UPCOMING EVENTS!

Sat. April 8  Arboretum/Conservatory Plant Sale
Sat. April 22  Picnic Day herbarium and conservatory open houses
Sat. April 29  Arboretum/Conservatory Plant Sale
Tues. May 2   Spring Meeting and Speaker, NOTE CHANGE IN SPEAKER: Tonya Kuhl will speak on the engineering of coffee roasting!
Sat. May 20  Field Trip to the Santa Rosa Plain
BLISS AT TAHOE: ANOTHER FLORA EXPLORED

In 2016, Daniel McNair and I performed a floristic and vegetation survey of D. L. Bliss State Park on the western shore of Lake Tahoe. Located just north of Emerald Bay State Park, D. L. Bliss is a popular destination for hiking and camping. During mid-summer, the parking lot at Lester Beach, at the north end of the park, is usually full.

In past issues of this newsletter, we have described our experience surveying other state parks in and around the Tahoe Basin (Sugarpine Point, Washoe Meadows, and Grover Hot Springs) where we encountered many wet to moist vegetation types. D. L. Bliss differs from those parks, because the dominant vegetation at D. L. Bliss is dry upland mixed conifer forest and montane chaparral. In fact, a large part of the park is barren rock outcrop with sparse conifer/shrub cover, some of which is on steep slopes.

Despite this dry terrain, there was more orchid diversity in this park than the others we have surveyed. This was due to the numerous streams that drain to Rubicon Creek in the northern part of the park and an unnamed creek in the southern part of the park that drains into Lake Tahoe. These drainages and seeps support alder thickets and small meadows with very diverse assemblages of species including manna grass (Glyceria elata), arrowleaf ragwort (Senecio triangularis), lady fern (Athyrium filix-femina), swamp onion (Allium obtusatum var. obtusatum), bog orchid (Platanthera sparsiflora), Sierra bog orchid (Platanthera dilatata var. leucostachys), broad leaved twayblade (Listera convallarioides), Pacific enchant er's nightshade (Circaea alpina), starry false lily of the valley (Maianthemum stellatum), ruffled starwort (Stellaria crispa), bog wintergreen (Pyrola asarifolia), Fendler’s meadow rue (Thalictrum)

CULTIVATING THE CONSERVATORY

Even though the Botanical Conservatory has been around for over 50 years, we’re constantly refining our strategies to get the most out of our greenhouse and outdoor spaces so as to meet the demands of being a teaching collection, while at the same time, keeping our plants as happy as possible.

The Botanical Conservatory (officially designated as GH 61) is one of the many areas used for growing plants for a variety of courses at UC Davis, especially for those in the College of Biological Sciences. The Conservatory functions as a museum of living plants. Every quarter, hundreds of BIS 2C students (600-700) and Plant Sciences students (ca. 120) visit the Conservatory to do data collection exercises and participate in guided tours respectively.
are a number of plants that, because of unique growing conditions in this greenhouse, are only grown in Room A, the cool climate room. After unsuccessfully growing *Amborella trichopoda*, the most ancestral of all the flowering plants, we’ve now found a perfect spot in Room A for this species. Multiple plants are currently being propagated so that Intro Biology students can see them in one of their labs.

Some of you may be familiar with the 3rd floor greenhouse on top of the Sciences Laboratory Building (SLB). If the Conservatory is a museum, then the SLB greenhouse is a combination of production facility and small farm. Ernesto and Marlene regularly propagate and grow crops in SLB for the current or upcoming quarters. For example, corn plants have to be planted every quarter 60 days before they are needed, and teosinte plants, the perennial ancestor of corn, are divided and placed in a short day chamber 75 days before they are needed. The plants are then brought out into the SLB-GH two weeks before they are seen by students in their labs. All this is done so that students can see living, flowering specimens of both species and compare domesticated and wild-type in Lab 5 of BIS 2C.

Adjacent to and east of the Botanical Conservatory is yet another greenhouse (GH 62) where a variety of plants are grown for teaching purposes that, for several reasons, cannot be grown in the other two greenhouses. Venus fly traps, of which we have multiple varieties, are grown in the middle room of GH 62 so that the plants can receive an abundant amount of light. They are then cycled into the Conservatory (Room B) where they can be displayed for visitors. If left more than a week or two in this display space, they slowly die or lose vigor from a combination of lack of sunlight and overstimulation (folding) of the leaves. On a side note, when grown as a houseplant, Venus fly traps usually die in a matter of weeks from insufficient light and/or overstimulation. *Nepenthes*, carnivorous low light understory plants from Southeast Asia—better suited as houseplants, are also grown in Room B to display their varied pitchers and methods of obtaining nutrients from a variety of prey.

Outside areas with varying amounts of protection and exposure round out our ability to grow a diverse array of plants for teaching purposes. Outside, between GH 61 and 62, a variety of subtropical and other more temperate species thrive. Mature *Sarracenia*, a temperate to subtropical genus of pitcher plants from eastern North America, are grown outdoors to provide appropriate diurnal temperatures and seasonal climate changes. When grown indoors under insufficient light, these plants are much more susceptible to thrips. In addition, the indoor plants can’t attract insects to digest like those grown outdoors; therefore the leaves of the outdoor plants are brought in for gory display to show insectivory on tours. Potted Ginkgo trees are also grown outside in this area and cycled into the SLB greenhouse on a quarterly basis to guarantee leafy specimens all year round for BIS 2C and several other courses.

Over the years, we’ve discovered that many species from subtropical and temperate climates will also grow and perform better when grown outside rather than in the greenhouses. On the west side of the Conservatory a number of stone plants (*Lithops*) and related Aizoaceae are grown outdoors to receive their seasonal temperatures. Doug Walker, who recently retired, has been volunteering his time to bring back the quantity, quality, and diversity of these species since they are a favorite of his (and of visitors) as well as excellent examples of camouflage in plants.

Moreover, we have discovered that many plants, especially as they approach maturity, grow much better outdoors and in ground beds than they do in any of the greenhouses, either as a result of diurnal temperatures and/or appropriate light levels. The South African cycad, *Stangeria eriopus*, which makes cones nearly year round and is used in Plant Development and several other courses, has been doing quite well in the breezeway between GH 61 and our adjacent workroom. We’re considering planting it out in a shady area at the southwest corner of Storer Hall so that this plant can further reach its growth potential.

Last are the various outdoor planting beds and areas around the Sciences Laboratory Building, the south and west sides of Storer Hall, and the developing Biological Orchard and Garden (BOG) adjacent to the Mann Lab. A number of plants used in BIS 2C and 2B as well as multiple upper division courses are grown on the east side of the Science Laboratory Building. This includes the biodiversity sampling beds adjacent to the Center for Plant Diversity.

Want to see for yourself? The outdoor growing areas around the Sciences Laboratory Building and Storer Hall and the BOG are, of course, always open, and the greenhouses are generally open to the public Monday–Friday from 9-5 and on weekends by special arrangements such as paid group tours. We also open the Conservatory for campus wide events each year like Biodiversity Museum Day and Picnic Day.

*E. Sandoval*
Thank you for your support!

RECENT GIFTS

Herbarium Endowment
Beth Lowe Corbin (in memory of June McCaskill)
Lewis Feldman
Russell Huddleston
Julie Knorr
Sue Nichol
Shannon Still
Mandy Tu & Philip Rogers
Roberto Urtecho
J. Giles Waines (in memory of G. Webster)
Georgie Waugh (in memory of N. Crosby)
Alan Whittemore
Carol Witham
Gary Zamzow

Herbarium Operations
H. T. Harvey & Associates
Johanna Kwan
Bruce & Heather Westlund
Alan Yen

Herbarium Gifts in Kind
Gerald Dickinson

Conservatory Endowment
Tom Rost

Conservatory Operations
Reynotta Hoberecht
Carole Ludlum
Jade Neely
San Francisco Succulent & Cactus Society

Davis Botanical Society
Student Grants Fund
Kai Battenberg
Barbara Monroe
Mandy Tu & Philip Rogers (in memory of L. Mitich)

Jack Major Student Grant Fund
Anonymous
Mary Hektner

BIODIVERSITY MUSEUM DAY 2017 IN THE HERBARIUM

Over 750 people visited the Center for Plant Diversity herbarium on February 18th for the annual UC Davis Biodiversity Museum Day. In five years of putting on this event, this was our largest crowd, and attendees came from over two hours away. The Botanical Conservatory had an equally impressive showing this year along with the other collections that participated.

Herbarium visitors got to watch and ask questions as our student workers, Binh, Mai, and Sarina demonstrated the specimen mounting process. Our volunteers, Lahari, Jennifer, Hong, and Juliana, were also a huge help with directing visitors to the herbarium and assisting with our conifer exhibit and pine cone petting zoo. Ellen Dean and I led tours of our collections area and explained why herbaria are essential resources for identifying plants and studying their biology.

I have to say, one of my favorite things about giving tours is seeing the looks on peoples’ faces when we take out a still-green specimen that is over 100 years old. It’s a nice attention-getter and provides a great opportunity to talk about the long-term scientific value of natural history collections.

D. McNair

A tour group being led through the herbarium collections area.
Photo: D. McNair

Volunteer and graduate student Jennifer Haskell shows attendees how to look at a pine pollen cone through the microscope.
Photo: K. Keatley Garvey

The herbarium pine cone petting zoo.
Photo: K. Keatley Garvey
WHERE CAN I GO TO SEE WILDFLOWERS NEAR DAVIS?

Spring wildflower season is here! While Stebbins Cold Canyon is always spectacular, in the interest of giving you some options, we asked a few Davis flower-fanciers about their favorite spots within an easy drive (an hour or so) of Davis. Here are four interesting places to check out from people who know best.

For Sacramento Valley species, Robbin Thorp, professor emeritus of entomology, recommends Jepson Prairie (managed by the Solano Land Trust and the UC Natural Reserve System) which is located along Highway 113, 12 miles south of Dixon. Jepson Prairie abounds with spectacular showy vernal pool flowers, such as goldfields (Lasthenia), tidy tips (Layia), and meadowfoam (Limnanthes). April is probably the peak month for bloom. Jepson Prairie also has many less showy flowers that are of special interest due to their rarity and endemism. The self-guided trail next to the parking lot is open to the public from dawn to dusk every day. Guided tours by trained docents are provided on Saturday and Sunday mornings starting in March and continuing to about Mother’s Day or whenever the biting flies come out. More information is available at: http://www.solanolandtrust.org/JepsonPrairie.aspx

For Northern Coast Range specialties, another great accessible wildflower hotspot within a short drive of Davis was suggested by UC Davis Center for Plant Diversity Collections Manager, Jean Shepard. She hikes County Road 53 in Yolo County several times each spring to view the changing wildflower display. Take Rt 16 from Woodland through the Capay Valley to Guinda. The Guinda Post Office will be on your right, a general store on the left. Go left on Forest Ave and continue straight until you see the signs: No parking past this point. If you cannot park before the signs, you’ll need to go back, park in the Post Office lot, and walk back. After the signs, the road turns left and there is a gate and a stile. There may be loose longhorn cattle. Dogs must be leashed. It is required to stay on the road (county right of way), as the area is all private property. The route is accessible by foot. It dead ends at about 4.7 mi from the first gate and features a view of the falls (when there is water) and views of the valley as the road climbs about 1000 ft. There are many spring wildflowers including shooting stars (Dodecatheon), warrior’s plume (Pedicularis), pipevine (Aristolochia), blue dicks (Dichelostemma), lupines and more. Watch for poison oak.

Ellen Dean, UC Davis Center for Plant Diversity Curator, says that one of her favorite spots is Bear Creek Ranch (this large BLM property is open-access land located southwest of the intersection of highways 16 and 20 in Colusa County). Easy access to the ranch is available along Highway 20 just west of 16. There is a large turn-out on the north side of Highway 20 opposite the ranch’s corral. The large meadow and hillside facing Highway 20 burned in the summer of 2015, and the colorful wildflowers were spectacular in late April and May last year and will be great again this year. A plant list for the ranch is included in the Cache Creek Natural Area Report available at the herbarium website under plant lists and floras (http://herbarium.ucdavis.edu). The meadow has tidy tips, goldfields, larkspur (Delphinium), clovers (Trifolium), monkeyflowers (Mimulus), and many other wildflowers. The hillside has Ithuriel’s spear (Triteleia laxa), golden fairy lanterns (Calochortus amabilis), and Chinese houses (Collinsia heterophylla) between the burned shrubs of the chaparral. At this writing, Highway 16 is closed at the Yolo/Colusa County line due to a mudslide, and so you might have to drive there via I-5.

For Sierran Foothills wildflowers, Art Shapiro, UC Davis Professor of Ecology and Evolution, suggests heading northeast from Davis along I-80 to Iowa Hill Road, just SSE of Colfax. Drivers get off at the Colfax/Grass Valley exit and make their way to Iowa Hill Road via Canyon Way. Iowa Hill Road dips into the American River canyon and there are places to park along the roadside to view the many species of wildflowers growing on the serpentine soils which peak in early April to late May (depending on the weather). There is excellent serpentine at Burnt Flat (but there is tremolite asbestos; be warned!). The many cliffs and N-facing slopes before the American River crossing, as well as the WSW-facing slopes after the crossing, offer an immense variety of things with a seasonal succession February to June. Flowers seen during previous outings include numerous species of lupine, including harlequin lupine (Lupinus stiversii), and multiple species of lotus (Acmispon), glia, and monkeyflower, as well as several genera of lilies.

E. LoPresti, E. Dean, J. Shepard, R. Thorpe, A. Shapiro
Two plant species, coast yellow lepto-
phon (*Leptosiphon croceus*) and Lassics 
lupine (*Lupinus constancei*), are cur-
rently candidates for listing as endan-
gered under the California Endangered 
Species Act.

Coast yellow lepto-
inuous annual plant in the Phlox 
family ( Polemoniaceae ) that produces 
dense heads of bright yellow flowers. 
It is only known from one population, 
which is located on Valleymar Bluff in 
Moss Beach, San Mateo County. This 
population is located in coastal prairie 
habitat atop a sea bluff at the edge of 
the coastline on a marine terrace. Its habitat 
supports a diverse array of perennial 
grasses and annual and perennial forbs, 
including two other rare plant species: Blasdale’s bent grass 
(*Agrostis blasdalei*) and johnny-nip 
(*Castilleja ambigua* var. 
*ambigua*).

When first described by botanist 
Alice Eastwood in the early 1900s, coast 
yellow lepto-
phon was observed covering 
the area that is approximately 0.04 acre 
(1,800 square feet) in size, which is less 
than half the size of a basketball court. 
Estimates of population size conducted 
in 1998 and 1999 noted between 400 
and 1,000 plants, with the most recent 
estimate in 2015 reporting less than 500 
individuals. Primary threats to this spe-
cies include habitat destruction, tramp-
pling, and bluff top erosion. Encroach-
ment of invasive ice plant (* Carpobrotus edulis*) is also threatening the coast 
yellow lepto-
population. A small housing development is planned on the 
property immediately adjacent to the 
coast yellow lepto-
population, which could result in habitat modifi-
cation and impacts to this species due to 
altered runoff patterns, introduction of 
chemicals such as herbicides, fertilizers, 
or pesticides, and increased human use 
of the area.

Coast yellow lepto-
highly 
vulnerable to extinction because of its 
limited distribution and small popula-
tion size, and any change or modi-
cation of its habitat could result in 
extinction of the entire species. The 
property that supports the coast yellow 
lepto-
population colony is located within the 
Fitzgerald Marine Reserve owned by San 
Mateo County, but the site is currently 
unmanaged.

The Lassics lupine is an herbaceous 
 perennial plant in the pea family (*Fabaceae*) that was first described in 1983. 
This species is low-growing (up to six 
 inches tall) and produces dense clusters 
of pink and rose-colored flowers that 
bloom in July. Lassics lupine grows on 
open barren slopes in and near serpen-
tine soils among a scattered assemblage 
of shrubs and forbs. Portions of the 
populations are found at the edge of 
or within Jeffrey pine (*Pinus jeffreyi*)/ 
incense cedar (*Calocedrus decurrens*) 
forest or growing under an overstory of 
Jeffrey pine.

The Lassics lupine is only known 
from two populations on the slopes of 
Mount Lassic and Red Lassic within Six 
Rivers National Forest in Humboldt and 
Trinity counties, at elevations between 
5,200 and 5,700 feet above sea level. 
Both populations together were reported 
to occupy an area of less than four acres 
in 2015. Monitoring and research of this 
species indicates the populations are 
decreasing.

The California Department of Fish 
and Wildlife (CDFW) is currently con-
ducting status reviews for coast yellow 
lepto-
and Lassics lupine. At the 
conclusion of the status review, CDFW 
will produce a peer-reviewed report 
for each species evaluating whether 
continued existence is in serious danger 
or is threatened by habitat destruction. 
Other threats that will be evaluated will 
include habitat modification, over-
exploitation, predation, competition, 
disease and/or other natural occurrences 
or human-related activities. The Fish 
and Game Commission, based on that 
report and other information in the ad-
ministrative record, will then determine 
whether listing each species as endan-
ergized is warranted.

A petition to list Lassics lupine as 
endangered under the federal Endan-
gered Species Act has also been submit-
ted to the U.S. Fish and Wildlife Service 
and is currently under review.

For more information on these and 
other California Endangered Species Act 
threatened and endangered species list-
ing petitions please visit the California 
Fish and Game Commission website at 
www.fgc.ca.gov/CESA.

C. Burton
Toothed wintergreen has grey glaucous leaves that differ from white veined wintergreen. Photo: M. Starbuck

The conifer forest hosts a noteworthy diversity and abundance of mycoheterotrophs in the Ericaceae that have no green pigment and/or lack leaves, such as snow plant (Sarcoides sanguinea), pinedrops (Pterospora andromedea), sugarstick (Allotropa virgata), and wintergreen (Pyrola spp.). We were surprised to learn that the online version of the Jepson Manual now divides Pyrola picta into three species: white veined wintergreen (Pyrola picta, distinguished by its white veins), toothed wintergreen (Pyrola dentata, distinguished by its grey-glaucous leaves), and leafless wintergreen (Pyrola aphylla, notable for not having any leaves). These three species all grow at D. L. Bliss, sometimes together.

If you are visiting the park, you can see most of these species by hiking the Rubicon Trail which runs north-south along the park and affords some grand views of Lake Tahoe. In particular, at the southern end of the park, the Rubicon trail crosses over the unnamed southern drainage and is a great spot to see several of the orchid species mentioned above. In general, the best time to catch things in bloom is late June through July. More info on the park available at www.parks.ca.gov.

A DAY IN THE MARSH

On October 8, 2016, Davis Botanical Society members enjoyed a day at Southampton Bay Wetland Natural Preserve near the town of Benicia in the San Francisco Bay Area delta. The field trip was led by expert botanists Drs. Brenda Grewell (current DBS board member) and Peter Baye, who donated their time and energy to pull together an incredible wealth of information on the marsh. They told us about the botanical history of the area, and the marsh in particular, with reference to Willis Lynn Jepson, Herbert Mason, Annie Alexander and many others. They gave us the most up-to-date information on the needs of healthy marshlands, the history of how this particular marsh was created, and the dismal predictions for what may happen to this marsh and others in the near future with sea rise due to climate change.

We saw an abundance of marsh plant diversity, including marsh gumplant (Grindelia stricta var. angustifolia), fleshy jaumea (Jaumea carnosa), seaside milkwort (Glaux maritima), seaside arrowgrass (Triglochin maritima), California sea lavender (Limonium californicum), and two varieties of annual saltmarsh aster (Symphyotrichum subulatum).

There were interesting ecological and taxonomic details provided for all of the plants pointed out by our leaders. We learned about zonation in the marsh and how a difference of one to two feet can greatly affect the dominant plants of the marsh. We saw plants that sequester salt (pickleweed, Salicornia pacifica) as well as those that excrete salt (saltgrass, Distichlis spicata), and we learned that although growing in a wet habitat, the marsh plants need adaptations that help conserve water (such as the C4 metabolism found in saltgrass). Also interesting was the discussion of the alkaline grasslands that occur on the edges of the marsh; these grasslands have numerous plants in common with the alkaline plains found in the Central Valley.

Weed control in the marsh was discussed at several sites, and we were shown the results of weed control of two invasive plants, perennial pepper weed (Lepidium latifolium) and black rush (Juncus gerardii). The ecology of both of these plants was discussed, and we saw how weed control efforts in the marsh have led to more plant diversity and an increase in abundance of the rarest plant in the marsh, soft bird’s beak (Chloropyron molle ssp. molle).

Of particular interest was the discussion of the formation of this delta marsh during the last little ice age in the 19th century; when fresh water inputs were high and sediment load was also high due to the gold rush. Sediment loads due to 19th century mining remained high until about 20 years ago, and fresh water inputs have been decreasing for decades. The salt marshes described in the late 19th and early 20th centuries by Willis Lynn Jepson were very different in terms of salinity and had a somewhat different flora than when Herbert Mason began to study them in the 1950s. They were also different in terms of dominant species and diversity than the florals found in the salt marshes today. California's coastal marshlands have been losing sediment and decreasing in area. When you couple that with the filling of marshlands for development, and the diking of some areas, preventing natural flooding that could deposit sediment, our marshlands are in crisis, even before you begin discussing rising seas that may gobble up our remaining coastal marshlands.

We thank Drs. Grewell and Baye for their incredible dedication to this rare habitat, their enthusiasm for botany and ecology, and their preparation and knowledge (and great plant list). They continued our tradition of really informative and high-level field trips that are a wonderful benefit of membership in the Davis Botanical Society.

E. Dean