UPCOMING EVENTS

Saturday May 21, 8 A.M.–6 P.M. Field Trip to Pine Hill with Melanie Gogol-Prokurat & Steve Schoenig. To register, contact Steve: sschoenig@ucdavis.edu.

Vascular Plant ID Group: The Ceanothus (aka See-I-Know-This) Group has resumed meeting at the Herbarium on third Saturdays of the month. The next meeting will be May 21, in 1026 Sciences Laboratory Building. Details at: http://ceanothusfieldbotanist.blogspot.com.

Bryophyte ID Group: Bryologist Stephen Rae will begin hosting a monthly keying group for bryophyte enthusiasts of all skill levels, provisionally called the Leskea Moss (aka Let’s-Key-a Moss) Group. Day and time TBA. If you are interested in joining this group, please email Stephen at: sprae@ucdavis.edu.

NOTE OF THANKS

Dr. Malcolm Sargent, professor emeritus, University of Illinois Champaign-Urbana, recently donated his set of Evansia to the Center for Plant Diversity library. Evansia, published by the American Bryological and Lichenological Society, provides a wealth of information on bryophytes, including California species. Mac, as he is known to friends and colleagues, has a longtime connection to California. He recently began distributing his bryological library to worthy collections and users. Mac selected our herbarium as an up-and-coming bryological resource warranting his support. Thank you, Mac, for your generous gift.
BRYOPHYES: COMING INTO FOCUS

Significant improvements are underway for the Center for Plant Diversity’s bryophyte collections (mosses and liverworts). Bryophytes have been accessioned in the herbaria in the Botany (DAV) and Agronomy (AHUC) collections since the 1930s, but the herbarium’s collecting emphasis has always been on vascular plants. Accordingly, the vascular collection is now approaching 300,000 sheets, whereas the bryophyte collection has only about 1500 packets to date. Direct contributions have been made intermittently, primarily by Jack Major, Steven Talley, Alan Whittemore, and Ellen Dean. Exchange specimens have also been acquired. In 2010, when I became a Research Associate in the herbarium, I began examining the moss and liverwort packets. As time has allowed, I’ve transcribed and translated label information, replaced packets, verified or completed identifications for a significant part of the collection, and organized the collection.

A big boost to the collection came earlier this year when Curator Alison Colwell tasked Assistant Curator Karen Kyutoku with the significant project of rehousing the entire bryophyte collection into new archival paper packets and digitizing the specimen label information. Most DAV bryophyte records are now available online in the Consortium of North American Bryophyte Herbaria (CNABH) database. The upgrade and data entry will be complete by summer. In support of this effort, I am reviewing each collection and updating nomenclature or identification, as necessary.

The next step is to expand the collection, filling gaps. For this phase, I am assembling a team of volunteer experts interested in implementing a vigorous collection and research effort on bryophytes. Activities have begun...
CONSERVATORY ACTIVITIES

The fruits of our botanical labors in glorious color: A photographic display of recent activities at the UC Davis Botanical Conservatory.

E. Sandoval

Student Dawson Diaz holds an impressively large fruit of Annona muricata. The fruit was studied and sampled by students in Plant Sciences 108, Plant Taxonomy. The parent tree is in a two-gallon pot, and Conservatory staff are continually amazed at the plant’s ability to make sizeable fruit in such a small container. Photo: E. Sandoval

The meeting of the Melocactus. Student employee Gianluca Bacci has been working on significant plant rejuvenation projects at the Conservatory. He worked with several other student employees, interns, and volunteers to transplant a record number of specimens. In addition, he has reorganized the collection, as shown in this grouping of Melocactus in the Cacti and American desert plants area, now located in greenhouse 62, adjacent to 61, the principal Conservatory greenhouse. Photo: E. Sandoval

BIS 2C back in the Conservatory. It was nice to have BIS 2C students back for their hunt for modified plants or plant parts as part of their lab 6 Conservatory exercises and presentations on February 17, 2022. Photo: D. Diaz

Controlled Aloe Pollination. Dawson Diaz has been busily buzzing about the buds of several Aloe in our outdoor plantings, hand pollinating within and between species of Aloe. He is thankful for the opportunity to practice some of the breeding techniques he learned in a class that was still online for most of winter quarter 2022. Photo: E. Sandoval
RECENT GIFTS

Ellen Dean Herbarium Endowment
Mick Canevari
Gerald D. Carr, in memory of June McCaskill
Ellen Dean & Thomas Starbuck, in honor of Alison Colwell
Ray & Mary Evert
Ron, Diana, & Nova Glick
Hazel Gordon
Albert & Barbara Grigarick
Jim Harding
Glen Holstein
Marie Jasieniuk & Frank Roe
Marla Knight
Patrick McGuire
Karen Miyagishima, in honor of Fifi Sue Nichol
Caroline & David Pratt
Lesley Randall
Lisa Serafini & Jim Richards
Mandy Tu
Neal Van Allen & Pam Kazmierczak
John Giles Waines
Carol Witham
Elizabeth Bernhardt & Tedmund Swiecki

Herbarium Endowment
Mick Canevari
Gerald D. Carr, in memory of J.M. Tucker
Beth Lowe Corbin
Lynn Gillespie
Ron, Diana, & Nova Glick
Brenda Grewell
Glen Holstein
Chuck, Jessica, & Henry Hughes
Marla Knight
Julie Knorr
Sally Manning
Staci Markos
Sue Nichol
Rob Preston
Lesley Randall
Barry & Elizabeth Rice & Salvia
Mandy Tu
John Giles Waines
Carol Witham

DBS Student Grants Fund
Elizabeth Brusati
Jason Carter
Ron, Diana, & Nova Glick
Brenda Grewell, in memory of Michael Barbour
Albert & Barbara Grigarick
Marie Jasieniuk & Frank Roe
Andrew Latimer
Sally Manning
Patrick McGuire
Stuart & Willa Pettygrove
Rosalie Vanderhoef
Alice Warrick

Conservatory Endowment
Robin A. Bacci, in honor of Gianluca A. Bacci
Sonia Cook
James Doyle & Susan Ustin
Glen Holstein
Marie Jasieniuk & Frank Roe
Lisa Serafini & Jim Richards

Herbarium Operations and Gifts in Kind
Rita Colwell
Katherine Mawdsley
Stephen Rae
Marcel Rejmanek
Shawna Martinez
Jim Thorne

Conservatory Operations and Gifts in Kind
John Brittnacher

Thank you!

LAW FAMILY ENDOWMENT STUDENT AWARDS

Veronica Noskevich. Photo: A. Colwell

The Law Family Endowment provides funding to recognize outstanding student assistants in the herbarium. The awards this year go to two super capable students who have played an important role in keeping our functionality (and spirits) up over the past couple of years. They both graduate this spring.

Veronica Noskevich is a Global Disease Biology major who became interested in plants after taking a Plant Pathology class. The class inspired her to look into broadening her skill set with some plant biology training. She found out about volunteering in the herbarium while browsing online for plant science volunteer opportunities. Veronica has been here nearly every week; she likes the variety of work the herbarium can offer, and finds the atmosphere and the tasks to be relaxing. At the herbarium and more recently at its public events, she enjoys the opportunity the herbarium provides to meet different groups of people. You may have learned about pine cones from her at Biodiversity Museum Day! When Veronica graduates in June, she will head to Nevada for a gap year while she looks to join a graduate program in Public Health, Epidemiology or Microbiology somewhere in the Western US.

Our other awardee, Hajiran Rehman, just graduated at the end of winter quarter. Hajiran has been working in the herbarium for three years, since she heard about the herbarium through a job advertisement for student assistants during her freshman year. The herbarium was outside her career plans and her major (Cognitive Science with a neuroscience emphasis), and that—as is the case for a surprising number of our student staff—is exactly why she wanted to work here. She found mounting plants to be therapeutic and relaxing. When the pandemic closure forced her to work remotely online, she shifted to editing herbarium specimen records on our Symbiota data portal. We sure appreciate the many hours she put in on this task from home! Now that she has graduated, Hajiran is planning to travel in Pakistan for a few months, where she has extended family, and hopes to find a job as a computing user interface designer when she gets back.

A. Colwell

Hajiran Rehman. Photo: A. Sharma

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CA STATE PARK COLLECTING PERMITS (CONT. FROM PAGE 1)

Cardinal monkeyflower, Erythranthe cardinals, Mount Tamalpais State Park. Photo: L. Gardner

conducted within State Parks that pertain to natural resources, including fieldwork, specimen collection, and data collection. If you intend to collect specimens, data, and/or produce a written document of your findings - such as a dissertation, thesis, academic paper, report, or professional publication - a permit is needed. Additional permits or approvals from other local, state, or federal agencies may also be required and are the responsibility of the researcher. (See the accompanying article on permits from the Department of Fish and Wildlife).

All collecting and research must be done in a manner that minimizes any impacts on the park's resources. As a condition of all permits for scientific research, the investigator must submit an annual summary of activities conducted under the permit, making any data and material published from the research available to the Department. For student research, the primary investigator is usually the professor or faculty advisor, with the student listed as the person in direct charge of fieldwork.

To apply for a Scientific Research and Collecting Permit, you must submit a complete application package according to the instructions posted on our website. Permits may be granted for research in a single park or multiple parks located in one or more park districts. Once processed and approved, permits are issued for a one-year period, but permit renewals or amendments can then be requested.

For more information and to submit your application, visit https://www.parks.ca.gov/?page_id=21557.

Here are a few examples of current botanical research projects in our State Parks:

- California poppy, Eschscholzia californica, Jack London State Park. Photo: L. Gardner
- Range-wide Population Dynamics of the Scarlet Monkeyflower, University of British Columbia
- The Biology of Hybrid Speciation in Penstemon, Stanford University
- Divergence with Gene Flow in the Plant Genus Linanthus, UCLA
- The Genomic Basis of a Trade-off between Defense and Reproductive Traits in Wild Radish, UC Berkeley
- Landscape Genetics of California Poppy, UC San Diego
- Trillium Floral Scent Composition, Humboldt State University

L. Gardner

CA DFW PERMITS FOR PLANT COLLECTION

Collection or “take” of any California Endangered Species Act (CESA) listed plant in California requires a permit from the California Department of Fish and Wildlife (CDFW). These permits are issued by CDFW's Native Plant Program or CDFW's regional offices, depending on the type of permit. There are three main permit types for plants depending on the activity being performed: Voucher Collection Permits, Scientific, Educational, or Management Permits, and Incidental Take Permits.

A rare, threatened, or endangered plant must be collected periodically to verify the identification of the plant, document a new occurrence, or document an existing occurrence that has not previously been documented or that has not had a voucher collected within the past 10 years. In these situations, a Voucher Collection Permit is necessary. Voucher Collection Permits are valid for 3 years and are issued by CDFW's Native Plant Program.

Scientific, educational, or management activities that may result in “take,” possession, import, or export of CESA-listed plants require a Scientific, Educational, or Management Permit. These permits are typically issued for research, seed banking, propagation, reintroduction, recovery actions, and operations of herbaria and botanic gardens. For this type of permit, a written proposal must be submitted to CDFW's Native Plant Program outlining the research being performed prior to the issuance of the permit.

The third type of permit is for the incidental “take” of CESA-listed plant species that occurs in conjunction with an otherwise lawful activity. These permits are called Incidental Take Permits, and impacts to CESA-listed species must be fully mitigated. Activities that may warrant an Incidental Take Permit include projects related to development, water/energy, public utility, and/or transportation projects. To obtain an Incidental Take Permit, the appropriate CDFW Regional office should be contacted.

Additional information for all three types of permits can be found on the CDFW's Native Plant Program webpage: www.wildlife.ca.gov/Conservation/Plants/Permits. If you are unsure what type of permit is needed, please contact the Native Plant Program at native-plants@wildlife.ca.gov.

K. Lazar

*Leah Gardner and Kristi Lazar are current DBS Board members. Leah is a Senior Environmental Scientist with California State Parks. Kristi prepared the companion article when she was a Senior Environmental Scientist in the Native Plant Branch of the California Department of Fish and Wildlife.
The big challenge for us this spring is getting back into the swing of participating and hosting live events, many of which I have no prior experience of. Biodiversity Museum Day was our first big one. Due to a winter surge in COVID cases, museum staff decided to convert it from a campus-wide museum open house to a one-venue exhibition in the UC Davis Conference Center with reduced advertising targeting a smaller campus-oriented audience, then we decided to delay it a few weeks. In the end, it turned out to be both well-timed and a great success, hitting its target of about 1300 attendees. Our confidence in holding this event was boosted immeasurably by having the support of the Aggie Ambassadors, who checked vaccine cards and symptom surveys at the door, and the universal adherence of attendees to mask-wearing.

The Botanical Conservatory had a table of unusual plants in the conference center plus the traditional open house in their greenhouses. The herbarium had a pine cone display, a specimen mounting demonstration, and a very popular children’s activity of decorating bookmarks with pressed flowers, a brilliant addition to our public display repertoire created by grad student Kandiss Dowdell, with assistance from grad student Will McMahan and DBS member Karen Miyagishima.

**A. Colwell**

**CONSERVATORY ACTIVITIES (CONT. FROM PAGE 2)**

Gianluca Bacci and several other students transplanted most of our sizeable collection of **Welwitschia** into new pots with the newest version of our specialized low-organic growth medium. The Conservatory has an unusually large number of these marvelous two-leaved plants. We are particularly proud of this specimen from 1993 (above right) that spent many years in an 8.5” diameter pot!

Herbarium assistant Winnie Sich answers questions about plant mounting. Photo: A. Colwell

Herbarium volunteers Veronica Noskevich and Anna Vershoor had a good time being pine experts. Photo: A. Colwell

Last quarter I put together this platter of different kinds of planting media to show our interns the varied media we use to grow and propagate one of the most diverse live teaching collections in the country. Photo: D. Diaz
BRYOPHYTES (CONT. FROM PAGE 1)

Bryologist and Research Associate Stephen Rae and Assistant Curator Karen Kyutoku identify moss specimens in the newly added workspace in the June McCaskill Plant Identification Room.

Photo: A. Colwell

with gathering reference materials and acquiring laboratory equipment and tools. Next steps will be acquiring and curating additional collections, identifying the collections, and mentoring new bryologists. In March, Dr. David Hutton (Biochemistry, UCD) and Dr. John Game (Genetics, Oxford) began participating in field forays, collecting mosses and liverworts, identifying collections, and creating digital imagery. Several others have indicated interest in joining the bryological team.

The bryological team adds specialized capabilities to the herbarium staff. Team members will participate in all curatorial tasks pertinent to bryophytes, but they particularly bring skills in identifying and handling the small plants, and familiarity with the published and unpublished resources unique to identifying mosses and liverworts. I am helping the herbarium acquire reference materials, sometimes by providing materials from my personal library or locating them in others. In addition, team members bring their own references when working in the herbarium.

DAV Director Dan Potter and Curator Alison Colwell welcome and support our bryological effort by providing a physical workspace, herbarium cabinet space, and supporting Karen Kyutoku’s time on the curation tasks. Karen, who intends to become a bryologist herself, has begun making her own collections and is learning to do identifications. In August, she will matriculate into a Master’s degree program at Cal State Los Angeles to work with Kristen Fisher on desert moss ecology.

This spring, after completing her work on the DAV specimens, Karen will tackle incoming donated specimens to add to the collection. Curation of bryophytes is a time-consuming curatorial task, as is mounting (gluing) vascular plants on paper sheets. Mosses and lichens are not glued on sheets, however; they are stored, unpressed, in paper packets with the labels glued on the outside of the packet. The packets are stored upright in open-topped boxes, allowing for quickly thumbing through the packets to locate ones of interest. Although many packets have labels prepared by the collectors or other herbaria, their format may lack some essential information or present data in a confusing format. For our own collections, or rehousing others, we have settled on printing labels directly on the packet from the data entered into Symbiota, the digital application used to enter records in the CNABH. With the species name printed at the top of the fold, packets are arranged alphabetically by genus, then species, for easy location and retrieval.

Bryophyte identifications typically require use of a compound light microscope rather than the dissection microscopes used for most plant examination. We examine stems, leaves, and capsules (spore-bearing reproductive structures) that are only micrometers in size. We also look at leaf cell surface ornamentation, cell walls, leaf borders, etc. We often must cut leaf cross-sections only one cell thick. These microscopes must have trinocular heads to allow digital camera photography. Digital imagery of microscopic features is an integral part of research publications, curriculum materials, and collaborative efforts with other bryologists. Digitized images of diagnostic parts can now be linked to the specimen entry in the CNABH database, enhancing its value.

So, what does the future hold for bryology at the herbarium? The team will recruit additional members to help in curation and solicit additional packet donations, as well as adding their own. Stephen will soon donate about 3,000 packets; David Hutton, 1,000+ packets, and John Game, 1,000+ packets from around California. Excess collected material will be set aside for teaching and outreach, such as ‘Intro to Mosses’ workshops and group identification sessions. The team envisions developing the herbarium as a Northern California bryological resource center. Such a resource center should attract and mentor future bryologists as well as anchor an outreach program.

The future also involves fund raising to maintain both herbarium staff and resources. Although the volunteer bryological team will handle most bryological tasks, some support by paid staff is necessary. The ongoing acquisition of packets requires a supply of archival packet paper. Most critically, we need to acquire suitable dissecting and light microscopes; the herbarium is currently using borrowed scopes. Fundraising has begun with two anonymous donations towards acquisition of a compound trinocular microscope. Contributions are most welcome!

By these means, the bryological team intends to develop a bryological resource center at UC Davis for central California, complementing existing bryophyte groups at institutions in coastal and southern California.

S. Rae
Have you ever wondered why the most conspicuously large-flowered Rubus in California has the species epithet *parviflorus* (small-flowered)? I have wondered about it each time I have seen this shrub with petals often well over 2 cm long. The first question that comes to mind is where is the large-flowered Rubus (possibly “*R. grandiflorus*”)? The botanist who described *R. parviflorus* probably wanted to make some comparison. Or, could the name have been a taxonomist’s joke?

*Rubus parviflorus* was described by the famous botanist and ornithologist Thomas Nuttall (1786–1849) in his “Genera of North American Plants” in 1818. At that time, there were three Rubus species known from North America with flowers only slightly larger: *R. odoratus* L., 1752, *R. pensilvanicus* Poir., 1804, and *R. spectabilis* Pursh, 1813. Compared with these, flowers of western thimbleberry may have been perceived as somewhat smaller.

What is probably more important is that Nuttall described *R. parviflorus* on the basis of an apparently relatively small-flowered specimen: “Shrubby and unarmed. . . flowers small; segments of the calyx villous. . .” (Nuttall 1818, p. 308). He collected this species “on the island of Michilimackinac” (present-day Mackinac Island in Lake Huron, Michigan).

While *R. parviflorus* is usually characterized as a species typical for the western US, its distribution is discontinuous, with major concentrations of populations not only in the Pacific states (from California to southern Alaska), but also in the Four Corners area of the southwest and in the Great Lakes region. Therefore, the remaining question is whether the Great Lakes populations (where Nuttall's originally described plant was from) have smaller flowers in general, or whether it was just Nuttall's specimen that had exceptionally small flowers. The first possibility may be supported by Farwell's (1929) suggestion that the western plants should be called *R. parviflorus* var. *grandiflorus*. This taxon was later accepted by E. O. G. Hultén in his *Flora of Alaska*. Nevertheless, the second possibility is more likely correct. This is what we can read about *R. parviflorus* in Michigan floras: “Thomas Nuttall . . . gave it the peculiarly inept epithet ‘small-flowered’ – when in fact the flowers may be 5 cm broad.” (Voss 1985). “The specific epithet is a misnomer; the flower is the largest among our species of *Rubus*” (Barnes and Wagner 1996).

Not so long ago, this would be the end of the story. Because there is nothing in the *International Code of Nomenclature for Algae, Fungi, and Plants* that mandates that a species epithet be descriptively appropriate, *R. parviflorus* would most likely be the accepted name forever. However, in 2016, Abraham Van De Beek published an article where he successfully argued that the first validly-published and legitimate name of the species in question is actually *Rubus nutkanus* Mociño ex Seringe, 1825, because the name *R. parviflorus* was used before 1818 for a different species. The name *R. nutkanus* is already accepted by Giblin et al. (2018) in their new edition of Hitchcock and Cronquist's *Flora of the Pacific Northwest* and will be used in the Jepson eFlora soon (Bruce Baldwin, personal communication). It seems that future generations of botanists will be deprived of the recurring puzzle why this “*parviflorus*” raspberry has such large flowers.