data management</li><li>• loaded by me or by herb.</li><li>• georeference in buffer</li></ul></li><li>- No bulk data cleaning<ul style="list-style-type: none"><li>- cleaning done by each member</li><li>- corrected by data owner</li></ul></li></ul>

# CalDay **April 13, 9 a.m. to 4 p.m.**

UC Berkeley opens its doors and offers over 300 lectures, tours, performances, demonstrations, and discussions. Many events are tailored for kids and families, prospective students, and other curious members of the community.

All events free and all ages are welcome.

***Join the Herbaria staff for an open house, displays, activities, and tours.***

For more information visit [calday.berkeley.edu](http://calday.berkeley.edu)



*Children make their own herbarium specimens, key out the specimens, and take them home.*




*Wildflower display inside the Herbarium.*

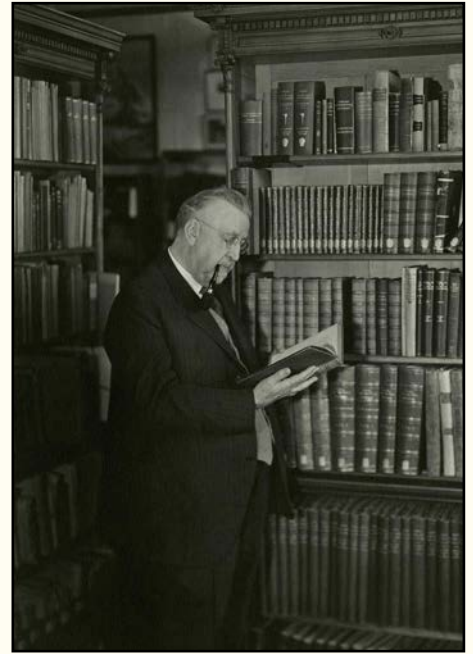
## William Setchell pipe collection featured in Hearst Museum exhibit

By Amy Kasameyer

Dr. William Setchell, head of the Botany Department at Berkeley from 1895-1934, was often photographed smoking a pipe. His smoking habit inspired his interest in the history of the origin and spread of the use of tobacco. As he traveled around the world for his research on marine algae, he studied local smoking habits and collected pipes to compare how different cultures used tobacco. In all, he collected 344 tobacco pipes and related smoking objects which he donated to the Phoebe A. Hearst Museum of Anthropology at UC Berkeley in the 1930s. Setchell went to great lengths to get as many representa-

tive pipes as possible, so his collection is valued for its depth and diversity, with pipes from the United States, Guatemala, Ecuador, Peru, Brazil, Ireland, the Netherlands, France, Italy, Germany, Austria, Russia, Egypt, South Africa, Syria, Turkestan, India, Burma, China, Korea, Japan, and the Philippines.

Pipes from Setchell's collection will be on display at the Phoebe A. Hearst Museum of Anthropology for their latest exhibition: *Pleasure, Poison, Prescription, Prayer: The Worlds of Mind-Altering Substances*. This exhibit runs March 14 to December 15 and explores the complex social and economic dynamics behind ten mind-altering drugs. For more information, visit the Hearst Museum website at [hearstmuseum.berkeley.edu/](http://hearstmuseum.berkeley.edu/). 



William Setchell, 1934. Photo by W. C. Matthews.

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**HERBARIA FUTURES ENDOWMENT**

14891

Support the infrastructure and care of the collections.

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[give.berkeley.edu/fund/?f=FU0840000](http://give.berkeley.edu/fund/?f=FU0840000)

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

**Thank you for supporting the Herbaria!**

(Rudi Schmid, continued from page 1)

We thank Rudi for his incredible generosity, desire to support the Herbaria in perpetuity, and foresight in understanding the increased need for endowment funding for the collections, programs, students, and staff of the Herbaria.

Rudi began his botanical career as a student at UC Davis, receiving both a Bachelor of Science in botany (1964) and a Master of Art in botany (1965). In 1967, he received a Master of Science in botany from The University of Michigan, Ann Arbor. In 1971 Rudi earned his Ph.D. in botany from Michigan for his thesis, "Floral anatomy of *Eugenia sensu lato* (Myrtaceae)." After a post-doctoral position at the Smithsonian, Rudi became a faculty member of UC Berkeley's Department of Botany from 1972-1989 and Department of Integrative Biology from 1989-2003. During his tenure, he had a strong interest in the flora and vegetation of California and other Mediterranean-like regions and taught *Introduction to California Plant Life* for many years. He also taught several other courses, including *Anatomy of Vascular Plants*, *Evolutionary Morphology of Land Plants*, and *Plant and Fungal Biology*. In addition

to his decades of service as a professor, Rudi was often called on to serve as an expert botanical witness on criminal cases and other cases involving the IRS and US Customs.

Rudi held offices in several professional societies, notably the International Association for Plant Taxonomy (IAPT). He was Editor for 30 years (1986-2015) of the "Reviews and Notices of Publications" column of *Taxon: International Journal of Plant Taxonomy, Phylogeny and Evolution*.

In 1999, in recognition of his editorial accomplishments for IAPT, he received its prestigious Special Engler Medal in Silver. Additionally, Rudi served on the Honours Committee of IAPT for 18 years (1 July 1999-30 June 2017), including the final 6 years as committee chair.

Throughout his career, Rudi has been an advocate for botanical documentation and a champion of floristic efforts, including the Jepson Flora Project. By establishing a new endowment fund, Rudi intends to foster the continuation of a strong tradition of botanical study, particularly of the California flora and conifers worldwide, at the University and Jepson Herbaria. Thank you, Rudi! 🍷

Upcoming releases in our new series

***The Jepson Videos: Visual Guides to the Plants of California***

Please subscribe to our channel and stay tuned for more videos!

[www.youtube.com/c/Jepsonherbarium](http://www.youtube.com/c/Jepsonherbarium)



Left, *Washingtonia filifera*. Right, *Fouquieria splendens*. Photos by Staci Markos.

## JEPSON HERBARIUM RESOURCES & PROJECTS RELATED TO THE CALIFORNIA FLORA

The Jepson Herbarium includes approximately 400,000 plant specimens from California.

**Director:** Brent D. Mishler  
California Phylodiversity Project  
Systematics and ecology of *Syntrichia*

**Jepson Curator:** Bruce G. Baldwin  
*Jepson eFlora*

Systematics and evolution of Calif. tarweeds and relatives (tribe Madieae, Compositae), *Chaenactis* (Chaenactidiaceae, Compositae), and *Collinsia* (Plantaginaceae).

**Curator of Ferns and Lycophytes:**  
Carl Rothfels

Divergence and hybridization in Californian ferns and lycophytes (especially *Notholaena*, *Cystopteris*, *Isoetes*).

**Curator of W. N. American Botany:**  
Barbara Ertter, *Flora of Mount Diablo* and flora of the East Bay, North American Potentilleae

**Asst. Director for Development & Outreach, and Globe editor:** Staci Markos

**Biodiversity Informatics Manager:**  
Jason Alexander

**Collections Staff & Plant Identification:** Kim Kersh, Ana Penny, and Margriet Wetherwax

**Archivist and Librarian:** Amy Kasameyer

**Public Programs:** Allyson Greenlon

**Membership, workshop enrollment, and Globe design:** Edith Summers

**Staff Research Associate:** Bridget Wessa

**Jepson Videos:** Staci Markos, Allyson Greenlon, Amy Kasameyer

**Trustees:**

Vice Chancellor Emeritus Beth Burnside; Professor Emeritus Russell Jones; Professor Emeritus Paul Licht; Professors John Taylor and Brent D. Mishler (ex officio)

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



**The Jepson Globe, Vol. 29 No. 1**

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## Space is still available in the following workshops!

April 22-24, 2019

***Introduction to Fire Ecology***

May 17-19, 2019

***Lupinus***

May 31-June 2, 2019

***California's Native Bees: Biology, Ecology, and Identification***

August 1-4, 2019

***North Coast Seaweed Frolic***

August 10-11, 2019

***Compositae, Especially Tarweeds***



*This image shows the River Fire burning around 3,000 acres of the protected land of the UC Hopland Research and Extension Center on the night of July 28th, 2018. The Introduction to Fire Ecology workshop, hosted at Hopland, will offer a unique opportunity to take a deep look at the effects of fire on plant communities of the Coast Range of California—right in the backyard of our workshop venue. Photo by John Bailey.*