



# Sego Lily

Newsletter of the Utah Native Plant Society

July 2008 Volume 31 Number 4

## Salt Lake Chapter Trek to the Beaver Dam Mountains

By Bill Gray

In April, eight Salt Lake Chapter members took a break from their long winter and headed south as far as they could get, actually ending up just over the border in Arizona. Somehow the Virgin River gorge and that part of the Beaver Dam Mountains feel as though they really belong in Utah.

Most of you have probably driven through the gorge on Interstate 15 *en route to/from* Las Vegas or Southern California, and have admired the steep rugged cliffs where the river has carved its way down. From a speeding car it is possible to spot a few of the obvious standout plants of the Mojave Desert – Joshua tree (*Yucca brevifolia*), Creosote bush (*Larrea tridentata*) and rather modest specimens of Leconte's barrel cactus (*Ferocactus acanthodes* var. *lecontei*).

But we wanted to take time to get out and really experience first hand the other unusual plants from this area. In this we were very fortunate to have one of the best possible guides in Dr. Larry Higgins. Larry grew up in the area, getting to know it like the back of his hand. Although he moved away to pursue his doctorate and a career in botany, he returned "home" a number of years ago. As one of the principal authors of *A Utah Flora* he presented a great combination [continued on page 4]



Above: *Crevice penstemon*, *Penstemon petiolatus*, grows in mostly inaccessible crevices in rugged limestone cliffs in Utah's Beaver Dam Mountains. Photo by Bill Gray

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## Utah Native Plant Society



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For more information on UNPS: Contact Bill King (582-0432) or Susan Garvin (356-5108), or write to UNPS, PO Box 520041, Salt Lake City, UT, 84152-0041 or email [unps@unps.org](mailto:unps@unps.org)

*Segoly Lily* Editor: Walter Fertig ([walt@kanab.net](mailto:walt@kanab.net)). News items, articles, photos, and illustrations from members are always welcome. The deadline for the September 2008 *Segoly Lily* is 15 August 2008.

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## UNPS and Chapter News

**Annual Field Trip:** At least two dozen UNPS members and friends attended the Society's annual spring field trip at Capitol Reef National Park on May 17, ably hosted by the Fremont Chapter. BLM botanist Maria Ulloa led the group on a tour of the Capitol Gorge area. Although this spring's dry, cool weather put a damper on the park's usual wildflower show, the group was still treated to many colorful and interesting species, including Claret cup cactus (*Echinocereus triglochidiatus*), Eaton's beardtongue (*Penstemon eatonii*), Circle Cliffs milkweed (*Asclepias labriformis*), Northern hedsyarum (*Hedysarum boreale*), and Western blanketflower (*Gaillardia spathulata*). Best in show honors, however, was given to the enormous purple mounds of Spiny milkwort (*Polygala subspinosa*) found at one site in the

canyon bottom. In the afternoon, Fishlake National Forest ecologist Bob Campbell gave an informative slide presentation on fire ecology and aspen biology in the local area. The day was capped by a delicious meal provided by the Fremont Chapter at the Sunglow Campground. Local cowboy poet C.R. Wood and country musician Ken Stevens of the band Latigo regaled us well into the night. Thanks to everyone in the Fremont Chapter for making us all welcome and providing a wonderful weekend of botanical fun—*W. Fertig*

### Escalante (Garfield County):

The chapter held its annual potluck/BBQ at the home of Ricki and Sandy Brown in early June. Ricki shared information he has gained utilizing water-conserving irrigation techniques in his gardens.

We will take a break from the bi-monthly meeting schedule during the summer. Expect another

chapter meeting in October.  
—*Allysia Angus*

### Manzanita (Kane County):

This spring the chapter sponsored field trips to the Toroweap area of the Grand Canyon and Snow Canyon State Park, as well as in our own backyard in Kanab. Additional field trips are slated for the Red Canyon area (near Bryce Canyon) and Twisted Forest (near Brian Head) in July and on the Kaibab Plateau in August. Our indoor meeting schedule will resume in early October—*W. Fertig*

### Southern (Washington Co.)

Our July 7th meeting will have a powerpoint presentation showing plants and landscaping by several local gardeners. What grows best plus tips about what works will be shared. The event will be held at the Canyon Community Center 126 Lion Blvd, Springdale.—*Barbara Farnsworth*

## Bulletin Board

**Coming in September! Gala 30th Anniversary issue of the *Sego Lily*:** The next issue of the *Sego Lily* will be a special theme issue dedicated to the 30th anniversary of the Utah Native Plant Society. Anyone with a story to share about UNPS, especially the society's early years, is encouraged to submit a short article or anecdote to [walt@kanab.net](mailto:walt@kanab.net). Deadline for the next issue is 15 August 2008.—*W. Fertig*

**UNPS Annual Members Meeting:** Our annual members meeting will take place in Salt Lake City in late October. This is the time when we elect a new board of directors for the following year. Currently we are aiming for Saturday October 25th, but might have to shuffle a bit depending on availability of an appropriate venue. Given that this is our 30th anniversary we plan to have some special presentations, and hope to attract many members and officers from the early years. So try to keep that date in mind as you plan your Fall schedules and come help us celebrate.—*Bill Gray*

**Sego Lily Archive Project:** Thanks to our earlier appeal for missing items we now have a complete set of all issues. These have been scanned and built into a searchable .pdf document that will be made available as a DVD. I am looking for some volunteers who can help create a user-friendly index. Depending on how many people participate, each person may need only cover one or two years. To help, please contact Bill Gray, and he will provide a copy of the DVD. - *Bill Gray*

**Life Member Update:** Jared Fuller of Provo recently became the 31st (and newest) life member of UNPS. - *Tony Frates*

**Volunteers Needed for Plant Surveys:** Mary O'Brien of the Grand Canyon Trust has asked whether UNPS could provide some volunteers for help with two plant surveys in central/southern



*Peterson's campion (Silene petersonii), the signature plant of Cedar Breaks National Monument. Photo by Douglas N. Reynolds. Print subscribers: go to [www.unps.org](http://www.unps.org) to see this and other photos in full color (as nature intended)!*

Utah. Volunteers would need to have good plant identification skills, particularly on the first of the events.

July 10-12 Tushar Mountains near Beaver, in collaboration with the US Forest Service and others. Volunteers will help to resurvey transects that are being monitored for the effects of grazing.

July 25-27 Two surveys. First, of an enclosure near Teasdale, to compare grazed and ungrazed areas. Second, a high elevation wetland area near Fish Lake, that may never have been thoroughly surveyed before.

If you are interested in learning more, please contact Bill Gray (801-532-3486; [cyberflora@xmision.com](mailto:cyberflora@xmision.com))

**Third Annual Cedar Breaks Wildflower Festival:** Cedar Breaks National Monument will host its third annual Wildflower Festival from July 3<sup>rd</sup> to July 20th. Festival highlights include guided walks, photography workshops, Junior Ranger scavenger hunts, and Zion Canyon Field Institute classes. Guided hikes, which will meet at the Visitor Center, will be offered twice a day during all 18 days of the festival. The hikes will take place at 10am and 1pm. Kid's activities include a Junior Ranger 'Wildflower Scavenger Hunt' at 3pm every Friday and Saturday. On the 19<sup>th</sup> of July the park will offer a free photography workshop at 10:00 AM. This workshop, "Wildflower Photography for Beginners", is open to amateur photographers of all ages and abilities.

Throughout the Festival, the visitor center will be hosting an ongoing electronic display of wildflower images, providing free wildflower photography tip sheets, and offering discounts on wildflower related books and sales items.

Lastly, the park will host several Zion Canyon Field Institute (ZCFI) classes to round out the schedule. The classes include: "Wildflower Photography: Cedar Breaks" on Tuesday, the 8<sup>th</sup>, "Wildflower Journaling at Cedar Breaks" on the 10<sup>th</sup>, and "Lifezones II: Zion to Cedar Breaks" on the 12<sup>th</sup>. Please contact ZCFI at 435-772-3264 for more information and to pre-register.

Cedar Breaks National Monument is located 23 miles east of Cedar City along Highway 148 between Highway 14 and Brian Head. The park entrance fee is \$4.00 per person ages 16 and older. Those traveling to the Festival should come prepared for cool weather at 10,000 feet: Daytime temperatures could be in the 60s and summer thunderstorms frequently rise over the mountain.

Updated Festival events and activities, reference lists, and more are available for downloading at the Cedar Breaks National Monument website: [www.nps.gov/cebr](http://www.nps.gov/cebr). Schedules and events are also available at the Visitor Center and at the Monument's administrative office in Cedar City which is located at 2390 W. HWY 56 Suite #11. Call 435-586-0787 or 435-586-9451 for more information.—*NPS Press Release*



## Salt Lake Chapter Trek to the Beaver Dam Mountains

[continued from page 1] of technical knowledge and direct natural history. For instance, one of the favored foods of the Threatened Desert tortoise is the introduced weed *Erodium cicutarium* (Heronsbill). We were joined by two members of the Southern Chapter who added greatly to the trip.

Friday night (April 25th) we straggled into the Cedar Pocket campground just off of the freeway: far enough to be free of traffic noise, but right in the wind tunnel! Some of us arrived in time to hike down to the river, which had a strong flow of water. We were delighted with the display that promised good things for the main event.

On Saturday morning we spent time around the campground identifying plants that had intrigued us the previous evening. One of the most dramatic was a Fishhook cactus (*Mammillaria tetrancistra*) with red fruit, growing right out of a volcanic boulder. Also gone to seed were the many plants of Moonpod (*Selinocarpus diffusus*). Then we crossed the freeway and took off on a gravel road that makes an anti-clockwise loop through the Beaver Dam Mountains: it was a bit bumpy in spots, but none of our assortment of cars had any problems. Before long we were into a routine of stopping where Larry knew the hunting would be good, wandering around to find the local celebrities, photographing them to our hearts' content, and then piling back into the cars for the next leg.

Our stops included gravel slopes and roadsides with little beauties like Desert-snow (*Linanthus demissus*) and our only Utah citrus Turpentine bush (*Thamnosma montana*). The fruits taste just like . . . well, turpentine! Next came a brief visit to a gypsum quarry area to see Palmer's phacelia (*Phacelia palmeri*), a rather rank member of the genus that specializes on this kind of soil. Higher up we were



treated to some spectacular Purple torch cactus (*Echinocereus engelmannii*), Silverleaf (*Enceliopsis argophylla*), and Fremont's indigo bush (*Psoralea fremontii*).

After a leisurely lunch we made our way down the long west slope of the mountains. Once we reached the paved roads we took two further stops along the way back to the camp site. First was at an area of stabilized sand dunes near the junction of Beaver Dam Wash and the Virgin River. It is clearly getting overgrown by the invasive mustard *Brassica tournefortii* but still has some neat native plants. Birdcage evening-primrose (*Oenothera deltoides*) has a peculiar growth habit in which the spreading recumbent stems curl up to create a little cage. The beautiful Sticky sand verbena (*Abronia villosa*) is widespread in the Mojave Desert, and barely makes it into Utah in the extreme southwest corner. From the loose sand of this stop we went to the steep limestone cliffs of the gorge proper. Our goal here was to see

Above: Trip participants in front of Joshua Tree (already gone to seed after flowering in February). Left to Right: Maggie Wolf, Sandra Bray, Marnie Ambrose, Bill Gray, Ben Everitt, Doug Reynolds, Larry Higgins, Kipp Lee (Photo by Kipp Lee).

the rare Crevice penstemon (*Penstemon petiolatus*), even though we knew it would not be in flower yet. Larry led us up a steep gully that seemed to have been dissolved out of the solid limestone, and pointed out the clusters of gray-green leaves that were almost holly like. Enroute we were rewarded by a fine Utah agave (*Agave utahensis*), the first that we had found blooming on the trip. On my return from a subsequent journey to California I was able to revisit and catch the penstemon in bloom (see cover).

After a fine pot luck dinner back at the camp we turned in for a well-deserved rest. Thanks to several people who made this happen, but especially to Larry Higgins for showing us around his 'playground'.

This report, plus more photos and a Google Earth tour, has been posted at: [http://web.mac.com/wasatchgrays/Wildflower\\_Hotline/Zion\\_%26\\_SW\\_Utah/Entries/2008/4/26\\_Beaver\\_Dam\\_Mountains.html](http://web.mac.com/wasatchgrays/Wildflower_Hotline/Zion_%26_SW_Utah/Entries/2008/4/26_Beaver_Dam_Mountains.html)

## Beaver Dam Mountain Plant List—April 2008 Field Trip

**AGAVACEAE** Agave Family  
*Agave utahensis* Utah agave -F  
*Yucca brevifolia* Joshua tree -S  
*Yucca utahensis* Utah yucca -V

**APOCYNACEAE** Dogbane Family  
*Amsonia tomentosa* Woolly bluestar -F

**ASTERACEAE** Sunflower Family  
*Ambrosia salsola* Burrobush -S  
*Baileya multiradiata* Desert marigold -F  
*Baileya pleniradiata* Annual baileya -F  
*Bebbia juncea* var. *aspera* Sweetbush -F  
*Chaenactis stevioides* Stevia dusty-  
 maiden -F  
*Chrysothamnus paniculatus* Mohave  
 rabbitbrush -V  
*Cirsium neomexicanum* var. *neomexi-*  
*canum* New Mexico thistle -F  
*Encelia frutescens* Bush Encelia -F  
*Enceliopsis argophylla* Silverleaf -F  
*Erigeron utahensis* Utah daisy -F  
*Eriophyllum lanosum* Gray's woolly-  
 leaf -F  
*Palafoxia arida* Spanish needle -F  
*Psilostrophe cooperi* Whitestem paper  
 flower -F  
*Senecio douglasii* var. *monoensis* Mono  
 groundsel -F  
*Thymophylla pentachaeta* var.  
*belenidium* Scale glandweed -F

**BORAGINACEAE** Borage Family-  
*Cryptantha confertiflora* Golden  
 cryptanth -F

**BRASSICACEAE** Mustard Family  
*Lepidium fremontii* Fremont's pepper  
 weed -F

**CACTACEAE** Cactus Family  
*Echinocereus engelmannii* var.  
*chrysocentrus* Purple torch -F  
*Ferocactus acanthodes* var. *lecontei*  
 Leconte's barrel cactus -V  
*Mammillaria tetrancistra* Common  
 fishhook -S  
*Opuntia echinocarpa* Silver cholla -F  
*Opuntia erinacea* Common prickly  
 pear -F

**CARYOPHYLLACEAE** Pink Family  
*Arenaria macradenia* Shrubby sand-  
 wort -F

**CELASTRACEAE** Stafftree Family-  
*Mortonia scabrella* var. *utahensis* Utah  
 mortonia -F

**CHENOPODIACEAE** Goosefoot  
 Family  
*Krascheninnikovia lanata* Winterfat-S

**FABACEAE** Pea Family  
*Psoralea fremontii* Fremont's  
 indigo bush -F



Above: Jelly-bean fruits of the Com-  
 mon Fishhook Cactus, *Mammillaria*  
*tetrancistra*. This is the only  
*Mammillaria* native to Utah. Photo by  
 Bill Gray.

**GERANIACEAE** Geranium Family  
*Erodium cicutarium* Heronsbill -F  
*Erodium texanum* Texas storksbill -S

**HYDROPHYLLACEAE** Waterleaf  
 Family  
*Phacelia crenulata* Narrowleaf  
 phacelia -F  
*Phacelia palmeri* Palmer's phacelia -F

**KRAMERIACEAE** Ratany Family  
*Krameria grayi* White ratany -F

**LAMIACEAE** Mint Family  
*Salazaria mexicana* Bladder sage -F

**LILIACEAE** Lily Family  
*Calochortus flexuosus* Winding mari-  
 posa lily -F

**LOASACEAE** Stickleaf Family  
*Eucnide urens* Rock nettle -B  
*Mentzelia multiflora* Desert stick-  
 leaf -B

**MALVACEAE** Mallow Family  
*Sphaeralcea parvifolia* Small-leaf  
 globemallow -F

**NYCTAGINACEAE** Four O'Clock  
 Family  
*Abronia villosa* Sticky sand verbena-F  
*Allionia incarnata* Desert windmills-F  
*Selinocarpus diffusus* Moonpod -S

**ONAGRACEAE** Evening-primrose  
 Family  
*Camissonia multijuga* Manylobe  
 Camissonia -F  
*Gaura coccinea* Scarlet gaura -F  
*Oenothera deltooides* Birdcage evening-  
 primrose -F  
*Oenothera pallida* Pale evening-  
 primrose -F

**PAPAVERACEAE** Poppy Family  
*Argemone munita* Armed prickly-  
 poppy-F

**POLEMONIACEAE** Phox Family  
*Eriastrum diffusum* Spreading erias-  
 trum -F  
*Eriastrum eremicum* Mohave eriastrum  
 -F  
*Linanthus demissus* Desert-snow -F

**POLYGONACEAE** Buckwheat Family  
*Eriogonum brachypodum* Parry's buck-  
 wheat -V  
*Eriogonum heermannii* var. *sulcatum*  
 Limestone buckwheat -B

**ROSACEAE** Rose Family  
*Prunus fasciculata* Desert peach -S  
*Purshia glandulosa* Desert bitter-  
 brush -F

**RUBIACEAE** Madder Family  
*Galium stellatum* Crevice bedstraw -S

**RUTACEAE** Citrus Family  
*Thamnosma montana* Turpentine-  
 bush -S

**SCROPHULARIACEAE** Snapdragon  
 Family  
*Penstemon petiolatus* Crevice pen-  
 stemon -V

**SOLANACEAE** Potato Family  
*Datura wrightii* Sacred datura -F  
*Lycium andersonii* var. *andersonii*  
 Anderson's wolfberry -S  
*Nicotiana trigonophylla* Coyote tobacco  
 -F

**ZYGOPHYLLACEAE** Caltrop Family  
*Larrea tridentata* Creosote bush -F

Key: B = buds; F = flowers; S = seeds/  
 fruits; V = vegetative.

List compiled by Bill Gray



## Q & A (Gleanings from the *Sego Lily* Mailbag): Growing Sego Lilies

**Q** Where can I buy Sego Lily bulbs? The nurseries say they don't carry them because they're difficult to grow. One nursery said it was against the law to sell the bulbs. The Forest Service said it's not against the law; in fact, you can get a permit to go dig them up and plant them in your yard. Red Butte Gardens said the lily has a tap root, so it's impossible to dig them up and transplant them, and so they cannot be sold as a bulb either. What is the real answer? - *Confused in Lehi*

**A** Dear Confused: Sego lilies (*Calochortus nuttallii*) are difficult to grow and maintain in garden settings, probably for several reasons. I have grown them from seed, briefly, but they are difficult to maintain as seedlings.

Sego lilies are ephemeral growers: the plant sends up a few narrow leaves either in the early spring or fall, I cannot remember, and the flower stem arises in the early summer, and then withers, and for most of the year no part of the plant is visible above ground. The bulb is small (1", max) and is found quite deep in the soil (I think >6" deep). Like most lilies, I do not think they have a persistent tap root, but the bulbs are so deep and often in such gravelly-stony soil that it is hard to dig down to the bulb.

Collecting seed and growing them from seed could be done, but my experience (and others I have talked with) was that it is hard not to over water them. I think you would have to plant the seed in some forgotten corner of the garden and never water or till, and hope to be surprised someday.

They are slow growers. Several native lilies have a neat mechanism of germinating the seed just below or at the soil surface, and growing a small blade or two, which then senesces. Over the late summer the dying root becomes like a shrinking rubberband which pulls the tiny bulb a bit deeper into the soil. With each passing summer the enlarging bulb gets drawn deeper into the soil.



Above: *Winding mariposa* (*Calochortus flexuosus*) and *yellow bladderpods*. Photo by Max Licher.

*Intermountain Flora* vol.6 (The Monocotyledons) by Cronquist et al., has a great description of attempts to cultivate this genus: "*Calochortus* is widely noted for its remarkable beauty and is therefore highly prized by gardeners. Alas, many of the species do not readily accept ordinary garden conditions and most attempts to introduce the genus into the horticultural trade have not been greatly successful. With care, sandy well-drained soil, and only natural rainfall, some species will flower in gardens in our area. If one remembers that most species of *Calochortus* are basically desert plants and treats them accordingly, some success may be expected."

Sego Lilies are not a protected species in Utah, so it is not illegal to have them, but to collect anything (plants, bulbs, seeds, timber, rocks, gravel, etc.) on any land not belonging to the collector, he/she needs to have written permission or a permit. - *Therese Meyer*

*Do you have a question for the crack Sego Lily answer staff? Email us at [unps.org](mailto:unps.org).*

### **Richard Joshua Shaw (1923-2008)**

Dr. Richard J. Shaw, former director of the Intermountain Herbarium of Utah State University and author of numerous popular wildflower guides and floras of northern Utah and Wyoming, passed away in April 2008 in Logan, Utah. Shaw was born in Ogden in 1923 and served for several years in the Navy as a Pharmacists Mate during World War II. After the war, he received his bachelor's degree in biology from Utah State, followed by a Master's degree in 1950 and a doctorate from the Claremont Graduate School in 1961. Shaw was a botany professor at Utah State University from 1951 until 1987 and worked seasonally as a naturalist in Grand Teton National Park for over 30 summers. Drawing on his years of field studies, Shaw wrote a series of illustrated field guides and floras, including *Utah wildflowers: a Field Guide to Northern and Central Mountains and Valleys*; *Wildflowers of Yellowstone and Grand Teton National Parks*; *Field Guide to the vascular plants of Grand Teton National Park and Teton County, Wyoming*. -*W. Fertig*

## Ten Things you Always Wanted to Know about Sagebrush (But were Afraid to Ask)

By Walter Fertig

Sagebrush is one of the most widely distributed and iconic plants of the American west, and yet also one of the least understood and appreciated. In the interests of increasing the SIQ\* of our readers, the *Sego Lily* offers the following ten sagebrush factoids (in no particular order):

# 1. Not all "sages" are sagebrush. True sagebrush belongs to the genus *Artemisia*, a group of more than 100 species in the sunflower family (Asteraceae or Compositae) distributed across northern Asia, Europe, western North America, and South America. The common name sage comes from the aromatic foliage that smells much like culinary sage (see # 3) and its relatives in the genus *Salvia*, which are all in the mint family (Lamiaceae or Labiate). Pioneers traveling across the western prairies and deserts applied the term "sage" to a number of shrubby species that had bluish-green foliage, inconspicuous flowers, or odoriferous leaves that are not true mints or members of genus *Artemisia*. The Latin name comes from Artemisia, queen of Caria (in modern Turkey) in the 4th Century BC, who was an amateur botanist and herbalist. She in turn was named after Artemis, the Greek goddess of the moon, hunting, and wild animals.

#2. There isn't just one kind of sagebrush, there are 69! Dr. Leila Shultz of Utah State University and author of the chapter on *Artemisia* in the *Flora of North America* (2006) accepts 51 species and 18 subspecies of *Artemisia* and *Picrothamnus* (traditionally included in *Artemisia*) in North America north of Mexico. In Utah, Dr. Stanley Welsh of Brigham Young University recognizes 23 taxa (31 if subspecies are included) of sagebrush. Only half of our sagebrush species are woody shrubs or subshrubs - the others are annual or herbaceous perennials that are often called sageworts or mugworts. All sagebrushes are characterized by numerous small flower heads with

rayless florets and tiny seeds lacking a pappus of bristles or scales for dissemination. Within the aster family, sagebrushes are most closely related to yarrow, chamomile, ox-eye daisy, and chickensage (*Sphaeromeria*).

Of our shrubby species, Big sagebrush (*Artemisia tridentata*) is the most abundant and variable. Shultz recognizes 4 subspecies in Utah, each adapted to different soil types or elevation zones. Basin big sagebrush (ssp. *tridentata*) is our most common form and occurs abundantly on deep sandy soils or stream terraces. Mountain big sagebrush (ssp. *vaseyana*) occurs in mountain meadows and Wyoming big sagebrush (ssp. *wyomingensis*) is found on clay-rich sites. Other common shrubby *Artemisia* species in Utah include Bigelow's sagebrush (*A. bigelovii*) found mostly on rocky ledges; Silver sagebrush (*A. cana*), of montane riparian habitats; Black sagebrush (*A. nova*) from limestone or shallow soils; and Sand sagebrush (*A. filifolia*) with very slender leaves found mostly on sand dunes.

# 3. If the recipe calls for "sage", don't put in sagebrush! Culinary sage (*Salvia officinalis*) is the spice used for seasoning foods with a sage smell. Native Americans did not cook with sagebrush, but did use it as a medicinal plant. Most often it was used as a tea or poultice to treat colds, fever, toothache, or to induce vomiting (an outcome most chefs are not looking for!). Branches were also burned to purify the air.

#4. Sagebrush really is a flowering plant. Individual sagebrush flowers are quite tiny (1.5-3 mm), lack showy petal-like ray flowers, and are brownish-green. Like other members of the sunflower family, the flowers are aggregated into small heads, each of which is enclosed in an involucre of greenish-gray leaf-like bracts. These flower heads are themselves arranged in branching, panicle-like flower stalks (inflorescences) that often stick out well above the



Above: Fringed sagebrush (*Artemisia frigida*) by Kaye Thorne.

### Fringed Sage

"Fringed sage begins the season in the garden as a twiggy mat, woody at the base, with dense gray-green foliage. The leaves are alternate, with very little petiole, and the blade is divided into 3-5 linear segments, up to 3/8 inch long. A stipular appendage is attached at the base of the petiole. Initial growth produces a soft silvery cushion. As a mass planting the effect is of an undulating carpet. However, in order to maintain this growth form it is necessary to either prevent flowering and fruiting or to pinch, clip or mow the flowering shoots off before they become mature. Nylon string weeders work well as does a rotary mower. If the flowers mature the plants tend to become lax and open and rather unsightly."  
—Richard Hildreth from his column "Naturally Native" in the April 1982 issue of *Sego Lily*.

\* Sagebrush Intelligence Quotient

foliage. The flowers are designed for wind pollination. Nearly all sagebrush species flower in late summer or early fall (the exception being Bud sagebrush, *Artemisia spinescens*, which flowers in mid spring). Wind-pollinated plants typically produce large quantities of very small pollen that waft through the breeze to randomly reach receptive stigmas on other plants. Many people with fall "hay fever" are allergic to sagebrush pollen, or pollen of herbaceous ragweeds (*Ambrosia* species). Old flowering stalks typically persist for nearly a year and are useful for distinguishing some species, such as Black sagebrush and Big sagebrush. Sagebrush species can produce large crops of tiny seeds each fall, which can be spread over large distances by wind gusts or, more frequently, fall near the parent plants.

#5. Some sagebrush species and subspecies can be identified by their unique leaf chemistry. Scientists have discovered that the presence and quantity of coumarin in leaf tissues can be used to differentiate some sagebrush taxa based on fluorescence of twigs placed in water under UV light. The higher the concentration of coumarin, the brighter the sample will fluoresce, while specimens without coumarin won't fluoresce at all. Presence of coumarin is also correlated with palatability. Those taxa with high concentrations generally are favored over those without (one exception is Wyoming big sagebrush, which does not fluoresce but is one of the more palatable taxa).

All sagebrushes get their distinctive sage odor from chemical compounds such as terpenes and sesquiterpene lactones. The intent of these chemicals is to reduce herbivory by insects and large mammals (including livestock). But not all chemicals are the same - their quantity and type directly influences the palatability of sagebrush foliage. Sage grouse and mule deer preferentially forage on sagebrush species with lower concentrations of these compounds. The amount of leaf chemicals differs between plants based largely on genetics, but can also vary seasonally and even from morning to evening.

#6. Big sagebrush produces two different kinds of leaves. Like most shrubby sagebrushes, Big sagebrush is evergreen, but individual leaves may be relatively short-lived. Overwintering leaves last for about a year and are short and typically clustered. These are capable of undergoing photosynthesis, even at relatively low winter temperatures. Longer ephemeral leaves are formed in the spring and occur singly on the stems. These leaves are shed when hot, droughty conditions occur in the summer, as their larger surface area makes them more prone to water loss than the evergreen leaves. Overwintering and ephemeral leaves usually have three lobes across their tip, while leaves associated with flowering stalks are often entire (unlobed). Leaf shape (elongate vs. bell-shaped) and length are used for distinguishing Big sagebrush subspecies, but can often be extremely variable on the same plant.

The distinctive bluish-green color of sagebrush comes from the dense mat of hairs that cover most of its foliage. These hairs reflect some sunlight and provide shade to the leaf and stem surface, keeping them cooler and reducing water loss through transpiration. The hairs may also interfere with herbivory by insects.

#7. Sagebrush can be completely defoliated and survive. Severe drought in southern Utah in 2002 prompted many sagebrushes to shed their leaves to preserve water. The drought was followed by an outbreak of Army cutworm caterpillars which subsequently defoliated many plants. Though they appeared dead, most of the shrubs survived this one-two punch. Big sagebrush does not survive after a fire, however, and is not able to resprout from its roots. The related Silver sagebrush is able to resprout if burned.

#8. Big sagebrush produces two kinds of roots. Like many aridic shrubs, Big sagebrush grows deep taproots up to 20 feet long. In general, root depth is 3-4 times greater than the height of the plant and varies depending on the depth

and rockiness of the soil. Big sagebrush also produces lateral roots that radiate out from the plant a short distance below the soil surface. These roots are especially effective at capturing surface moisture following rain or snowmelt. The range of sagebrush strongly correlates with areas where precipitation comes mostly from snow. This accounts for the rarity or absence of sagebrush vegetation in grass-dominated ecosystems such as the Great Plains where most precipitation comes as summer rain.

The presence of lateral roots and competition for water may help explain the natural spacing of sagebrushes and gaps that form between plants. In the past, range managers suspected that sagebrush leaves and roots exuded chemicals into the soil that inhibited growth of competing plants (a condition called allelopathy). Scientific analysis of leaf and soil chemicals, however, provide no basis for this assumption. In fact, grass and forb species are more likely to grow under the canopy of sagebrush where they are partly protected from herbivores and provided shade (which also keeps the soil moister). Rather than inhibiting other plants, sagebrush acts as a nurse plant that improves the probability of seedling survival.

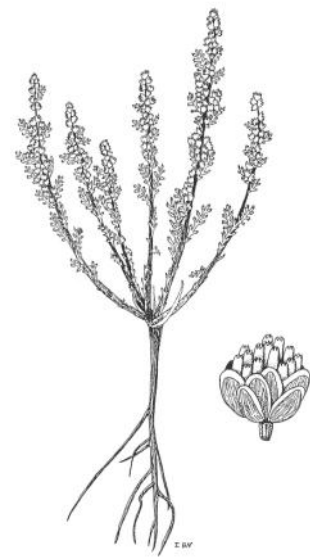
#9. Big sagebrush produces wood and annual growth rings, just like many trees. Although not especially thick, the main stems of Big sagebrush regularly grow a new ring of woody tissue (water-conducting xylem) each year. These growth rings reflect climatic conditions, with thicker rings produced during wetter years and thin rings during times of drought. Patterns in the annual production of rings can be used to date the age when a sagebrush plant became established and to assess variations in past climate. Researchers studying age rings within sagebrush populations typically find that shrubs are of similar ages, suggesting that seedling establishment is infrequent and episodic. They have also found that stem size does not reflect age - large sagebrushes attain their size because they grow in favorable environments and not because of their longevity.



#10. Contrary to what you may have heard, sagebrush is quite valuable to wildlife for food and shelter. As discussed under #5, aromatic chemicals in sagebrush foliage are designed to reduce herbivory, but many animals (especially mule deer and sage grouse) are able to tolerate sagebrush browse, and in fact rely on it extensively in their diet. Sagebrush is an important source of protein for mule deer on their winter range. The Greater and Gunnison sage grouse feed almost exclusively on sagebrush from October to April (their gizzards are not adapted for grinding hard seeds like other upland game birds). Sage grouse also rely on sagebrush for nesting cover and feed their chicks insects, grasses, and forbs that grow under the sagebrush canopy. Brewer's sparrows, Sage sparrows, and Sage thrashers are other "sagebrush obligates" because of their reliance on *Artemisia* for hiding cover, nesting sites, and feeding areas. More than a dozen other bird species are highly dependent on sagebrush and grassland habitats, including Black-throated sparrows, Vesper sparrows, Lark sparrows, Green-tailed towhees, Burrowing owls, Short-eared owls, Long-billed curlews, Sharp-tailed grouse, Prairie falcons, Ferruginous hawks, and Swainson's hawks. At least 16 species of rodents and rabbits feed on sagebrush, as well as hundreds of insect taxa (52 species of aphids alone according to one study).

Big sagebrush is also less responsible for the decline of native grasses and deterioration of range conditions than is often depicted. Anecdotal evidence that sagebrush is significantly more common today than in pre-settlement times is not substantiated by historical records of pioneers and early photographs. One famous photo used in textbooks for years to illustrate the increase of Big sagebrush in the last 130 years actually depicts an area that was recently burned (and thus devoid of sagebrush), rather than a site naturally dominated by grasses. Changes in the abundance, density, and composition of native perennial grasses and forbs since settlement are better explained by past grazing history and changes in climate

and fire regimes. Despite decades of removing sagebrush by chaining, thinning, burning, and applying herbicides, sagebrush habitats have rarely been permanently converted to perennial grasslands because shrubs are better adapted to winter precipitation, drought, and grazing pressure. Modern sagebrush systems are being impacted by changes in natural fire frequency from invading annual weeds (such as cheatgrass, red brome, and Arabian grass) and conversion to agriculture and urbanization to such a degree that many sagebrush obligate species (especially sage grouse) are in significant rangewide decline. It is surprisingly difficult to find unaltered sagebrush vegetation anymore!



Above: *Artemisia biennis* var. *diffusa*.  
Illustration by Isobel Nichols.

### A New Sagebrush for Utah?

In August 1980, Robert Dorn discovered an unusual population of Biennial wormwood (*Artemisia biennis*) on clay barrens near the Jim Bridger Power Plant, northeast of Rock Springs, Wyoming. Dorn observed hundreds of plants at this site, all of which were uniformly short (less than 30 cm tall) with numerous branches originating from the base of the stem. The plants also had atypically short leaves (8-17 mm) and extremely long inflorescences relative to the overall stem length. Eight years later, Dorn described the unusual sages from Sweetwater County as a new taxon: *Artemisia biennis* var. *diffusa*.

Var. *diffusa* was given the common name "Mystery wormwood" because it remained undetected for nearly 20 years (the type population is now thought to be extirpated). In September 1999, Kim Anderson of Dixie National Forest discovered an unusual population of *A. biennis*-like plants near Pollywog Lake on the Aquarius Plateau in south-central Utah. Robert Dorn verified that the Utah plants matched the holotype of var. *diffusa*. Anderson later discovered additional populations of the Mystery wormwood elsewhere on the Aquarius Plateau.

The Utah populations occur in a much different habitat than those from Wyoming. Near Pollywog Lake, I have found *diffusa* growing on rocky clay soil of roadsides and adjacent drainage channels at the edge of *Artemisia cana*-*Antennaria* communities bordering aspen woods at elevations of 9160 feet. The type locality in Wyoming is a clayey playa dominated by *Hordeum jubatum* and *Chenopodium glaucum* at 6500 feet. The Wyoming population may have become established during construction of the Jim Bridger Power Plant, possibly hitching a ride on construction equipment or livestock transported from Utah.

Recent taxonomic treatments either do not recognize var. *diffusa* or treat it as a synonym of *A. biennis*. Although the characteristics of var. *diffusa* are striking in the field, individually none of its diagnostic traits are unique within *A. biennis*. It is possible that the combination of low stature, small leaves, and elongate inflorescences has developed independently in Utah and Wyoming populations (and perhaps elsewhere) and merely reflects variability within the whole species. However, with fresh material of *diffusa*-like plants now available from the Aquarius Plateau it ought to be a simple matter to conduct a genetic assay of the populations to determine if they are, in fact, unique. Such a study could help take the mystery out of the Mystery wormwood.—*W. Fertig*

## What's In a Name: Rafinesque and *Rafinesquia*

By Walter Fertig

Over the centuries the study of taxonomy has attracted its fair share of eccentrics, but few rival Constantine Samuel Rafinesque-Schmaltz. Born of a French father and German mother in Turkey in 1783, Rafinesque was a successful, self-made merchant and businessman in Sicily and earned enough money to retire at the age of 25 to pursue his interests in natural history. In 1815 he emigrated to the United States, surviving a shipwreck off the coast of Connecticut, but losing his personal library and possessions. For the remainder of his life, Rafinesque traveled throughout eastern North America to collect specimens and published hundreds of book and articles on topics ranging from zoology, geology, and meteorology to Indian languages and history.

Rafinesque was especially interested in naming and describing new species of plants and animals. He took to describing species with a zeal almost unmatched in American history, naming 2700 new genera and 6500-6700 new species. Unfortunately, Rafinesque's enthusiasm did not match his skill and only about 30 of the genera and 100 species that he named are still recognized today.

Early 19th Century taxonomists found Rafinesque's methods sloppy and his conclusions poorly supported. Many of Rafinesque's "new" species proved to be already named, or had inadequate Latin descriptions. Some of his species were named on the basis of hearsay rather than physical evidence, including an imaginary Mississippi River fish he learned about from a practical joker named John James Audubon. Although Rafinesque collected numerous type specimens, many lacked proper labels or were lost when his personal herbarium was split up after his death (in part to pay outstanding debts).

Sadly, Rafinesque's immodest and peculiar personality did little to win over his colleagues. Some authorities even suggest he may have gone mad. Asa Gray, one of the pre-eminent botanists of the 19th Cen-



*New Mexico desert chicory* (*Rafinesquia neomexicana*), a white-flowered member of the Aster family found in Creosote bush communities of the Mojave Desert in southwestern Utah and the southwestern United States. Photo by W. Fertig.

tury, captured the prevailing view of Rafinesque in an 1841 eulogy: "... a gradual deterioration will be observed in Rafinesque's botanical writings from 1819 to 1830, when the passion for establishing new genera and species appears to have become a complete monomania".

Rafinesque's reputation has enjoyed a bit of a comeback in recent years, as molecular studies suggest some of his segregate genera have merit. Colorado botanist William Weber has been among those championing old Rafinesque names and even dedicated his 1987 *Flora of Colorado: Western Slope* to Rafinesque and several other prominent splitters.

On two occasions Rafinesque proposed the genus name *Rafinesquia*, only to have it not accepted. The third time proved the charm when Thomas Nuttall published the name *Rafinesquia californica* for a white flowered, chicory-like composite from San Diego in 1841. Asa Gray described a second species, *R. neomexicana*, from the Rio

Grande valley near El Paso in 1853. The two species, commonly called desert chicories, can be recognized by their white ligulate flowers, plumose (feathery) pappus bristles surmounting an elongate beak and pinnately lobed stem leaves. Both taxa are spring-flowering annuals that occur in the Mojave Desert portion of Utah. New Mexico desert chicory (*R. neomexicana*) is the more showy and widespread of the two, and can be found in Creosote bush and Joshua tree communities on sandy or gravelly soils over much of western Washington County. It often grows among the branches of spiny desert shrubs which offer protection from herbivory and support for the plant's spindly stems. California desert chicory (*R. californica*) is known from a single location in the state in Cedar Pocket Canyon and can be recognized by its relatively small flower heads.

#### References:

Gilbert, B. 1999. An "odd fish" who swam against the tide. *Smithsonian* 29 (10):112-125.

## UNPS Scholarship Speciation and Soils: What can the Wild Buckwheats Tell Us?

By Ben Grady

Department of Botany – University of Wisconsin

Many have wondered and speculated, what role does soil play in plant speciation? Edaphic endemics, species found only on one type of substrate, are prevalent in the floras of western states. Soil types are also extremely diverse and patchily distributed in the west, providing many potential niches for plant species. One group of plants that is nearly as diverse as the topography and soils of the western U.S. is *Eriogonum* (Polygonaceae), more commonly known as wild buckwheat. *Eriogonum* is a large genus of about 250 species, limited to North America, with centers of diversity in California and the Great Basin. Nearly one third of these species are considered uncommon to rare in their distribution. Additionally, many wild

buckwheat species are often only found on certain soils. If there is an unusual soil type in the arid west, you can bet there is a species of *Eriogonum* growing there!

The focus of my graduate research will center on inferring the evolutionary history of the *E. ochrocephalum* complex, a group of about 25 closely related species, found mostly within the Great Basin. DNA sequencing, greenhouse transplants and measurements of soil properties will provide the necessary data for this study. Many of the species in this 'complex' are narrow endemics, often found growing on unusual substrates. A prime example is the Frisco wild buckwheat, *E. soredium*. This rare species is only known from calcareous soils in the San Francisco Mountains in west-Central Utah. I will determine if

taxa, such as the Frisco wild buckwheat, are specifically adapted to certain edaphic conditions or if species of *Eriogonum* are edaphic generalists that can tolerate a wide variety of soil conditions. My work will shed light on the evolution of soil specialists and aid conservation efforts by highlighting suitable ecological areas to search for additional populations of rare species of *Eriogonum*.

Finally, I would like to thank the Utah Native Plant Society for support with this project. Field studies will be essential for this project and without the support of the UNPS, this research would not be possible.

*Editor's Note: Ben received a \$1000 scholarship from the UNPS board in 2008 with funds provided from generous contributions by society members. Thanks!*

### Noteworthy Discoveries

#### New *Potentilla* in Utah and Nevada

The alpine summits of the Rocky Mountains and higher peaks of the Great Basin share many characteristics with the tundra environments of the high arctic, and not surprisingly, have similar (though not identical) floristic elements. Whether the ranges of these species were once continuous and subsequently fractured following retreat of the last continental glaciers, or populations have taken hold following long-distance seed dispersal, alpine species are often widely isolated (disjunct) from related arctic populations. Over time, limited gene flow between populations has fueled natural selection and the evolution of new varieties or full species.

One such taxon is Holmgren's cinquefoil (*Potentilla holmgrenii*), described as a new species in 2007 by David Murray of the University of Alaska and Reidar Elven of the University of Oslo, Norway. Holmgren's cinquefoil (named in honor of

Noel Holmgren) is endemic to the high peaks of the Schell Creek and Snake ranges of White Pine County, Nevada and the Deep Creek Range of western Juab County, Utah. Traditionally, this species has been included within Snow cinquefoil (*Potentilla nivea*), a widespread arctic-alpine species of Alaska, Canada, and scattered locations in the Rocky Mountains south to Colorado. *Potentilla holmgrenii* differs from its close relative in having a more densely compacted growth form, basal leaves that are more tomentose above with blunt to rounded teeth on the leaflets, marginal teeth on the leaves that overlap with the terminal tooth, epicalyx bractlets that are shorter and narrower than the sepals, and longer styles without warty papillae at the base. Noel Holmgren noted many of these differences in his treatment of *P. nivea* in volume 3, Part A of the *Intermountain Flora* in 1997, but did not recognize the Great Basin plants as a separate taxon at

that time. The sole population in Utah cited by Murray and Elven is from a collection made by Sherel Goodrich in July 1983 (*Goodrich 19024* BRY, NY).

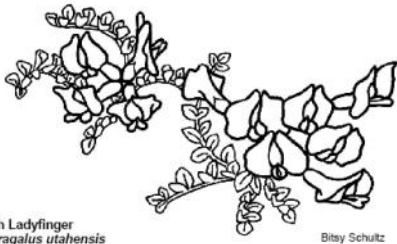
Cottam's cinquefoil (*P. cottamii*), also of the Deep Creek Mountains and adjacent Great Basin ranges of eastern Nevada and western Utah, is another local endemic apparently derived from an arctic relative, *P. hyparctica*. It differs from Holmgren's cinquefoil in having basal leaves that are green on the upper and lower surfaces. - *Walter Fertig*

#### References

Murray, D.F. and R. Elven. 2007. A new species and two new combinations in *Potentilla* Sect. *Niveae* (Rosaceae). *Journal Botanical Research Institute of Texas* 1 (2):811-814 (formerly *Sida*).

*Do you have a noteworthy discovery to share? A new record for the state or a county in Utah? Attain fleeting botanical glory by emailing your findings to unps.org.*





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