



Sego Lily

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**Searching for
Penstemon petiolatus
in the Mojave**



Penstemon petiolatus	2	Gardening with Natives	14
UNPS 40th Anniversary	5	Dorde Woodruff 1928-2018.....	16
How Lupines Talk to Bees	6	Return to Bald Mountain	18
Tracking Monarchs	7	Fast and Furious Two	19
Bearclaw Poppy in AZ?	10	Chapter Reports	21
wonka's Botany Flashback..	13	Bill King Book Review	22

Beauty and the Beast: Searching for *Penstemon petiolatus* in the Mojave

by Norman Anderson III & George E. Otott

The desert invites contrasts just as an oasis beckons travelers. The harsh and delicate, vibrant and colorless, common and rare, survivors and victims, expected and unexpected, hot and cold, dry washes and flash floods, shady “spots” and scorching heat, life and death. In this often remote niche of dramatic contrasts and an eternal furnace of heat, it is hard to imagine a plant that better exemplifies the ever present dichotomy of these extremes than the flower of the rocky desert crevices, the *Penstemon petiolatus*. To come upon one in full bloom when other plants are hiding from the sun’s heat is like finding a rare orchid in Borneo or a diamond deep in the ground in Africa, they are an unexpected spot of grace and beauty in an otherwise inhospitable landscape. Finding the first one is seldom a matter of luck and it most likely occurs with perseverance, knowledge, timing or some combination of factors which includes divine intervention.



Two talented guides helped in a recent effort. Blake Wellard, a gifted botanist with a good sense of rare botanical beauty and known well to members of the UNPS, and George Otott, a local geologist and stratigrapher whose primary interest is in geology and the Beaver Dam Mountains. Both are the equivalent of highly knowledgeable mountain goats that never say no to the cliffs where *P. petiolatus* chooses to populate. Blake’s interest in *Penstemon petiolatus* and George’s mapping of the Beaver Dam Mountains encouraged our outing. During a day of exploration, we educated each other, searched, and then incrementally began to

understand some of the conditions necessary for *P. petiolatus* to thrive. In May, with the geological and botanical information in hand, at a time that coincidentally appeared to be at the height of their bloom, seeing them became much easier. Knowing where to look (area), rock type (limestone covered with chert) and what they looked like (pinkish red flowers with muted green leaves) allowed discovery and viewing in several, physically separate sites.



For background, published descriptions of *P. petiolatus* are readily available. Briefly, *P. petiolatus* is said to be found in the rocky outgrowths of Pennsylvania limestone, in the eastern Mojave, Washington County Utah, and the Beaver Dam mountains of Utah and

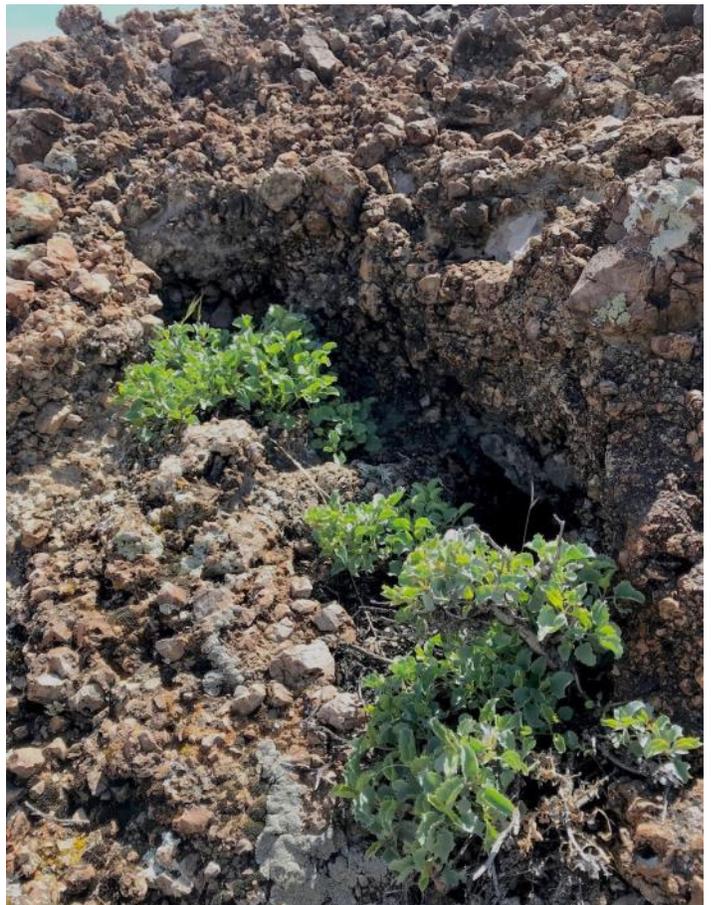
Arizona. It occurs at elevations from 900 to 1400 feet and blooms in May and or June. Plants in the Mojave crevices live for many years, seeds sprouted outside of the Mojave have a much shorter life. It is rare, but once found, other plants are often nearby. It is well adapted to tolerate the desert heat and may be the best example of “rock mulching” to be seen in the Mojave and takes root deep into a source of moisture, much like nearby junipers and pinions.



We found *P. petiolatus* in three distinctly different areas which shared three commonalities: 1. Rock type which was limestone covered with chert and or breccia. 2. North facing cliffs of rock that were significantly angled. 3. Exposure to sunlight on the brightest days was limited by physical and geological factors.

The first area that we searched was in the Pennsylvania limestone near the Arizona border, east of US 91 with multiple promising cliffs and no sign of *P. petiolatus*. Blake knew of a plant east of US 91 which we used to later identify other plants and the rock type in the area. This plant was growing in brecciated limestone. Later, on a separate outing, we found *P. petiolatus* growing nearby (west of US 91) on exposed slabs of a layer of the Beaver Dam Mountains. This is a Redwall limestone formation that is covered with chert and brecciated towards the bottom. Also, this area is better defined as an area of gravity slide blocks with brecciation that occurred during their slide. There are numerous “slide blocks” in the area and once you find the correct conditions (exposure, direction, angle of repose), multiple *P. petiolatus* have taken root. Most of the slide blocks are covered with chert, a silica derived from skeletons of plankton that lived in the water column.

This Redwall section has not been differentiated by geologists into separate members yet as it has been in the Grand Canyon and other places where it has attracted much more interest by geologists. In this





whereas the lime muds and sands lithified into limestone. The Redwall is about 850 feet thick in this area, the gravity slide blocks are a now disconnected part of this layer.

eastern Redwall section, the Redwall forms a single uniform cliff of dark gray, thick layered limestone, although there are certain areas, up to 80' in thickness that are clearly different from the normal pattern. The depositional environment was very shallow to moderate water depths conducive to accumulations of mostly lime mud and lime sand on the seafloor. The formation of Redwall east of US 91 is locally fossiliferous, with lots of corals, crinoids and brachiopods in beds. Chert formation occurred when the plankton died, their hard parts fell to the seafloor and formed an ooze. Upon burial of the Redwall sediments by overlying formations, the silica ooze tends to segregate and harden into lenses and layers (chert)

At an outing of the American Penstemon Society, during their annual meeting, outside of Las Vegas in the National Wildlife Preserve, we were taken to a place where *P. petiolatus* was growing. Although the plants were much smaller, the type of rock, exposure and geologic conditions were similar.

This rock, off the Mormon Wells Road in Nevada, is most likely the Antelope limestone formation of the Pogonip group and contains many fossils including numerous ammonoids in a breccia crust overlying the principal rock, limestone.

In late May, on a random walk up a canyon east of US 91 in the Beaver Dam Mountains, was another collection of large *P. petiolatus*, growing in the Fossil Mountain member of the Kaibab limestone, not the Redwall limestone west of US-91. The Kaibab limestone can be



confused with the Redwall limestone because they both have abundant dark colored chert (silica) in some locations and are very similar in both locales (east and west of US 91). Also, nearby and often in massive form is the nearly smooth and not covered Pennsylvania limestone in which we were unable to find any *P. petiolatus* as described in the current literature. It would not be surprising that botanical sites in this area may be geologically mislabeled as the entire area is well known for its stratified conundrums.

Overall, we found *P. petiolatus* growing in the Redwall (Devonian), Kaibab (Permian) and Antelope Valley (Ordovician) limestone formations which suggests that *P. petiolatus* may not be as fussy about the specific rock as long as it is limestone. The question that remains is why the hearty growth of the *P. petiolatus* seems to be associated with limestone covered with chert, breccia or both. It may very well be that this outside covering of the limestone may serve to either channel or impede the runoff of rainwater by creating numerous micro reservoirs that are then guided by gravity to the cracks and crevices where penstemon wait for each droplet, a condition somewhat analogous to a large Pachinko machine that randomly picks out fissures to place water in. Similarly, the rough outside covering could also help to move opportunistic seeds into cracks where they first

nestle and then with rain, sprout. On a smoother surface of pure limestone, the seeds would more often fall off of the rock, onto the ground where survival would be tenuous. While it remains speculative that the outside covering of chert or breccia aids in moisture retention or water movement towards cracks and or seed retention or propagation, it is not in doubt that a covering of the limestone with a crust is consistently associated with *P. petiolatus* growth and survival in the Beaver Dam mountains.

Early June signaled the most recent journey into the Mojave, a time to gather seeds for the American Penstemon Society following requests from botanists Cindy Reed of South Dakota and Blake Wellard. On this outing, if you were a raven sitting on a rocky outcrop, down a dirt road in the Beaver Dam mountains, you could have spotted two aging flower children trying to scale cliffs before dawn, before the heat. The raven would also observe that the humans were each clutching small sacks to store even smaller seeds and that they seemed to move deliberately. Out of season effort for the love of a bloom that doesn't appear to belong, a beauty that beckons in the Mojave, a beast of a desert that grows lonely for human visitors in the summer.



All UNPS Members are Invited to the
UNPS 40th Anniversary
Potluck Picnic Celebration & Retreat
Wednesday, September 12th, 5:00 p.m.
Big Cottonwood Canyon
Spruces Campground, Group Site

This is a special occasion, well worth celebrating. 40 years! Come as early as 2:00 p.m. and go for a flower hike led by Bill Gray. The main dish will be provided, along with plates, napkins and silverware but feel free to bring a dish to share (appetizer, side dish or dessert). Spruces Campground is located ½ mile past mile marker 11 in Big Cottonwood Canyon. Turn right into the campground then continue to the right and follow the loop that says campsites 1-38. Group Reservation #1 will be on the immediate left. The campsite is **handicap accessible**. This is an overnight campsite, out-of-towners and locals are welcome to camp for the night. Ten free parking passes come with this group site, senior passes are accepted, so please use your pass if you have one. More details will be emailed as we get closer to the date. *Sponsored by Salt Lake Chapter and UNPS.*

How Lupines Talk to Bees

by Peter Lesica

Lupines are common and pretty much ubiquitous in Montana. However, it was only this year while photographing Wyeth's lupine (*Lupinus wyethii* = *L. polyphyllus burkei*) that I noticed how the flowers change as they mature. Most of our lupines have blue flowers, but the center of the reflexed banner petal is white; at least sometimes it's white. Lupine flowers are borne in long racemes with the lowest flowers blooming first. As the upper flowers open, the central banner spot of the older, lowest flowers turns from white to purple. Slowly flowers with banner spots that have turned purple are found higher and higher in the inflorescence as it matures. So what's that all about?



Several researchers have explored aspects of this question. Anthony Stead at the University of California working with white-leaved lupine (*L. albifrons*) found that the change in pigmentation from white to purple is not caused by simple withering because young, white-spotted flowers do not become purple-spotted if they are removed from the plant. Rather the pigmentation change is a response to ethylene produced by the pistil (female part of the flower) after it has been pollinated and is no

longer receptive. On average, flowers with a purple banner spot have just 1--2% of the pollen as white-spotted flowers, and most of this is not viable. So the change to purple acts as a signal that the flower is done. Okay, so who cares?

Bumblebees care, and they are lupine's principal pollinators. Lupines provide lots of pollen but no nectar. Bumblebees collect the protein-rich lupine pollen to feed their young. Barbara Schaal studied Texas lupine (*L. texensis*) and found that bumblebees can and do use the color of the banner spot to guide them to the flowers with the biggest reward, so they visit flowers with a white-spotted banner and avoid those with purple spots. This arrangement helps the bees because they don't waste their time visiting empty flowers. It also helps the lupines because bees will be more likely to visit and pollinate flowers with receptive pistils. But if a lupine plant "wants" to keep bees from visiting already-pollinated flowers, why not just drop the petals instead of evolving this color signaling system?

David Gori at the University of Washington answered this question by observing bees visiting silvery lupine (*L. argenteus*). He found that lupine inflorescences with more flowers attract more bees from afar regardless of whether the flowers have a white or purple banner spot. But once a bee arrives at the inflorescence she preferentially visits the flowers with white-spotted banners. The fact that larger inflorescences attract more insects has been observed for many species of plants, and lupines are taking advantage of bee behavior by maintaining corollas of already-pollinated flowers but making them identifiable at close range. What all of this tells me is that lupines invented stoplights; only they use white instead of green to tell their clients to go.

Further reading

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Adapted from an article first published in *Kelseya*, the newsletter of the Montana Native Plant Society.

Tracking Monarchs and Milkweeds in the Intermountain West

by Candace Fallon, Senior Conservation Biologist, Endangered Species Program

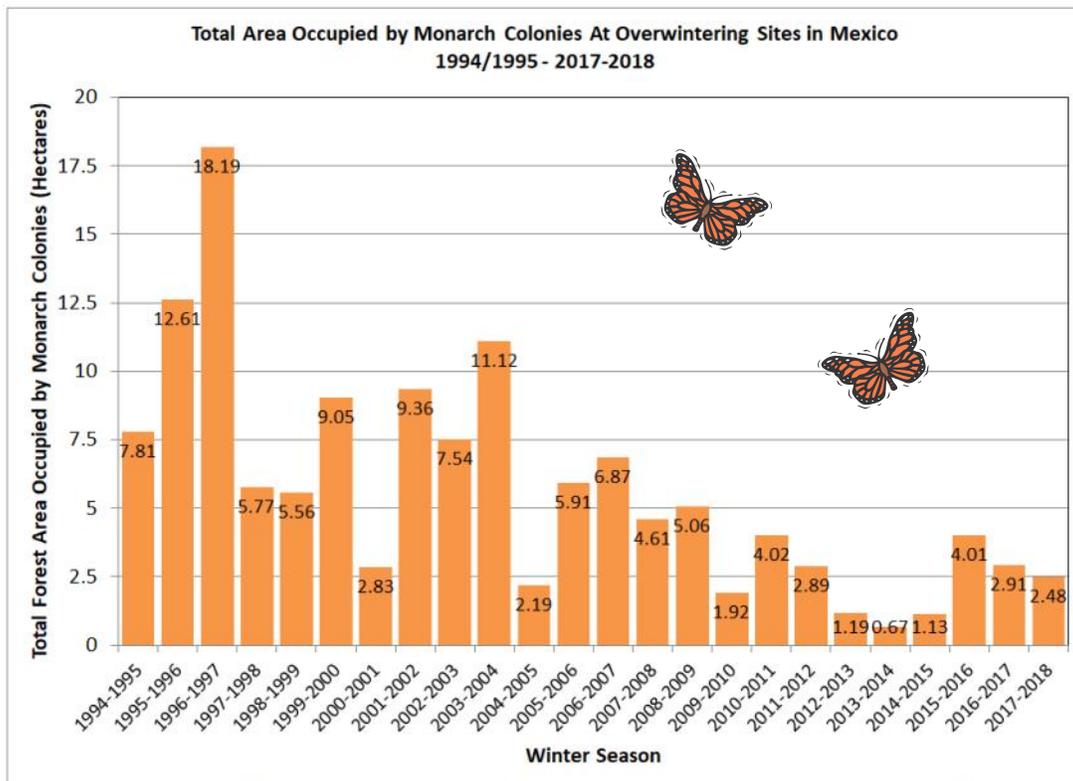
The Xerces Society (www.xerces.org) for Invertebrate Conservation Summer is in full swing, and here in Portland, where the main office is based, we are rejoicing in some sunshine after a long gray winter and spring. I suspect it is a different scenario for those of you based in Utah, where I recently had the pleasure of leading a monarch conservation workshop! Although we did not find any monarch adults or caterpillars, we did find several species of milkweed at the Red Butte Garden in Salt Lake City, and I heard many monarch stories from participants. Nearly everyone I meet seems to have one of these stories—finding caterpillars as a child, raising a monarch in school, or planting milkweed and other flowers to provide food for waves of migrating adults in the fall. Monarchs may very well be the best known and most loved insect in North America. Yet, they are in trouble.

Western monarch biology

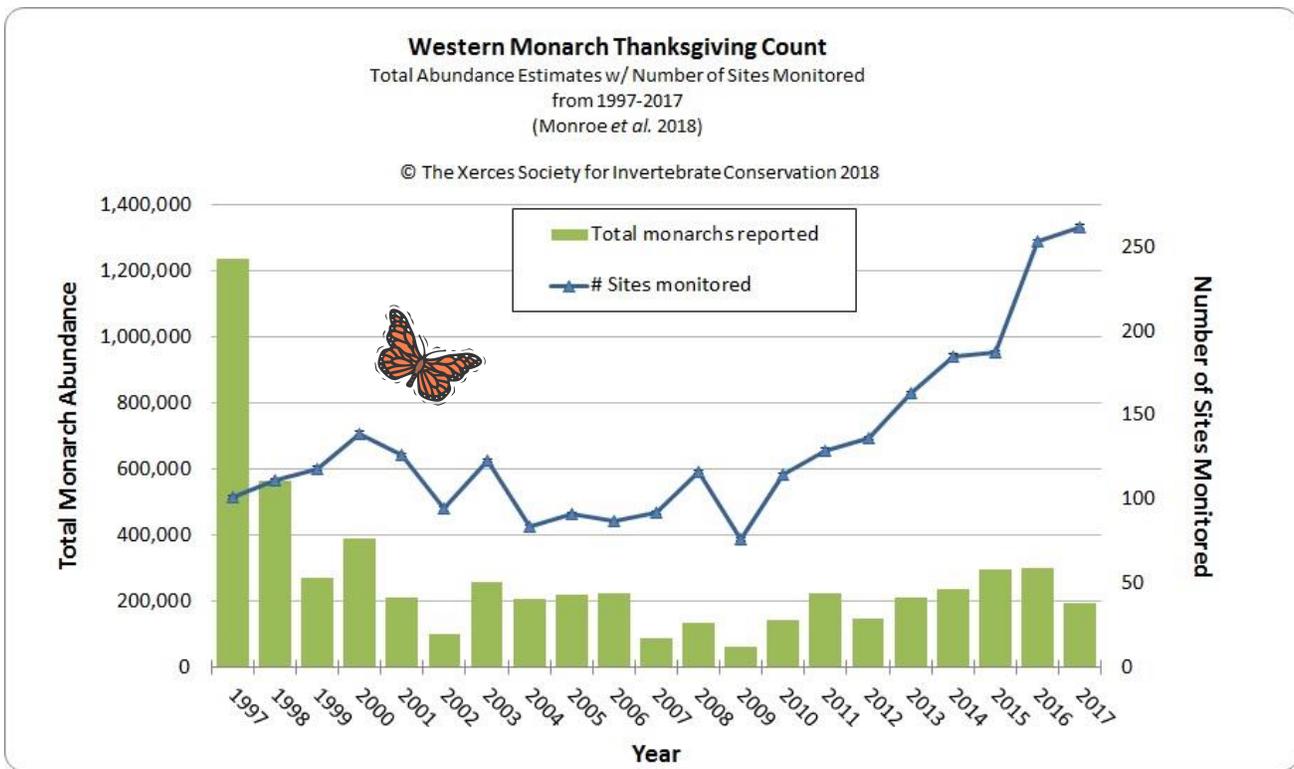
In the continental United States, monarchs are known from two general populations—the western population, which occurs primarily west of the Rocky Mountains, and the eastern population, which occurs primarily east of the Rockies. Here in the West, monarchs leave overwintering sites along the California coast in February or March, mating and searching for milkweed host plants on which to lay their eggs. They typically reach the interior states in early summer, around June or July. Several generations are produced over the course of the summer, and then the final late summer/early fall generation migrates to overwintering sites in both California and Mexico. Throughout their life cycle, monarchs need nectar to fuel their flight and reproduction, milkweed host plants to feed their caterpillars, and safe places to breed, migrate, and overwinter.

Conservation status and threats

In the West, population counts of overwintering monarchs are conducted each year as part of the Xerces Society's Western Monarch Thanksgiving Count (www.westernmonarchcount.org) a volunteer-based program in California. In Mexico, the total area occupied by butterflies is used to estimate the eastern population size. Population estimates at both locations show a



Data from 1994-2003 were collected by personnel of the Monarch Butterfly Biosphere Reserve (MBBR) of the National Commission of Protected Natural Areas (CONANP) in Mexico. Data from 2004-2018 were collected by the WWF-Telcel Alliance, in coordination with the Directorate of the MBBR. 2000-01 population number as reported by Garcia-Serrano et. al (The Monarch Butterfly : Biology and Conservation, 2004)



similar decline since monitoring started in the mid-1990s, and the most recent data from this past winter reveal that monarchs are not showing signs of recovery.

While researchers are still teasing out the specific reasons for decline, it is likely that many factors come into play, including loss or degradation of breeding habitat (milkweed and nectar plants), loss or degradation of overwintering sites, pesticide use, climate change (including drought), disease, parasites, and predation.

Get involved

Monarch conservation has a strong history of citizen science participation, and much of what we know about monarchs in the West is thanks to the efforts of dedicated volunteers. While we are now gaining a better understanding of monarch and milkweed distribution and phenology around the West, more data are needed from Intermountain West states like Utah. In addition, tagging data from this region is lacking. As native plant enthusiasts, you no doubt already have a sense of where milkweed and monarch nectar plants exist on the landscape—perhaps you have even seen monarchs as well. Whether you rally your friends to tag monarchs in late summer, report a milkweed you find while hiking, or commit to a long term monitoring project in your garden, we encourage you to take part in one of the citizen science projects described below. The more information we can gather about this incredible species, the better poised we are to protect it.

Western Monarch Milkweed Mapper

Submit observations of western monarchs and milkweed to the Xerces Society’s mapper project



The author, Candace Fallon, examining a well budded Showy Milkweed, *Asclepias speciosa*.



Candace (third from left) demonstrates how to look for Monarch eggs or caterpillars on milkweed plants (hint: very gently).

(www.monarchmilkweedmapper.org). This website provides a wealth of information on monarch and milkweed biology and offers milkweed profiles, range maps, and an ID tool for all milkweed species known to occur in the West. Sightings are shared on a map and all data are publicly accessible—the site currently hosts over 49,000 records!



Southwest Monarch Study

Help researchers understand the migration and breeding patterns of Intermountain West monarchs. We know that monarchs west of the Rockies migrate to both California and Mexico overwintering sites, but more data are needed from Intermountain states like Utah. Join this project to tag monarchs and contribute to our knowledge of monarch movement in the West!

www.swmonarchs.org

Monarch Larva Monitoring Project

Ready to commit to a long-term monitoring project? Help researchers at the University of Minnesota gather data on the distribution and abundance of monarchs during the breeding season. There is currently only one participant from Utah! www.monarchlab.org/mlmp

Another monarch butterfly article published in Sego Lily: <http://www.unps.org/segolily/Sego2014NovJan.pdf>

Utah's Monarch Butterfly Conservation Initiative is being led by Mindy Wheeler, State of Utah (mindywheeler@utah.gov); with the help of Rachel Taylor, Research Associate, Southwest Monarch Study (monarchsintah@gmail.com) <https://sites.google.com/utah.gov/monarchconservationintah/home>



Monarch Butterfly Workshop at Red Butte Garden, taught by Candace Fallon of the Xerces Society, was well attended by members of various government agencies and citizen scientists.

Does the Dwarf Bearclaw Poppy Occur in Arizona?

By Tony Frates

When former Utah State Heritage Program botanist Ben Franklin mentioned to me the mystery surrounding the reported occurrence of the ESA listed *Arctomecon humilis* in Arizona during the spring of 2010, it seemed like it was a mystery that could be definitively solved given the improved information access and ease of communications available in the digital age.

Arctomecon humilis is a rare Utah endemic species favoring highly gypsiferous soils growing in roughly a five mile radius mostly south of St. George in Utah's Washington County. St. George itself is very close the Utah-Arizona border (just under seven miles), a fact that has cramped its now Wasatch Front style growth over the past few decades.

Commonly referred to as the Dwarf Bearclaw Poppy, a translation of its name would more accurately be Low Bear Poppy. The term *humilis* in Latin means “low” and *nana* instead means dwarf. There is also no “claw” in *Arctomecon*, the Greek origins of *arcto* meaning “bear” and *mecon* referring to “poppy.” Meconic acid is a chemical found in opium and some other plants in the Papaveraceae (Poppy family). Common names though are simply those names most often used by the public, not just botanists or taxonomists, to refer to plant species, and they aren't subject to any particular rules. The leaves of this species are claw-like, and there are other species containing the specific epithet *humilis* that are commonly referred to as being “dwarf.” An example would be *Chamaerops humilis*, the Dwarf Fan Palm.

The first botanist to document the presence of *Arctomecon* in Utah was Dr. Charles C. Parry near what is now Bloomington in 1874. He thought initially that the species was the same plant found by John C. Fremont in 1844 in the Las Vegas area, i.e. *Arctomecon californica*. Parry noted however several morphological differences in the Utah plants as compared to the plants found some 30 years earlier in Nevada. It wasn't until after Parry's death when Frederick Coville reexamined Parry's specimens that the Utah plants were named as a different species in 1892. The species was one of the first from Utah to be proposed for listing under the Endangered Species Act

in 1976 and was subsequently listed in late 1979 as endangered, and has retained that status ever since (Frates 2008-2018).

Early Arizona floras treated *Arctomecon humilis* as an Arizona native. In the second edition of *Arizona Flora* published in 1960 (a prior version was published in 1951), *A. humilis* was included with this additional description:

North of Wolf Hole, Mohave County, 2,500 feet, May (Peebles & Parker 14749). Southwestern Utah and northwestern Arizona.

A handsome plant, the petals pure white (Kearney, 1960, p. 324).

And in fact, this description was carried over from an



even earlier flora by Kearney and Peebles (Kearney, 1942).

Yet as part of a later updated treatment of the Papaveraceae for Arizona, *A. humilis* was not included (Ownbey, 1998).

The key to this mystery seemed to rest with the Peebles and Parker specimen 14749 collected on May 9, 1940. Where exactly was it taken?

While that specimen was not showing up in any database searches in 2010, contact was made with Phil Jenkins with the University of Arizona Herbarium (ARIZ) in Tucson and he confirmed that it was indeed a “real” specimen but that it had been on loan since September of 1997 to the Arizona State University Vascular Plant Herbarium (ASU) in Phoenix, and that they were still awaiting its return. The specimen had been missing for almost 13 years evading easy review by interested Utahns.

Meanwhile I attempted to research the adventurous botanical trip taken by Peebles and his student Parker during that spring of 1940. They covered a huge amount of territory over weeks of botanizing. On May 8 they were initially in the Pipe Springs area. There are some gaps in their specimen numbers, but the chronological order of their specimens seems to outline their path. By the end of the day on May 8, Peebles 14742 places them eight miles south of the Utah border and finally Peebles 14745 (a collection for the invasive species *Malcolmia africana*) places them “north of Wolf Hole, near Utah boundary.” Presumably they camped somewhere very close to White Dome in Washington County, Utah on May 8.

May 9, 1940 was yet another busy collecting day for Peebles and Parker. There are eight collections that seemingly started off the day, all indicating “Arizona-Utah line” as follows:

Baileya pleniradiata #14746

Krameria erecta #14747

(#14748 missing or the record not yet on-line)

Arctomecon humilis #14749

(#14750 missing or the record not yet on-line)

Psorothamnus fremontii var. *fremontii* #14751

Petalonyx parryi #14752

(#14753 missing or the record not yet on-line)

Eriogonum trichopes #14754

Acamptopappus sphaerocephalus #14755

Krascheninnikova lanata #14756

All of the species above can be found in Utah's Washington County (although none of them, other than *Arctomecon humilis* definitively places Peebles and Parker in Utah rather than in adjoining Arizona. Plants do not understand state border lines.)

A plant that commonly grows with *A. humilis* is the gypsophile *Petalonyx parryi* and which is known to co-occur with the poppy specifically in the area where Peebles & Parker collected it in an area that is roughly 6.5 miles due south of St. George. The gypsum tolerant shrub *Psorothamnus fremontii* is also an associated species of *A. humilis* and while widespread, it has been more commonly collected on the Utah rather than Arizona side of the border in this specific area (no doubt because soil with a higher gypsum content does not extend much past the border in this area). Both of these associated species of the poppy however do straddle the border.

Peebles #14757 and #14758 are then at a location eight miles south of Wolf Hole followed by #14759 thru 14764 at some 10 miles south of Wolf Hole, and so forth. Clearly their foray near the UT-AZ border had ended and they were headed back to Arizona and in fact they proceeded to Boulder Dam (later renamed Hoover Dam) in the Lake Mead National Recreation Area where their last collection was made that day.

(Note: the list above list is a combination of information from two different sources with similar but not identical information: Consortium of Intermountain Herbaria, 2018 and University of Arizona Herbarium, 2018.)

After contact was then initiated with ASU, Elizabeth Makings investigated and quickly found the missing specimen. In her communication to me she indicated that it had been filed as an ASU specimen in a North American green folder versus their Arizona manila folder. And this occurred after Jeff Brasher had reviewed the specimen for the updated Arizona Papaveraceae treatment, and had concluded, after speaking to Dr. Stanley Welsh, that the specimen was most likely collected in Utah and not Arizona. Hence it went into a different colored folder (herbariums



At the UT-AZ border (fence at right more or less representing the border line: Arizona to the right, Utah to the left) looking towards the southwestern corner of White Dome and showing where White Dome just barely touches the line entering in AZ (but poppies to my knowledge have not been found growing on the Arizona side). May 1, 2004 photo by Tony Frates



Looking south on the old River Road into Arizona; White Dome at left. May 1, 2004 photo by Tony Frates

commonly separate their specimens in folders differentiating between those found in the “home” state versus those found elsewhere). Elizabeth then made reference to the interesting notation appearing on the specimen and also that Brasher had also crossed out Mohave County on the label replacing with the Washington Co, Utah. The notation reads:

Stan Welsh tells me that Peebles surely was in UTAH when he collected it, because the habitat does not occur in AZ at all. Moreover, in 1940 he could not have known exactly where the state line was. It wasn't marked anywhere near there until much later. See also Nelson and Welsh 1993. *Rhodora* 95:197-213.

Jeff Brasher 22 Sept 1997.

On June 4, 2010, Elizabeth Makings generously provided a digitized image of Peebles and Parker #14749 (which is included with this article) and then proceeded to return the specimen to ARIZ.

Based on collection data that is now available, I am convinced that Dr. Welsh was right, and that Peebles and Parker were in Utah when they collected *Arctomecon humilis* and the location was no doubt at White Dome (which is exactly where the road north of Wolf Hole would lead), the southwestern tip of which touches the UT-AZ line. Where that occurs, there is

now a freeway (Southern Parkway, originally referred to as Southern Corridor) which parallels the state line south of White Dome, and north-south River Road which used to skirt White Dome on its western side has since been re-routed by the Utah School and Institutional Trust Lands Administration (SITLA) directly through the plant's habitat to connect with that freeway.

So does the Dwarf Bearclaw Poppy occur in Arizona?

As far as is presently known, no (and despite some extensive searching by botanists). And historically there are no plant collections that have convincingly documented it as having occurred anywhere other than in Utah.

Could it some day be found in Arizona? Of course. Plant populations are not static. A migration event could occur leading to it growing across state lines. The likelihood of that though becomes lower and lower over time due to the extensive amount of development in the area and the associated increased number of barriers to seed movement creating highly isolated populations coupled with also the disturbing downward trend of the poppy's pollinators.

Acknowledgements:

Phil Jenkins (ARIZ) and Elizabeth Makings (ASU) both provided critical information (in May/June 2010) with respect to tracking down the Peebles specimen, plus the additional research and follow-up by Elizabeth in locating the Peebles collection. And Ben Franklin provided me with the initial challenge.



White Dome habitat in Washington County, Utah (note the white-flowered poppies in bloom) looking to the S/SE into Arizona. This had been a poor year for the poppy at other locations. This area is now mostly surrounded by paved roads and other developments and is highly isolated. April 27, 2002 photo by Tony Frates

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wonka's Botany Flashback:

...from the *Daily Utah Chronicle*, SLC, Utah, December 6, 1934

Cottam Plans Addition for Botany Garden

A botanical garden with over 3,000 varieties of Utah plant life is being planned for the University campus by the botany department, according to Dr. W. P. Cottam, associate professor of botany. It will fill a long-felt need for a living collection of Utah plants, and will be one of the largest out-door collections in the country. Over 4,000 varieties of plant life may be found in the state, more than in almost any other state, and Dr. Cottam believes that more than 3,000 of them can be made to grow here on the campus.

Although started only a year ago, the present garden contains over 100 varieties of Dixie cacti and shrubbery, which proves that the semi-tropical plants of Southern Utah will grow farther north, even though unprotected from the weather.

F.E.R.A. workers throughout the state will assist in the collecting of these plants, and the actual work of planting and arranging will be done by the botany students. Rare specimens will be gathered during the annual excursions of the botany students and by others interested in botany. Much interest is being shown by local nature lovers, and if plans materialize, Utah will have one of the finest botanical gardens in the country.

Container Gardening with Native Plants

by Kipp Lee

Over the years I have read many books and articles featuring beautiful container gardens using common annuals, succulents, and perennials. I have often looked to Sunset Magazine or Western Garden Design books as sources for inspiration. I tried to get ideas for color and plant combinations and textures. The photographs featuring planters and containers were striking but I was more interested in the idea of using plants native to Utah. I looked at various plant types such as vines, flowers, trees, shrubs, succulents, and yuccas used commonly in horticulture and searched for their native equivalents. I admit I am biased toward the use of natives as I find them rather beautiful and they are well adapted to our climate. Utah is home to some of the most beautiful and diverse flowers, grasses, shrubs, and trees but integrating many of these species into horticulture has been challenging. Suppliers are few and far between and specialty nurseries are disappearing. But with a little resourcefulness, locating desired species is possible.

For those of us who love growing native plants but don't have a large space or yard, pots, planters, or containers are the next best option. More people like myself are living in apartments or smaller homes so space becomes an issue. But it is possible to create a miniature garden

on a patio, balcony, or even a hanging garden on a wall! Remarkably, many native plants take well to container culture as long as their specific needs and growing conditions are met. Factors such as lighting, watering, temperature, and growing medium (soil) all come into play when considering container culture. Looking at specific microclimates in the growing area is important—is the growing area north facing, cooler, and shady or is it south facing and an inferno during the summer months? Is it exposed to the full elements or is it afforded some protection by buildings or fences during winter?

Choosing a pot or planter is the first step. In terms of planters, I personally stay away from terracotta because it rarely lasts a year with the freeze thaw cycles of winter. If terracotta is the desired planter, one can use a sealant to prevent the pots from cracking and to make them last longer. My preferred types of pots include the glazed and colorful Malaysian pots, cement planters, and even plastic pots. These come in various shapes and sizes. There are bowl, rectangular, square, cylindrical and round shaped pots. If designing an area with multiple planters, I personally like to use odd numbers and mix different shapes and heights. Keeping in mind what you want to grow will also determine the size you will need. I also like to consider the color of the planter in my design because you can complement your plantings with floral colors. For example, a dark blue pot would look great planted with White Evening Primrose, Sulphur Buckwheat, or *Penstemon eatonii*. The primary colors complement each other. Keep in mind that smaller pots will require more frequent watering than larger one and may need extra protection in winter.

Soil is an important factor for successful container gardening. I make sure to use a good loam soil. As clay is a major soil type in the area, I often add components like



Lobelia cardinalis, *Epipactis gigantea*, *Mimulus lewisii* & *M. guttatus*.



Penstemon strictus, *P. richardsonii* & *P. eatonii*.



Pinus monophylla.



Penstemon species.



Penstemon species.



Sclerocactus.



Asclepias tuberosa and A. speciosa.

paver sand, mulch, and turface to create a soil that will hold enough water when its hot and drain enough when its wet and colder. I find using a good loam soil works the best but some species will do better in mix with more sand. Many natives have done well in a good draining potting mix. The key with using a heavily organic potting mix is that you need to keep it on the dry side in the winter because many native plants don't like to have their roots constantly wet during the winter. You also don't want to allow it to completely dry out in the winter either so a little watering is recommended during warmer dry spells. A few plants such as *Oenothera caespitosa*, some penstemons, cacti and yuccas do not like to be grown in an organic mix at all and will not survive. In short, mountain species tend to do okay in organic mixes while desert species like a good draining low organic soil. Wetland species will do well in clay soils mixed with peat and perlite. The use of a mild organic fertilizer is recommended for trees, shrubs, cacti, yuccas, and vines during the growing season. Fertilizers like Miracle Gro will kill most penstemons and desert perennials so avoid using any at all with these plants.

I like to take larger pots and use a specimen plant such as a small tree, shrub, yucca, or large cactus. This can be used as a centerpiece for several planters or displayed individually. Many of the native trees and shrubs grow slowly but may eventually outgrow the container and need to be planted out in the yard. One can also use large perennial flowers such as *Asclepias tuberosa* or Nuttall's Sunflower or a yucca plant such as *Yucca harrimaniae*.

It can be fun to create miniature gardens using plants from the same habitats. I have created container gardens featuring species from wetlands, deserts, mountains, and foothills. I currently have a large Malaysian bowl bog garden planted with *Mimulus lewisii* and *M. guttatus*, *Lobelia cardinalis*, *Epipactis gigantea*, and an

unidentified sedge. It has been growing for 2 years. Bog gardens are easy to make and maintain. They require constant moisture and some drainage to prevent stagnation. I have also created desert containers featuring native cacti such as *Echinocereus*, *Pediocactus*, *Sclerocactus*, *Grusonia*, and *Escobaria*. I have included numerous *Penstemon*, *Oenothera* and *Sedum* species, and buckwheats. These type of containers require less watering and a good draining soil.

Because plants grown in containers need a little more TLC than those in a landscape, I really pay attention to watering. When you water your containers, you aren't watering the plants, you are watering the soil. The soil is where the intake of nutrients and water uptake takes place. It is also where beneficial microrrhizae, insects, and microorganisms reside. They key is to make sure to water plants more in hotter dry months and less in cooler months. Because our winters have become warmer and drier, I recommend watering your containers as needed.

In very exposed areas, placing planters next to a building or fence during the winter can be beneficial. Insulating planters with bags of leaves may also help protect plants during periods of extreme cold. The freeze thaw cycles of winter can damage pots and plants.

Here is a list of plants I have grown successfully in containers and pots. Of course, there are many more species that would grow as well.

Trees

Pinus edulis
Pinus monophyla
Pinus longaeva
Pinus ponderosa
Acer grandidentatum
Quercus gambelii
Quercus turbinella

Shrubs

Arctostaphylos patula
Arctostaphylos ursa-urvi
Amelanchier utahensis
Cercocarpus intricatus
Cercocarpus ledifolius
Cercocarpus montanus
Chamaebatiaria millefolium
Fallugia paradoxa
Fraxinus anomala
Pershia tridentata
Ribes aureum
Salvia dorrii

Perennials

Eriogonum spp.
Sphaeralcea spp.
Penstemon caespitosus
Penstemon duchesnensis
Penstemon eatonii
Penstemon humilis
Penstemon platyphyllus
Penstemon pachyphyllus
Penstemon rydbergii
Penstemon sepalalus

Cactus

Cylindropuntia acanthocarpa
Cylindropuntia echinocarpa
Coryphantha vivipara
Opuntia erinaceae
Opuntia fragilis
Opuntia marcorhiza
Opuntia polycantha
Pediocactus simpsonii
Sclerocactus parviflorus

Grasses

Bouteloua gracilis
Leymus cinereus

Yuccas

Yucca baccata
Yucca harrimaniae
Yucca utahensis
Yucca brevifolia

Vines

Clematis ligusticifolia
Clematis occidentalis

Dorothea “Dorde” Woodruff

1/3/1928 - 7/17/18

The Utah Native Plant Society mourns the loss of longtime member and renowned cactus expert Dorde Woodruff, who passed away at her home in Holladay at the age of 90. Dorde moved to Salt Lake City in 1953 where she discovered *Opuntia* on the property she bought and that is what sparked her interest in cacti, according to Tony Frates. She went back to school in her 30's, studying under Michael Treshow and Kim Harper and earned her Master's Degree in Biology from the University of Utah in 1960.

She found *Sclerocactus pubispinus* in 1960, which started her work with Lyman Benson, (known for his authoritative work “Cacti of the United States and Canada”), co-authoring several Sclerocacti with him. In 1961, she discovered another new sclerocactus, which Benson named *Sclerocactus wrightiae* after her in 1966 (based on a previous married name).

Dorde also did much work in botany in general, collecting thousands of herbarium specimens and spent countless hours doing field work for various studies for the BLM and other agencies all over the state, but especially western Utah and the Uinta Basin. She made contributions to the “Guide to the Woody Plants of Utah” by Michael Treshow, et



al., “Woody Plants of Utah,” by Renée Van Buren, et al., the first “Utah Flora” treatment of Cactaceae, was a reviewer/ contributor to the “Intermountain Flora” section on Sclerocacti, to the “Cacti of Arizona” by Lyman Benson and others.

We were fortunate to have many articles contributed by

Dorde to this very newsletter and she also spoke numerous times to the Salt Lake Chapter of the Utah Native Plant Society. She was an incredibly knowledgeable woman on the subject of cacti and her absence will be sorely felt by us all.

Obituary Published in Salt Lake Tribune on July 28, 2018

1-3-1928 ~ 7-17-2018

Dorde loved so many things, and lived for so many things. She was a beacon of strength who redefined beauty and brains, and an exquisite mix of brave fierceness and gentle grace. She was a collector of mysteries: she would ply them and know them, then joyfully dole them out like gifts to her family and friends. She was an explorer and an adventurer. She lived the journey. She loved the journey.

Raised in Chicago and educated at Carlton College and Northwestern University, she ventured west while still in her 20's with her husband Robert H. Wright when the Midwest proved to be too tame. She and Bob loved the wildness of the West. She took the landscapes of Utah - swift rivers, towering mountains, deep sandstone canyons, and most of all her beloved deserts - into her heart and made them her own with a loyalty that could only have been created in the wildfires of the soul. By horseback or by river raft, by jeep, sailboat, or on foot, with family or with friends or even alone, she went about the serious lifetime business of exploring as much of her splendid adopted state as she could grasp.

She raised four children in Utah: daughters who from the beginning carried in them her passion for knowledge, her love of all wild and living things, her longing for the landscapes, her appreciation for diverse lands and peoples, and her compassion for the frailties inherent in the beauty of all these things.

As her children grew older, she studied at the University of Utah in order to obtain an advanced degree in botany. She was a scientist at heart, and pursued her study of cacti with her characteristic arc towards excellence. In doing so, she discovered a previously unrecognized species of cactus that was ultimately named after her. Often in her desert research, she packed in on dirt bikes in order to reach the more remote areas. And so she discovered the path to her second career - that of a motojournalist. She was unfazed by the scarcity of women in that field at the time. Taking demo bikes of all sizes and dispositions in order to write about them for various publications, she made long sweeping motorcycle trips across many corners of this country, often with her children or later her grandchildren in tow. When she got married a second time to James E. Olive, they would ride motorcycles and explore the unknown lands together.

She made the extraordinary seem normal. Her grandchildren grew up thinking it was an everyday adventure to explore the desert in your grandma's sidecar. Traveling with her made you think that every dirt road led to a place of beauty. It was a common outing for the family to comb the meadows of the high Uintas in search of medicinal plants. Admirers of her work would visit from as far away as Germany to learn about the little sclerocactus she discovered and researched throughout the many decades of her life. Even into her late eighties she would drive her beloved desert backroads, often camping alone in search of beauty and solace. Once, when her little truck broke down many miles from any paved roads, to get help she flagged down a train.

In the end she rested quietly at home, in her house with the little forest around it that she had created, with her husband and her sister and her children and her grandchildren and her great-grandchildren. They sat at her bedside and held her hand and stroked her hair and sang to her and told her it was okay to let go. At 3:00 am on July 17, 2018 her heart - this heart, which had been so strong and wild and passionate and full of love for ninety years - beat one last time, and was still.

A Celebration of Life will be held on Saturday, August 4th, 2018 at 2:00 pm at the South Valley Unitarian Universalist Society located at 6876 Highland Drive, Cottonwood Heights, UT, 84121. Everyone is welcome.



Return to Bald Mountain

by Bill King

The UNPS Salt Lake Chapter went on a field trip to Bald Mountain in the Western Uinta Mountains on the Mirror Lake Highway, UT #150, on June 24, 2018. Twenty hardy souls joined us for the field trip to Bald Mountain on a picture perfect crisp day including some of the state's best amateur plant hunters and a few professionals, too. It is a 65 mile drive to the parking lot at the trailhead for Bald Mountain from Salt Lake City. Bald Mountain Pass is the highest paved road in Utah and peaks out at 10,715 feet, which puts you conveniently right in the subalpine life zone when you open the door and not far up the mountain to the krummholz (elfin woods) and alpine zone. Bald Mountain is unique in another way, it is the pinnacle of four river drainages that go in all directions. It is also at the western edge of the Uinta Mountains that run more than 100 miles east to west. Most western mountain ranges run north to south. We stopped along the way on the Mirror Lake Highway (Utah Hwy. 150) at the mile marker 16 to hunt for *Calypso bulbosa*, the Fairy slipper orchid and to have a look at the remnant montane life zone.

We dusted off an old plant species list for Bald Mountain that some of us had used for the 1996 North American Rock Garden Society international meeting. It was the product of three summers of field work at Bald Mountain by plant enthusiasts from around the US and included many knowledgeable people including the late Elizabeth Neese. The *Utah Flora*, *Utah Atlas*, *Intermountain Flora* and *Uinta Basin Flora* were all consulted. Also a plant list by Ben Franklin for nearby Murdock Mountain was also reviewed. We expected the list to still be of value but new genetic work on many of the families on the list has changed much of the nomenclature. Bill Gray volunteered to bring the names on the list up closer to today's standards based on what appears to be the current consensus. Thus our beloved Penstemon are no longer seen as Scrophs or Figworts but rather have been lumped in with parking lot weeds, the Plantain Family.

At the Trial Lake Snotel site at almost 10,000 feet elevation, just below Bald Mountain, the snowpack and precipitation from October 1, 2017 to June 12, 2018 was about 65 % of normal and as a result, the site melted out on May 24, 2018, eighteen days earlier than normal. On melt out day at these high elevation sites, the snow and exposed dirt are patchy and the snow melt plants like erythronium, ranunculus and claytonia are just starting to bloom. They pre-form flowers in the fall and are ready

to go at the first sight of spring. But for most of the alpine plants they must grow to flowering and it usually takes another four to eight weeks after melt out. We made two scouting trips before the main field trip to ensure that there would be enough of interest blooming on June 24 which, in a normal year would have been too early. Bill Gray also did some scouting.

We stopped near the mile 16 marker in a fragmented lodgepole pine community and searched for the mystical Fairy Slipper Orchid, *Calypso bulbosa*. We have stopped at this location almost every year since 1993 and some years more than once to look for the orchid. We have seen it there four times on the north side of the road and once on the south side making a batting average per year of about 20%, but have not seen it there recently. Bill Gray had spotted it at another nearby location, nearer the Shady Dell campground, on two out of five years or about 40% of the time. In any event, the odds were a bit against us.

Calypso is a circumboreal species and grows mostly in shaded conifer forests in the boreal region around the world. In the Uintas it mostly grows in lodgepole pine and spruce-fir communities but has also sometimes been seen in aspen, ponderosa or sagebrush at an elevation of 5900 to 9500 feet. Common understory associated species include wild strawberry (*Fragaria vesca*) Starry Solomon's seal (*Maianthemum stellatum*), Wintergreen (*Pyrola virens*), Pipsissewa (*Chimaphila umbellata*), Whortleberry (*Vaccinium* spp.), moss and Coralroot orchids (*Corallorhiza* spp). While we found all of the associated species at mile 16 marker and nearby, we did not find the Calypso. It may have been that it was too dry this year or the many impacts that this area has sustained over the years have taken their toll. We did find many spotted coralroot orchids (*Corallorhiza maculata*) and the albino form of the spotted coralroot that has no purplish pigment and is quite yellow. We also found a nice stand of the white bog orchid (*Platanthera dilatata*) nearer the Provo river. Marv Paulson reported that Calypso is common in other parts of the Uintas on moist years, we will have to try another year, what a sight that must be.

At Bald Mountain, many made it to the peak at 11,943 feet, a 2.6 mile round trip. We recorded a total of 68 plant species, 52 on Bill Gray's list of the upper mountain and 15 additional on Cathy King's list of the lower meadow. The Stireman brothers, John and Tony, spent their time hunting on the edge of the krummholz for the rumored

Eritrichium nanum. One plant of it had been reported there at the 1996 meeting. And find it they did. It had a light blue corolla not quite as pretty as the sky blue eritrichium found in the Colorado mountains. Bill Gray also found *Lewisia triphylla*, which is on the UNPS Watch list, that was not on the old plant list, bringing the old list up to 200 species. Jonathan Barth reported that his favorite on the upper mountain were all the tiny bun plants.

In the lower meadow, the three of us that had chosen not to go up the mountain had a wonderful time exploring the small ponds and meadows. The early bloomers, Marsh Marigold, *Caltha leptosepala* and Spring Beauty, *Claytonia lanceolata*, had already gone over the top but the common Blue Violet, *Viola adunca*, had taken over the show. It outlined in bright blue the edges of rocks, logs and trails. Never have we seen the violet so prolific.

Three different species of Lousewort, *Pedicularis*, were just starting their turn. It was a glorious day at Bald Mountain wherever you chose to go.

We would like to thank Wayne Padgett and Bill Gray for their help on this field trip and the other two Salt Lake Chapter field trips this summer. It is wonderful to have two experienced and knowledgeable leaders along on the trips and willing to spend their time and energy to make these trips a great success.

Plant lists are located on the UNPS website:

<http://www.unps.org/plantlists/BaldMountainPlantList06242018.pdf>

<http://www.unps.org/plantlists/BaldMountainFieldTrip06242018.pdf>

UNPS Field Trips 2018: Fast and Furious Two

by Wayne Padgett

The wildflower season of 2018 came fast and at an unrelenting rate. By all accounts, we had a fun and successful summertime of wildflower viewing in northern Utah. We started near Strawberry Reservoir looking for prairie smoke (*Geum triflorum*), among numerous other plants. We then hit the Mirror Lake Highway and Bald Mountain looking at a tremendous variety of alpine and subalpine species with the leadership of Bill King. Bill Gray then led us to Mary Ellen Gulch, off the backside of Snowbird Ski Area, to see the alpine collomia (*Collomia debilis*) among other beauties. Bill King will be writing an article about our trip east of Kamas, so I'm leaving that to him.

Strawberry Reservoir and Surrounds

Our trip to strawberry reservoir started along the Strawberry River, where conditions were a bit drier than they had been in previous years. We were still able to see most of what we came for including the prairie smoke (Fig. 1), which in past years was quite abundant. In addition, we were able to see small camas (*Camassia quamash*; Fig. 2), and diffuseflower evening primrose (*Camissonia subacaulis*; Fig. 3) among others. We then made a quick stop to see Drummond's milkvetch (*Astragalus drummondii*; Fig. 4) along the road on the west side of Strawberry Reservoir. This was a stop primarily for those who had been on the various field trips that had focused on milkvetch species of northern Utah. We ended the trip with a hike up a Forest Service Road near the southwest end of Strawberry Reservoir

that included everything from mountain big sagebrush, to riparian and aspen plant communities. And a good time was had by all.

Mary Ellen Gulch and Alpine Collomia

This trip included a ride on the Snowbird Ski Area tram to the top of Hidden Peak, followed by a good hike down to Mary Ellen Gulch in Utah County, then back to the tunnel through the ski area from Utah to Salt Lake County, then a fun ride down the Peruvian chair lift. Some hearty souls actually hiked up to the top of Hidden Peak from the bottom of the ski area, but I'm just not that strong!

Our main goal of this hike was to see the alpine collomia (Fig. 5). While not a rare plant it does tend to occur in or near alpine habitats in Oregon, Washington, Idaho, Montana, western Wyoming, Nevada, and Utah. In Utah, it is only known to occur in Salt Lake, Utah, Wasatch and Juab Counties. And, it is a beauty! Growing with it and nearby were several other lovely species. Cordroot beardtongue (*Penstemon montanus*; Fig. 6), Jacob's ladder (*Polemonium pulcherrimum*; Fig. 7), and dwarf mountain ragwort (*Senecio fremontii*; Fig. 8) were just a few of the many, many species we saw.

As a postscript on the Mary Ellen Gulch trip, Bill Gray returned there on July 23rd, hiking over from Albion Basin. Flowers were wonderful, with over 100 seen in bloom. Surprisingly the *Collomia debilis* was still blooming, so it puts on a display over at least 4 weeks. *En route* he found *Ivesia utahensis* in flower near Germania Pass, making up for its not being found on

Bald Mountain earlier.

All in all, it was a good year for wildflowers. Not the best, but certainly worth every minute at every destination of the 2018 UNPS field trips. The dry spring and summer did not make for the most spectacular viewing, but it was still a fine time for those that joined us on the three sponsored trips. We hope you all got out

on your own and were able to spend some time outside looking at the beauty of Utah wildflowers. We look forward to new adventures and new wildflower sites next year!

Snowbird Plant List on UNPS website:

<http://www.unps.org/plantlists/SnowbirdFieldTrip06242018.pdf>



Figure 1. Prairie Smoke (*Geum triflorum*) growing along the drier edges of the meadows adjacent to the Strawberry River, was less abundant than in previous years, but still a nice site to see.

Figure 2. Small camas (*Camassia quamash*) was near the end of its flowering season for 2018.

Figure 3. Diffuse flower evening primrose (*Camissonia subacaulis*) was scattered beneath some of the larger wildflowers and grasses in the meadow.

Figure 4. Drummond's milkvetch (*Astragalus drummondii*) is not abundant, but occurs along the roadside on the west side of Strawberry Reservoir.

Figure 5. Alpine collomia (*Collomia debilis*) is not a very common species in Utah, but where it grows, it's spectacular.

Figure 6. Cordroot beardtongue (*Penstemon montanus*) is another species that occurs in alpine habitats, often with alpine collomia.

Figure 7. Jacob's ladder (*Polemonium pulcherrimum*) occurs in all western states and is always a nice find.

Figure 8. Dwarf mountain ragwort (*Senecio fremontii*) is shown here next to alpine collomia.

Two Canyonlands Chapter Workshops in Summer 2018

by Diane Ackerman & Mary O'Brian

This summer the Canyonlands chapter of Utah Native Plant Society received a special treat. We have been hosting grass identification workshops for our members in partnership with Mary O'Brien of Grand Canyon Trust over the past several years. But in May of this year wildflowers got their turn. We were delighted when Al Schneider, noted for his website www.swcoloradowildflowers.com, enlightened us on how to use a plant key, using *A Utah Flora*. We are grateful that such a well-known plant expert in our region is a member of the Canyonlands chapter. He presented us with several copies of the book donated to our group by Dr. Stanley Welsh. We were also grateful to USU-Moab, which donated their staff and classroom for the first day of a two-day workshop. The second day found us perched in a pod of shade on the ground surrounded by a light breeze as we worked our way through several species, including the tough (to identify) little *Erigeron pumilus* var. *concinus*.

Al captures the tone of the workshop with this post-event missive to his students: "I sure hope our two-day workshop added considerably to your plant knowledge. As you are (perhaps painfully) aware, I did not try to tell you that identifying plants is a snap. It is a real mental challenge combining the skills of a puzzle-solver, an English interpreter, a doubter, and a researcher—all

with unending patience and devotion. Is it worth it? I hope you think so. I love it. I love the leg work and the brain work that go into finding and understanding plants."

Yes, Al, I think we all agree how we can be carried away not only with the beauty and diversity of the plant world, but also with the skills and tenacity that identifying those plants entails.

And back by popular demand, on June 9 Mimi Trudeau offered the one-day grass identification workshop that she has offered annually since 2015. A horticultural teacher by background, Mimi moved to the Moab area in 2013 from New York. Following a Bad Ass Botanist training with Grand Canyon Trust, she decided to learn every grass she met in southern Utah. Through her ability to identify a grass that has been chewed down to two inches, Mimi has become a major support of the Trust's field work on aspen restoration and grazing reform.

Mimi's infectious enthusiasm for grasses and her ability to convince workshop participants that they, too, can really see (and love) key differences between grass species – exotic and native – leads to annual requests for her workshop in Castle Valley. In 2019, Mimi will lead a 2-day trip up in the La Sal Mountains for those who have attended her grass workshop here in Castle Valley.

The Canyonlands chapter is grateful not only for native plants, but also for Al Schneider and Mimi Trudeau – teachers extraordinaire.

Report for the Utah Valley Chapter:

The Utah Valley chapter had a very successful "Purge Your Spurge" event in April, which was co-sponsored by Provo City. Provo city residents were educated about the threat of this class IV weed and were encouraged to pull spurge from their properties in exchange for Utah native plants. We had a wonderful turnout with 68 trash bags of spurge pulled.

Special thanks to Perennial Favorites Nursery who donated plants for the event, as well as Great Basin Natives of Holden, UT. Also, thanks goes to the Provo City Parks Department for their help in organizing and advertising for the event, as well as for volunteer students from UVU, in particular prospective Environmental Studies major Erin Call who surveyed neighborhoods in the east of the city and made a map of all the spurge populations there for reference in future control and education efforts for Provo City.

UV Chapter also participated in an outing at the beginning of July walking around the trails at Cascade Springs on the Alpine Loop Road. Many thanks to those who participated, especially Andrey Zharkikh for sharing his plant ID list from the event which is posted on our chapter's Facebook page.

For information on future events for our chapter, check our Facebook page for announcements at <https://www.facebook.com/UVUNPS>.



68 bags of spurge pulled.

Common Southwestern Native Plants

a new book review by Bill King

Our friends at the Colorado Native Plant Society sent us over a sample copy of a book: "Common Southwestern Native Plants, An Identification Guide," third edition, enlarged and revised, 2018. The book was previously published in 2003 and 2009. The society has helped sponsor this new book and is its' publisher and distributor, a very large undertaking. It is primarily the product of Jack L. Carter and his wife Martha A. Carter. Jack is a retired Colorado College biology professor. They were joined by Donna Stevens, who helped gather much of the information and edit the book and Jennifer Boussetol a PhD horticulturist. Many others assisted with the book and are given credit. The book is 278 pages of wonderful high gloss pictures and prose covering 128 woody and 64 herbaceous common plants of the southwestern United States. The book was printed in Korea and was funded by a generous grant from the Terra Foundation. "Southwest" is defined as much of southern Utah and Colorado as well as most of Arizona and all of New Mexico. The western tips of Oklahoma and Texas are also included and a small section of southeastern California.

The book is divided up by sections covering Gymnosperms, Trees, Small Trees and Shrubs, Shrubs, Vines, Cacti, Agaves and Their Allies and Herbaceous Plants. This is an unusual organizational style for a guide book but seems to work. Each species in all sections, except for the herbaceous plants, include fine line drawings and good to excellent photos, as well as some enlargements of important characteristics. The herbaceous section only has a single photo of each species and no line drawings. While the photos and line drawings are from many different people, a high standard of quality is consistent. However, the techniques used in execution vary somewhat and comparison between the plants is hindered. The book is well indexed with separate indexes for common and scientific names. References for further study are also provided.

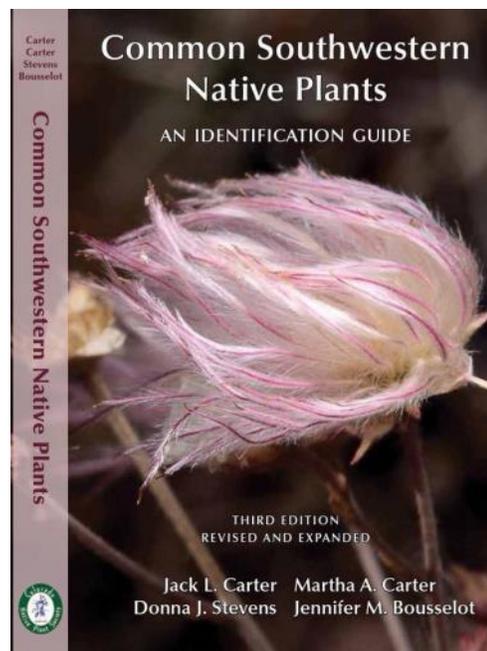
Each plant has a written description, distribution and habitat. For the most part these characteristics are of a non-technical, easy to understand language. For the botanical speciality words that are used, a glossary and Illustrated glossary are provided in back. Both scientific and common plant names are provided. Scientific plant names have been updated from previous editions. The distribution of each plant is given by which state they

are present. Included in the habitat is the elevation range given in feet and meters. Sidebars of interesting facts about most species are also provided. This includes but is not limited to uses of the plant by man or animal for food or medicine, biggest or tallest known tree of a species, horticulture uses or a bit about the person who discovered the plant or for whom the plant was named.

The strongest and most useful part of the book is that of trees and shrubs, a speciality of Jack Carter. While the third edition was strengthened by the addition of 25 more herbaceous plants than previous editions bringing the total to 64, the total is still relatively small in comparison to the the many hundreds of common herbaceous plants in such a large area. I was also surprised to find two cactus listed in the herbaceous section rather than in the section on cactus.

This book seems to be designed primarily for the beginner but has much information that may be useful to even the most advanced plant enthusiast. The book is 6 by 9 inches and weighs 1.4 pounds and will easily fit in your backpack when hiking in the southwest or it should make a fine reference book for your library. It is available from the Colorado Native Plant Society, contact Jen at 720-810-5748 or CoNPSpromote@gmail.com. It is available for \$12 at wholesale in multiples of 5. Compared with other guidebooks on the retail market, it is a \$20 to \$25 value.

The Colorado Native Plant Society is to be congratulated for helping to bring this very useful book back to the market.



Your Membership

Your membership is vital to the Utah Native Plant Society. It is important that your information is correct and up to date for notifications and the delivery of The Sego Lily newsletter. Susan Sims is our UNPS Membership Committee. You may direct any questions about and updates to your information to Susan at: membership@unps.org

WANTED: Membership Person

UNPS is looking for a **volunteer membership assistant** to keep membership records. Some data-base entry helpful, but will train. Contact Susan Sims, shsims@mac.com



Utah Native Plant Society

Utah Native Plant Society
PO Box 520041
Salt Lake City, UT, 84152-0041.

To contact an officer or committee chair write to

Webmaster: unps@unps.org

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Publications: Cathy King

Website/Internet: Tony Frates

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Salt Lake: Cathy King

Southwestern/Bearclaw Poppy:

Utah Valley: Susan Sims

Website: For late-breaking news, the UNPS store (posters, etc.), the *Sego Lily* archives, Chapter events, sources of native plants, the digital Utah Rare Plant Field Guide at unps.org.

Webmaster inquiries at unps@unps.org

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Sego Lily Editors: John Stireman jstireman@outlook.com
Cathy King: cathy.king@gmail.com

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Submit articles to Cathy King:
cathy.king@gmail.com

UNPS Chapter Map



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