



# Sego Lily

Newsletter of the Utah Native Plant Society

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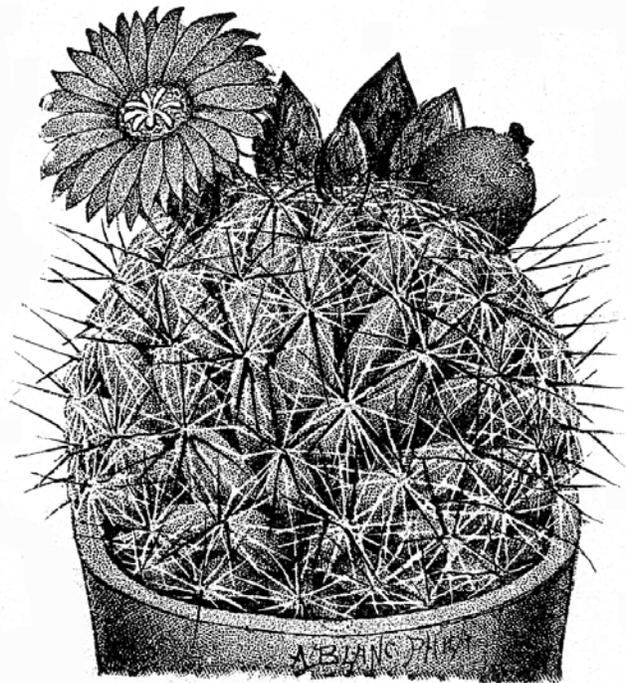
## Exploitation of Utah Cacti Began Early

By Dorde Woodruff

Land managers often debate how often cacti are taken from public lands. Some cases are obvious and notorious. For instance, in May of 1999 the BLM marked with pin flags plants of *Sclerocactus wrightiae*, a plant listed since 1979 as threatened under the Endangered Species Act, to protect them from mining activity on a proposed project to mine fossilized oyster shell. In the spring of 2000, the BLM revisited the site and saw that the marked cacti had been dug up. Shallow holes remained at the pin flags. At least 47 plants were taken. Relevant to this kind of activity, Beckee Mcgown of the Fish and Wildlife Service made a rule this year that pin flags used to mark *Sclerocactus brevispinus* and *S. wetlandicus* in the Vernal oil and gas area had to be removed by nightfall, even if they then had to be replaced to protect the plants from later activities.

Another debate is whether raising plants of listed species from seed and making them available to cactophiles causes them to be less likely to be taken from the wild. Many conservation documents counsel that this should be done. Probably the answer to this particular debate is that some people will act ethically and some will not.

Steve Brack, a prominent cactus plant grower and seed provider who was recently featured in an Associated Press article (see for instance the *Deseret News* webpage <http://deseretnews.com/dn/view2/1,4382,695198218,00.html?textfield=cacti>) says that once seeds for a certain species get into a country, or an area such as Europe, then local cactophiles *Continued on page 6*



*Above: Mamillaria montana (now Coryphantha vivipara) from page 72 of the Blanc catalogue. This is a better representation than many in the illustrated catalogue of cactus specimens, but the buds and fruit are noticeably too big.*

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## Utah Native Plant Society



## Utah Native Plant Society

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**Many thanks to Xmission for sponsoring our website.**

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)

*Sego 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 January 2008 *Sego Lily* is 15 December 2007.

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## Chapter News

### Fremont (Richfield Area):

This has been a busy summer for the Fremont Chapter. In July, the group met for an overnight camp-out at Mt. Terrel Ranger Station. The weather was perfect, despite numerous fires in the area. This was the season of the wildflower. Saturday morning after breakfast, chapter members took a long, leisurely walk through the nearby meadows observing the magnificent plethora of flowers. Maria Ulloa, BLM Botanist, led the group and helped with plant identification.

The Fremont Indian State Park has been another site of intense activity by the Fremont Chapter. Ron Parsons, Vice President of the chapter, has established a cooperative arrangement with Park authorities to assist in the

landscaping of a new public camp site in Sam Stowe Canyon. The canyon is east of the park headquarters where spectacular cliffs, hiking trails, camp sites and a stream will provide a favorite outdoor camping area. The park staff has already built two large group pavillions, 5 tent pads, 5 back-in trailer sites with full hook-ups, restrooms and showers. Our chapter is assisting with planting and maintaining native shrubs, trees and flowers. So far we have planted native grasses and wild flowers around the tent pads. We have also planted Rocky Mountain junipers, choke cherries, fruitless mulberry trees and hackberry trees. Members have spent many hours raking, cleaning and leveling these areas. We drive to the canyon regularly to water the young plants until they are established.

On the agenda for the Sam Stowe project is a proposed Heri-

tage Garden south of one of the pavillions. We hope to have this 1,000-square-foot garden planted before winter. It will be another great spot to showcase native plants. - *Janet Nielson*

### Manzanita (Kane County):

Carolyn Shelton of the Grand Staircase-Escalante NM will be the speaker for our 6 November meeting. She will present 'Sex in the Garden II', a sequel to her award-winning one-woman show from a few years ago. Carolyn promises clean, wholesome, family-oriented entertainment. Noted landscape architect Tim Clarke from Boulder, UT will be speaking on December 4<sup>th</sup> on designing with native plants. Our meetings are held in the public conference room of the Grand Staircase-Escalante NM visitor center (on Hwy 89 E of historic downtown Kanab, next to Walkers truck stop) at 7 PM, followed by a dessert social. — *Walter Fertig*

**Salt Lake:** On September 7, we had a potluck social at the Sugarhouse Garden Center with the Wasatch Rock Garden Society. Besides the wonderful food, we enjoyed several slide shows of native wildflowers and cacti taken by various members during the summer.

The Salt Lake Chapter hosted a booth for the Garden Fair at the Jordan Valley Water Conservancy District Demonstration Garden on September 8. The event was well attended and we provided information on native plants and invasive species. The chapter raised \$70 at the event!

Maggie Wolf recently held 4 native plant propagation workshops in which native plants grown from seed were sold. The classes brought in over \$530 to the chapter. Way to go Maggie!

The Salt Lake Chapter is in desperate need of an event coordinator to help organize topics and speakers for chapter meetings (generally 7 per year) and 2 fundraising events. If you would like to help or know someone you would like to nominate, please contact me at [kipp\\_lee@comcast.net](mailto:kipp_lee@comcast.net) or call 759-6204. - *Kipp Lee*

**Utah Valley (Utah CO):** On October 13th, Utah Valley Chapter added a new Heritage Garden designed by Bitsy Schultz. This new garden is located at Central Utah Water Conservancy District on 355 W University in Orem, UT. The aim of the garden is to show people in Utah how they can use native plants in their own yards and save water as well. The garden has 3 water zones--medium, low and very low. It has a pretty sophisticated irrigation system, installed by Allstate Construction. The slope of the area really highlights the wonderful array of plants; my personal favorites are the buckwheats that grace the southwest corner of the garden. You can easily stroll through the garden, despite some steep slopes thanks to Bratt Lansdaping that put in

the retaining walls and walks.

Susan Meyer, Bitsy Schultz, Tamara Bahr, Denise Van-Keuren, Gloria Perry, Randall Nish, Celeste Kennard, Tim Hannis, Kim Despain, Megan Guenter, Casey Finlinson and Dennis Wilson braved the rainy weather to plant about 500 plants. It was fun to get together and work again with some old friends and new faces. Megan Guenter of UCWCD was impressed with the hardiness of our volunteers that worked in the wet sand and mud. At the end we enjoyed treats and awarded the muddiest pants title to Susan Meyer. The garden looks out over Utah Lake and promises to be a nice spot to enjoy the amazing plant palate that Utah's natives offer.

While we were planting we talked about the other gardens that we have put in over the years. We talked about all the great gardens that got planted with a big bang. We lamented the demise of the gardens that did not have a committed person that took ownership of them. It is one thing to put in a garden but the test comes in maintaining it. In that spirit we ask that everyone who has helped put in a garden visit and tend the garden that is near to them. We would also so like to thank IN-PGA members--Susan Meyer, Janett Warner, Brad Soelberg, and Tim Hannis for growing the plants for the garden.

#### Ongoing Activities

On Tuesday afternoons between 2-4:30 PM, join Bitsy and the students of Wasatch Elementary (1040 N. 900 E.) as they take care of the native plant garden. Call Bitsy at 423-2603 if you would like to help.

On Wednesdays at 10:00 am join Celeste Kennard and her children for native plant adventures at a toddler pace in Utah County. Luckily a toddler pace is about the same as botanist pace, so it's a great chance to look at beautiful fall scenery. We also

have hikes planned for the South Fork of Provo Canyon, Rock Canyon and Battle Creek Canyon. We also have talked about going sledding near Aspen Grove once the snow falls.

For questions regarding any of these activities please contact me at (801)377-5918 or e-mail [celeste.p.kennard@gmail.com](mailto:celeste.p.kennard@gmail.com).—  
*Celeste Kennard*

## President's Corner: Additional Thoughts on the Annual Meeting

It was a real pleasure to acknowledge the dedication of retiring board members Winnie Washburn and Jackie Freshwater who worked hard in so many ways to benefit the Society. In particular, Winnie was a driving force behind the Escalante Chapter's growth. Special thanks were also extended to Walt Fertig who has transformed the *Sego Lily* into a first-rate newsletter over this past year, and to Tony Frates who continues to man the website and put in countless hours of work on conservation issues.

We elected a new board of directors for the coming year. Our official slate consisted of seventeen continuing members (see list on page 2) plus two new nominees, Maria Ulloa and Leila Shultz. Charlene Homan was nominated from the floor by Maggie Wolf, and seconded. The members present voted unanimously to confirm the nominations.

Maria has been very active in helping to get the Fremont Chapter established, one of our significant events this year. She is a botanist with the BLM's Richfield office. Leila has served previously on the board, and has just retired from the Floristics Laboratory after many years as a leading researcher into Utah's native flora. Charlene is a master gardener who has worked in local conservation ecology and education at Utah Museum of Natural History. — *Bill Gray*

## UNPS Annual Meeting and New World Potluck

By Mindy Wheeler

Due to inclement weather, Saturday the 20<sup>th</sup> of October wasn't the best day to travel or tour native gardens, yet several dozen native plant lovers came out to the Central Utah Water Conservancy in Orem for a potluck and a great presentation. The turkey was incredibly moist (thanks Celeste!) and all the various trimmings and desserts were delicious!

After complete satiation for all, everyone ambled across the hall for Dr. Susan Meyer's presentation on a retrospective of the last ten years of working (volunteering, really) as a native plant advocate.

It turns out it all started as a result of feeling a bit disconnected from the community at large, as Susan interfaced with the same few people every day. This put Susan into motion to seek out those in the community that loved native plants as she does, and decided a 'Utah Native Plant Forum' was the way to do it. The event was quickly organized in 1997 and about 200 native plant enthusiasts and scientists showed up. The energy and enthusiasm generated from this meeting began the next 10 years of rediscovering the many wonders of Utah's native plants and the plethora of people that shared Susan's passion.

Many of these 200 people thought that Utah's native plants needed the appreciation and respect of the every day gardener. Susan and others noted that once a native plant is placed in a garden, it no longer bears the label of being that 'weed' on the hillside. Thus, the 'Utah Heritage Garden' program was born out of this newfound respect and appreciation of Utah's native plants. After finding and engaging the right people about native plants, the first Heritage Garden was installed at Wasatch Elementary in Provo almost 10 years ago. This beautiful Heritage Garden in Provo began a flurry of interest and demand for



*Above: Susan Meyer displays her plaque and looks stylish in a native plant t-shirt. Photo by Mindy Wheeler.*

Heritage Gardens across the state. Susan estimates that she grew about 50,000 plants for these various gardens and between her and Bitsy Schultz, they spent countless volunteer hours helping various institutions, schools, and municipalities with the design and installation of these gardens. Throughout this process, Susan and Bitsy discovered that institutional support is critical for the maintenance of these gardens. In some cases, unfortunately, this was learned the hard way as some Heritage Gardens have languished over the years from lack of support and maintenance. Both Susan and Bitsy can now sense true support for a Heritage Garden when they receive inquiries and carefully choose where they put their energy. Heritage Gardens are now under way at the Utah Botanical Center, Red Butte Gardens, the Conservation Garden Park, and a virtual garden on Central Utah Water Conservancy's web site.

In the midst of the Heritage Garden bustle, the native plant propagation workshops were also instigated to teach more people about native plant characteristics and cultivation. Susan estimated about 900 people attended these workshops over the 5 years she was teaching them.

However, Susan soon remembered that she indeed still had a full time job as a prolific research scientist at the USFS Shrub Sci-

ences Laboratory in Provo. She encouraged the Utah State University Extension to step in to organize the propagation workshops to assure their longevity. Maggie Wolf of the Salt Lake County extension office just recently completed 3 of these workshops.

In essence, Susan and Bitsy increased the interest in Utah's native plants (with a little help from a 5 year drought) to the point where an organized effort was needed to assure the public could continue to acquire these drought hardy native plants for their yards. Roger Kjelogren, Janette Warner and Susan began what soon became the Intermountain Native Plant Growers Association (INPGA). INPGA hosts a program called Utah's Choice ([www.utahschoice.org](http://www.utahschoice.org)), which "effectively markets Intermountain native plants and educates consumers about the benefits of choosing native plants for their landscapes. The program focuses on providing the best native plants for horticultural use, increasing their availability, and making sure that consumers have the information they need to be successful cultivating these plants." Forty-two native plants are now being marketed under this program, with potentially more in the near future. INPGA now has 85 members (mostly businesses) from 5 states.

Through all of these efforts, Susan continues to increase interest in our native botanical heritage and continues to promote the Utah Native Plant Society. We are all grateful to her (including the plants themselves!), and the UNPS board thought it only appropriate to present her with a token of our appreciation and esteem!

The plaque states "The Utah Native Plant Society hereby honors Susan Meyer in appreciation of your dedication to the botany, horticulture and ecological research regarding Utah's native plants. Here's to a great native plant advocate and a wonderful person! Thanks Susan!"

## Postscript\*:

### USFWS Decision Keeps ESA Protection for Three Uinta Basin Sclerocacti

On September 18, the US Fish and Wildlife Service made a final ruling on a petition filed by the Center for Native Ecosystems and the Utah Native Plant Society to list the Pariette cactus (*Sclerocactus brevispinus*) as Endangered under the US Endangered Species Act. The Service acknowledged that listing this tiny cactus, known from a single main population in the Uinta Basin of northeastern Utah with less than 4,000 individuals, was warranted due to threats from on-going energy development, over-collection, and other factors. However, the service is precluded from moving forward with listing due to budget constraints and because other listing actions are considered a higher priority.

In a companion decision, USFWS announced a proposal to recognize and protect three segregate *Sclerocactus* taxa that have traditionally been treated within the single species, *S. glaucus* (Uinta Basin hookless cactus). In 2004, *S. glaucus* was split into three species following the taxonomic revision published in volume 4 of the *Flora of North America*. The segregates include Pariette cactus and Ouray cactus (*S. wetlandicus*), both endemic to Utah, and *S. glaucus* “*sensu stricto*”, now limited to northwest Colorado. Since all three taxa were considered part of *S. glaucus* when it was listed as Threatened in 1979, the Service is proposing to retain Threatened status for each of the segregate species.

USFWS is seeking public comments on the merits of these proposed taxonomic changes until November 19, 2007. Comments can be sent to: Field Supervisor, U.S. Fish and Wildlife Service, 2369 Orton Circle, Suite 50, West Valley City, Utah 84119 or by email to: fw6\_sclerocactus@fws.gov.



Above: *Pariette cactus* (*Sclerocactus brevispinus*) by Dorde Woodruff.

If approved, the new decision by USFWS will provide ESA protection for Pariette cactus (as a Threatened species) until such time as the Service can complete a rule to list it as Endangered.

The proponents of the listing petition for *S. brevispinus* are pleased with the turn of events. "This decision is long overdue and will ultimately provide the Pariette cactus with the separate recognition and protection it deserves," says Tony Frates, Conservation Co-Chair for the Utah Native Plant Society. "The Pariette cactus is in danger of becoming extinct, and needs to be separately listed as Endangered as quickly as possible in light of extensive oil and gas development that exists throughout its extremely limited habitat which must also be protected."

But the Pariette cactus remains vulnerable. In 2005, the Bureau of Land Management approved over 900 oil and gas wells near the core of the Pariette cactus' range. Rec-

ognizing the species as its own entity will make it easier for agencies to analyze potential ill effects on the unique *S. brevispinus* populations. Agencies will no longer be able to average out cumulative effects over the range of all three species—basically justifying the loss of some habitat if other populations are maintained.

"The BLM needs to rethink its decision to drill the Pariette cactus into extinction," says Jeremy Nichols, Conservation Director with the Center for Native Ecosystems. "We can have oil and gas drilling, but it needs to be done right. Doing it right means safeguarding native wildlife, fish, and plants from extinction." - compiled by Walter Fertig from USFWS and UNPS press releases.

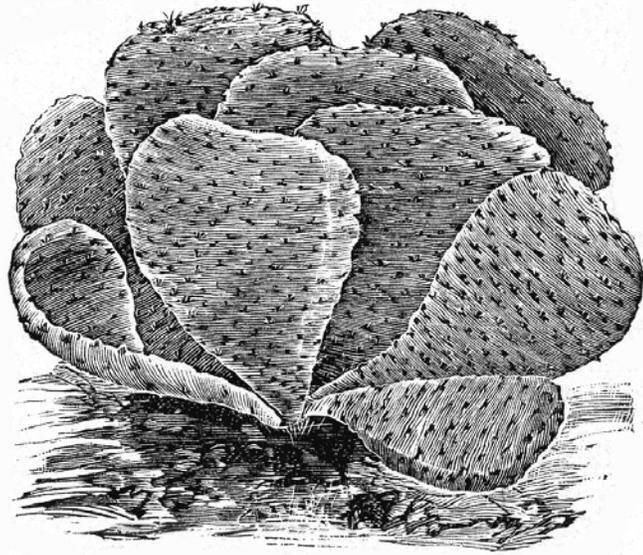
\*See "USFWS to investigate status of rare Uinta Basin sclerocacti" in the January, 2007 *Sego Lily* (vol 30, # 1, pp 10-11).

## Exploitation of Utah Cacti Began Early *(continued from page 1)*

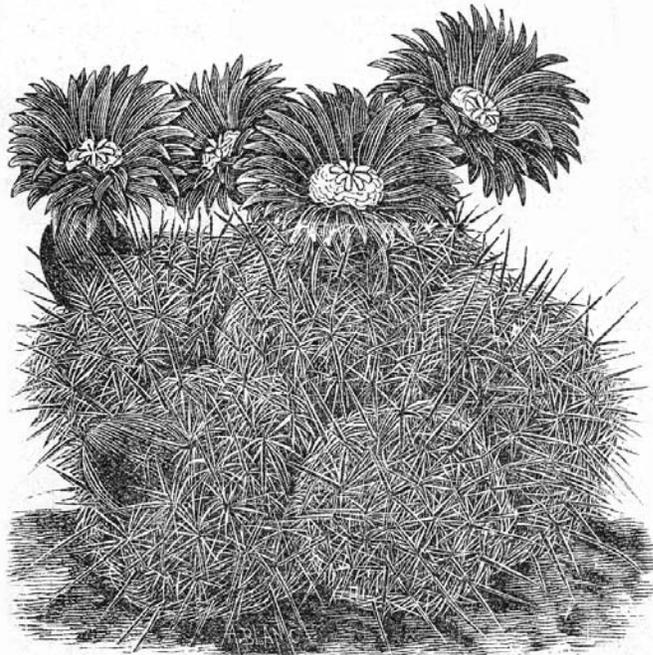
trade or sell seeds around and grow their own. Interstate and international trade in seeds is carefully regulated by CITES, but some countries pay meticulous attention to CITES and some do not.

The business of cacti was not always regulated. Even in the 50s and 60s, when I was active first as a cactus fancier and then as a researcher, no one thought about permission or permits, although thoughtful individuals would not take too many plants from a population.

On the other hand, at a Mineralogical Society of Utah field trip to the Toana Range in Nevada on May 1 of 1960, a woman came up to me and said, "Everyone up on the hill there is getting cacti to take home, you'd better get some." It was a fairly large group of people there that day, looking carefully over the hillside for pseudomorph specimens and finding cacti during the process. I took three *Pediocactus simpsonii* and one *Sclerocactus pubispinus*. I could never find any Scleros there again.



*Above: Opuntia basilaris from the Blanc catalogue (page 80): "Perhaps the finest of the Opuntias. . . so beautiful." Below: Echinocactus (Pediocactus) simpsonii from page 51. Not one of Blanc's better illustrations, as the flowers are relatively smaller with wider petals and the plant is not so spiny.*



Recently a friend, Nina Bowen, sent me a copy of a rare cactus publication that she bought at an estate sale. Entitled *Hints on Cacti*, it was published by an A. Blanc, who is reputed to have had the finest, most extensive collection of cacti in the world at that time, in the 1880s into the 1890s. The late Larry Mitich wrote an exhaustively-researched series of three articles about Albert A. Blanc and his business, *The World of A. Blanc*, parts 1, 2 and 3, for the *Cactus and Succulent Journal (U.S.)*: Vol 45, 1973: 158-170, 203-213, 269.

According to Part 2, p. 204, this copy of *Hints on Cacti*, which is undated, is either from 1894 or 1895. Sorted from editions of other years by number of pages and an illustration on page 108 dated 1893, these two are distinguished only by the different inside front covers, but Mitich doesn't specify the difference.

Blanc was an artist who succumbed to the cactus fancy and turned from a collector into a nurseryman, later branching out into other collectible plants such as African succulents, ferns, and orchids.

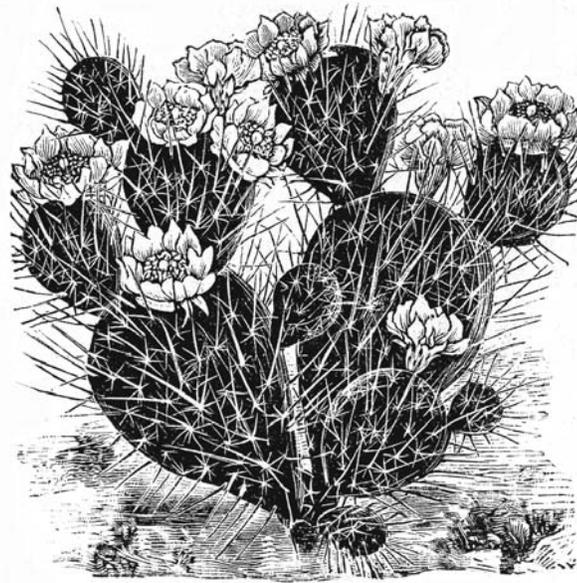
On page 2, Blanc makes offers of Cheap Collections of Cacti, to be

sent postpaid: 5 fine plants of our choice for 50 cents, or your choice for 60 cents; 7 fine plants of your choice for \$1, 10 plants of our choice for \$1; 16 plants of fine sorts our choice for \$2, or your choice for @2.35; 25 plants our selection, for \$3. "These plants are mostly of blooming size..." To make up these Cheap Collections 20 species were offered, including our *Echinocactus simpsonii*, now called *Pediocactus simpsonii*.

On page 7, Blanc states, "It is erroneously supposed that nearly all Cacti are native to the United States, while indeed, scarcely more than 50 varieties can be found within their limits and many of these are disappearing rapidly owing to the enormous demand created of late. He goes on to write about various difficulties of collection, "One of our Utah collectors had to travel 600 miles by wagon in order to obtain 3 of the 9 varieties indigeneous (sic) to that state."

The "enormous demand" of the time was largely created by the enthusiasm and marketing of this same A. Blanc, thought to be responsible for the Cactus Craze of the 1890s (Mitich, 1973: 158).

Utah species offered by Blanc in this edition of *Hints on Cacti* were *Echinocactus johnsoni* (sic), now *Echinomastus johnsonii*; *Echinocactus lecontei*, now *Ferocactus cylindraceus*; *Echinocactus sileri*, now *Pediocactus sileri*; *Echinocactus simpsonii*, now *Pediocactus simpsonii*; *Echinocereus engelmannii*; *Echinocereus fendleri* (rare in Utah, extreme SE); *Echinocereus gonacanthus*, now *E. triglochidiatus*; *Mamillaria arizonica*, now *Coryphantha vivipara*; *Mamillaria montana*, now also part of *C. vivipara*; *Opuntia basilaris*; *Opuntia echinocarpa*, now *Cylindropuntia echinocarpa*; *Opuntia missouriensis*, now *O. polyacantha*; *Opuntia camanichica*, now *O. phaeacantha*; *Opuntia whipplei*, now *Cylindropuntia whipplei* (nomenclature according to *Flora of North America*). Since this list numbers 13, Blanc's collectors did not know that this many different cacti lived



Above: *Opuntia missouriensis* (now *O. polyacantha*) from page 84 of the Blanc catalogue: "...nothing better can be had for planting in the open ground, where it will soon form fine masses that will be covered in the summer with magnificent large yellow flowers." Blanc was not aware of the many clones with pink flowers, or ivory, orange, or other intermediate shades.

in Utah; of this list, all may not have been collected in Utah.

Blanc must have tried growing cacti from seed, since he describes the process. But he adds, "We might as well say that we scarcely even think of raising a Cactus from seed—the task is too tedious", indicating that at least the bulk of the plants he sold, other than *Opuntias* that can be propagated vegetatively, must have been wild-collected.

Mitich notes that Blanc was the first to offer many rare species, and quotes the catalog description of *Echinocactus sileri* (*Pediocactus sileri*), "A very fine *Echinocactus*, discovered recently by Mr. Siler, of Utah. It grows in a very inaccessible and limited locality. We doubt if it can be found in a half dozen collections. The plant looks more like a *Mamillaria* than *Echinocactus*, having prominent tubercles and no ribs. They are of an ashy-white color and tipped with short, gray spines; flowers greenish; never offered before. Price, by mail, \$1 to \$2.50." Blanc frets about the difficulty of assigning

correct names, and uses the modern spelling of *Mamillaria* here, rather than the older single "m" of this edition of *Hints on Cacti*. *Hints on Cacti* is full of general information on growing cacti, and also serves as a catalog since it lists available species and their prices. However, Blanc published a separate *Descriptive and Illustrated Catalogue of Cacti* that "will be sent free to any one applying for it." The price of *Hints on Cacti* was 10 cents. In this edition, *Echinocactus* (*Pediocactus*) *sileri* is listed as "Stock exhausted".

In addition to selling cacti and other exotic plants, Blanc, an artist, had a prosperous business supplying other nurseries, publications, and florists with engravings and electrotypes of plants. An electrotype, not a word heard frequently today, is a plate prepared by electroplating for letterpress printing. An engraving, of course, is an illustration cut into a surface with a tool known as a graver or burin. Blanc's artwork remained in use in plant catalogs through the first half of the 20<sup>th</sup> century.

## Noteworthy Discoveries

### Sulfur Cinquefoil in Utah

By Beth Lowe Corbin  
Wasatch-Cache & Uinta National  
Forests

Sulfur cinquefoil (*Potentilla recta*) is a weed native to Eurasia that has only recently been recognized in Utah. Although widespread throughout much of the United States (and on at least five states' noxious weed lists), it is not included in A Utah Flora, third edition (Welsh et al 2003), the USDA PLANTS database for Utah ([www.plants.usda.gov](http://www.plants.usda.gov)), or the Intermountain Flora (Vol. 3a, Cronquist et al 1997). However, recent information about infestations in several locations within Utah have surfaced. A 1932 collection from the La Sal Ranger Station (San Juan County) was re-identified in 2006 as *Potentilla recta*, rather than the native *P. gracilis* the specimen had originally been called. Dr. Steve Dewey collected sulfur cinquefoil from at least three locations in Logan Canyon (Cache County) in 2007, and there's another Logan Canyon collection from 2001. I found *P. recta* in Middle Fork Wildlife Area and two locations in North Fork County Park (Weber Co.) in 2007, and there's an earlier Weber County collection from near Eden. In addition, I found it near Camel Pass northeast of Springville (Utah County) in 2007.

Given these widely scattered locations, it seems likely that sulfur cinquefoil occurs elsewhere within the state as well and has simply been overlooked. This is understandable because this weed looks very much like the widespread, common (and desirable) native slender cinquefoil (*Potentilla gracilis*). Both are perennials with yellow flowers and palmately compound leaves – that is with leaflets coming from one center point, radiating somewhat



like fingers from a palm. However, there are some subtle but distinct differences between the native and the weed (see chart below).

For example, their growth habits are different. The weedy sulfur cinquefoil is more likely to grow in a dense patch, displacing desired native vegetation, while our native slender cinquefoil is more neighborly, sharing its space with other plants. That's the character that caught my eye the first time I saw it.

Sulfur cinquefoil is apparently very difficult to get rid of once it's established. Weed managers in other states (such as Montana and Washington) spend a lot of time, money, and effort attempting to control it, and have observed it rapidly expanding in recent years. Sulfur cinquefoil is unpalatable to

nearly all animals.

We in Utah have the opportunity to nip this pest in the bud (so to speak) and control it before it gets out of hand. Do your part by watching for sulfur cinquefoil in your travels. Report infestations you find to the appropriate land manager. If you're unlucky enough to find it on your own property, pull or spray it before it flowers or sets seed, and plan on treating it for several years to entirely eliminate it. As always, be vigilant against spreading seeds of any weeds around, by cleaning your boots, socks, and pack (and maybe tires) thoroughly between trips, using only certified weed-free feed for horses, and not dragging home plant parts indiscriminately (Look, Mom, at the wildflowers I brought you....).

Character	<i>P. gracilis</i> – native	<i>P. recta</i> - weed
Basal leaves	Usually present at flowering	Usually dried by flowering
Stem leaves	Few	More
Stem hairs	Spreading or appressed (pressed against the surface), but short	Coarse, long, yellow and at right angles from the stem (in addition to dense, short hairs)
Leafblade hairs	Silkywhite and appressed	Like the stem hairs
Achene fruit ("seeds")	Smooth	Roughened (use a good lens)
Flowers	Bright yellow	Pale yellow

## Botanica

### Was a Fossil Tree Really Just a Humungous Fungus?

Determining the proper relationships of fossil organisms is always difficult, especially the deeper one goes back in time. A case in point is the fossil *Prototaxites*, which has been called a “colossal fossil enigma”. *Prototaxites* is a fossil organism dating from the early Devonian (400 million years ago) consisting of a large trunk-like structure nearly 3 feet in diameter and up to 24 feet tall. Paleobotanist Sir William Dawson published the first description of the plant in 1859 and concluded that it was a precursor of gymnosperms like the modern yew (*Taxus*), thus accounting for the scientific name ‘early yew-like’. Dawson cited as evidence the annual growth rings in the trunks and peculiar details of the cell anatomy of what he considered decayed fossil wood. Later researchers found that what seemed like wood was actually interlacing tubules of two distinct sizes. Rather than being a woody plant, *Prototaxites* was clearly non-vascular and probably a type of algae or fungus.

Over the next century, proponents of the algal hypothesis held sway. Most researchers placed *Prototaxites* in the extinct order Nematophytales, a grab-bag of unusual algae that represented an early and ultimately unsuccessful attempt to colonize land. More recently, German botanist H.-J. Schweitzer has suggested that *Prototaxites* represented the basal stem of a kelp-like marine brown alga, perhaps an analogue of the modern genus *Laminaria*. This hypothesis, however, has been refuted in part because the fossils are all associated with freshwater deposits.

More detailed study of the anatomy of *Prototaxites* has also revealed striking similarities to the internal growth form of basidiomycete fungi. Studies by Francis Hueber show that *Prototaxites* may have actually been a giant,

long-lived, columnar bracket fungus with the annual growth rings representing a fresh hymenium (the layer of cells producing the reproductive spores) produced each year. Surprisingly, though, no fossil spores have ever been recovered in association with *Prototaxites* fossils. This finding and the organism’s exceptionally large size has led French researcher Marc-Andre Selosse to suggest that *Prototaxites* was a colossal lichen comprised of fungal hyphae supporting a thin layer of photosynthetic algae on its outer surface.

In 2007, the story has taken a new turn with the publication of a study by C. Kevin Boyce and colleagues that examined the carbon isotope composition of *Prototaxites* and other fossils growing in the same layers. Boyce’s team found much broader variation in the ratio of carbon isotopes C-12 to C-13 in *Prototaxites* than in vascular plants, strongly suggesting that the fossil derived its nutrition as a heterotroph (like a fungus) rather than a photosynthetic autotroph. This new finding would indicate that *Prototaxites* might have actually been a giant subterranean fungus (accounting for the lack of spores).

But stay tuned – to paraphrase Huxley, another undiscovered ugly fact about this enigmatic fossil may yet slay this latest, beautiful hypothesis. - *Walter Fertig*

#### References:

- Boyce, C.K., C.L. Hotton, M.L. Fogel, G.D. Cody, R.M. Hazen, A.H. Knoll, and F.M. Hueber. 2007. Devonian landscape heterogeneity recorded by a giant fungus. *Geology* 35(5):399-402.
- Hans’ paleobotany pages ([www.xs4all.nl/~steurh/engprot/eprotot2.html](http://www.xs4all.nl/~steurh/engprot/eprotot2.html))
- Lundmark, C. 2007. Mighty *Prototaxites*. *BioScience* 57(6):544
- Stewart, W.N. and G.W. Rothwell. 1993. *Paleobotany and the Evolution of Plants*. Cambridge University Press, New York. 521 pp.

## Prickly Problems

A poem by Harriet Priska

Perhaps if there’s a Purgatory  
And plucking Puncture vines my fate  
With one for every sin committed  
I’d repent afore it’s too late!

Pesky devilish pricklers pierce my skin  
Reminding me of unrepented pleasure.  
Rapidly multiplying 6 times o’er  
Expanding beyond all measure

Above or underground they lie  
Just waiting for encouragement  
Eagerly spiny goat heads grow  
Adding to my discouragement

Even from under fresh asphalt  
spring  
Yellow blossomed spokes in endless variation  
A fresh and fruitful crop to bring  
100% germination!

For over 50 minutes now,  
Eternally a-choppin’  
“Oh, not more sprouts”, I cry,  
I choose to sin less often!

## Bulletin Board

**Forest Service Rare Plant Info on the Internet:** The Forest Service has posted a new Rare Plants module on the national Celebrating Wildflowers website. It is by far the most comprehensive source of Forest Service information on the web for federally Threatened and Endangered plants. All 115+ listed species that occur in US National Forests are individually profiled. Species can be viewed by close-up images, links to listing and recovery documents, conservation status, and individual Forest. The introductory material is an informative synopsis of our rare plant programs (e.g. what rare plants are, what the causes of rarity are, success stories, etc.). The website address is: <http://www.Fs.fed.us/wildflowers/rareplants/index.shtml>. — *Teresa Prendusi*

## Utah Plant Families: The Duckweeds (Lemnaceae)

By Walter Fertig

If a prize were awarded for the smallest flowering plant, the winner without question would be the duckweed and its relatives in the Lemnaceae. Our largest duckweeds top out at 6-7 mm long, while the smallest, tiny *Wolffia*, averages 1 mm. To the uninitiated, these aquatic monocots might be confused for floating algae, or debris left by a duck with bad table manners. Few botanists have ever even seen the plant's almost microscopic flowers. An ant would be hard-pressed to make a bouquet of duckweed blossoms.

Duckweeds are true vascular plants (unlike algae which lack water conducting xylem and food transporting phloem), but they represent an extreme form of reduction of the standard vascular plant body plan. Although they may appear like tiny floating leaves or fronds, the duckweed body is actually a flattened, modified stem (true leaves are absent). Sometimes the stem is called a thallus, though this term is more properly applied to non-vascular plants. The duckweed body can be recognized as a stem rather than a leaf because of its ability to form buds that beget new stems (and which can break off to form new individuals). Leaves are not capable of producing true buds.

Most duckweed stems are able to float on the surface of slow-moving water bodies because of their high surface area to volume ratio and because of the presence of air spaces among their thinly packed stem tissues. Such tissue is called aerenchyma or literally "air filling" in Greek. Duckweeds with less aerenchyma float below the water surface.

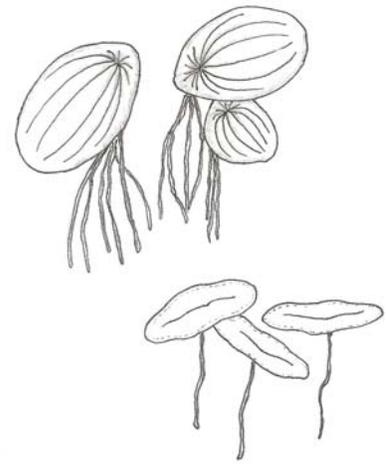
Most duckweeds retain simple roots for mineral absorption, though they no longer need them for anchorage. Actually, the presence or absence of roots and their

number helps identify different genera in the duckweed family. Members of the genus *Spirodela* (represented by one species in Utah, *S. polyrhiza*, sometimes called 'Giant ducksmeat'\*) have a cluster of 2 or more roots per stem. The true duckweeds of the genus *Lemna* (6-7 species in Utah, depending on who is counting) have a single root per stem. Lastly, the genus *Wolffia* (one species in Utah, *W. borealis* or watermeal) lacks roots altogether.

While the identification of genera is relatively straight forward in the Lemnaceae, determination of species can be difficult. Unlike most plants, flowers are nearly useless in differentiating species because they are rarely formed, extremely reduced in size, and lack showy petals or sepals. This just leaves stem characteristics which can be variable because of environmental influences. Stem length and shape are useful, as is the presence of a stalk, venation, or other surface ornamentation, or whether the stem forms clusters or occurs singly. Many of these features are difficult to detect without high magnification. Even under the best circumstances, the identity of a duckweed species (especially a *Lemna*) is often an educated guess.

The inflorescence of duckweeds (yes, it is technically a cluster of flowers) provides some important clues as to the evolutionary placement of the Lemnaceae. A duckweed inflorescence is comprised of three flowers: one pistillate (female) and two staminate (male). Each flower consists solely of one pistil or 1-2 stamens. The entire inflorescence is located within a pocket in the stem and is usually wrapped at the base by a small bract or spathe. The arum family (Araceae) is also characterized by plants having an inflorescence with a spathe, though in most aroids (such as Jack-in-the-pulpit, Skunk cabbage, Calla lily, and the house plant *Anthurium*)

\*though I'd like to see a 'Midget ducksmeat' for comparison.



Top: Giant ducksmeat (*Spirodela polyrhiza*) is recognizable by its multiple roots. Bottom: Valdiv's duckweed (*Lemna valdiviana*), like other *Lemna* species, is characterized by a single root. Illustration by W. Fertig.

the spathe is either brightly colored, much enlarged or somewhat succulent in texture. Traditionally, these two families have been considered closely related, and are indeed classified within the same order, the Arales. Water lettuce (genus *Pistia*) in the Araceae seems to bridge the morphological gap between the two families in being a free-floating aquatic (though with numerous, large leaves) and having very minute, *Lemna*-like, inflorescences. Recent cladistic studies utilizing morphology, anatomy, flavonoid, biochemistry, and chloroplast DNA confirm that the Lemnaceae nest nicely within the Araceae and should be considered part of an expanded Arum family. The same studies, however, suggest that *Pistia* evolved its aquatic habit independently of the duckweeds and is only a distant cousin at best.

In spite of being tiny and lacking showy petals or sepals, female duckweed flowers do attract flies, aphids, mites, small spiders, and even bees that are drawn by the sticky secretions from the stigma.

These arthropods pick up and transport spiny pollen grains between inflorescences to bring about pollination. Duckweeds can also be “contact pollinated” through the collision of adjacent stems jarring pollen onto receptive stigmas.

But sexual reproduction in the Lemnaceae is a rare event, with most species opting for asexual propagation via stem buds. Newly formed stems may remain attached to their parental stem (forming chains of interconnected fronds) or split off to form separate individuals. Many duckweeds also produce specialized greenish or brown over-wintering buds called turions. These starch-filled bodies detach from the stem and sink to the bottom of shallow ponds or lakes. As their starch stores become depleted in the spring, the turion gains buoyancy and develops into an adult duckweed to continue its life cycle anew.

Duckweeds are able to grow and produce new offshoots rapidly and can quickly cover the entire surface of a pond (especially one rich in nutrient runoff). Under such conditions, the area occupied by duckweed can double in size every two days. Dense populations of duckweed can be beneficial in creating cover for fish fry, reducing the evaporation rate of bodies of water, and providing food for ducks and other waterfowl.\* Occasionally, duckweed growth can become a nuisance to humans who prefer open water. While herbicides are sometimes used, safer and equally effective duckweed control can be attained manually with a pool skimmer or by hungry grass carp or koi.

Scientists are learning to appreciate the prodigious growth rate of these small plants and their enormous potential for bioremediation

\*In parts of Asia, duckweeds are also used for human food, though the Lemnaceae have not caught on in North American cuisine.

### Lemnaceae in a Nutshell

Number of genera: 5-6 worldwide, 3 in Utah (*Lemna*, *Spirodela*, and *Wolffia*)

Number of species: 38 worldwide, 8-9 in Utah (9th species, *L. turionifera*, is reported in *Flora of North America Vol 22*, but UT specimens may be *L. obscura*).

Distribution: worldwide in freshwater, absent from Arctic and extreme deserts. In Utah, found in ponds, lakes, and slow-moving streams across the state, but species diversity is greatest in the northern mountains.

Key Features: minute size, free-floating body reduced to an elliptic to oval stem without true leaves (stems sometimes called a thallus or frond), tiny inflorescences of apetalous unisexual flowers surrounded by a tiny spathe, roots usually present (absent in *Wolffia*) but not anchored to the soil.

Economic Significance: food for waterfowl, fish, and livestock, bioremediation of polluted water, potential for genetic engineering of insulin and other drugs.

of polluted waters. Duckweeds are especially proficient at incorporating excess amounts of phosphorus and nitrogen from agricultural runoff into their own biomass. In doing so, duckweeds actually produce more protein per square meter of growth than soybeans. Harvesting duckweed reduces the amount of phosphorus and nitrogen remaining in polluted waters while also providing nutritious feed for cattle, poultry, fish, and shrimp. Some farmers even use duckweed as fertilizer.

The fast and consistent growth rate of duckweeds makes them well suited for bio-assays of solutions. Duckweed growth will respond in predictable ways to changes in the concentration of various solutes in water. This makes duckweeds useful for

assessing pollution levels in natural bodies of water.

Recently, bio-engineers have discovered the potential utility of duckweeds for producing pharmaceuticals. Dr. Anne-Marie Stomp of North Carolina State University has developed a technique to transfer simple protein-coding genes into *Lemna* plants using bacteria. Ultimately, her lab hopes to use duckweeds to synthesize insulin and other proteins. The fast growth of duckweeds and their immunity from animal viruses makes them an ideal biological tool to develop medicines. Eventually these technologies could be worth billions of dollars.

Not too bad for a tiny little aquatic plant that we either ignore, overlook, or confuse with algae. What else remains to be discovered about these remarkable miniatures?

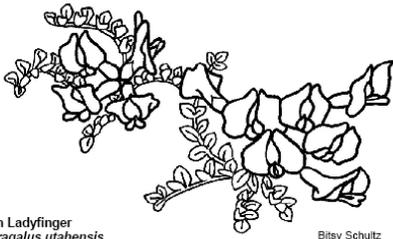


Above: Ivy-leaf duckweed (*Lemna trisulca*), perhaps the most easily recognizable of the duckweeds with its characteristic long stipe-like base. Illustration by W. Fertig.

#### References:

The Charms of Duckweed (website): [www.mobot.org/jwcross/duckweed/duckweed.htm](http://www.mobot.org/jwcross/duckweed/duckweed.htm)

Armstrong, W.P. 2001. Wayne's Word Lemnaceae on-line (website): <http://waynesword.palomar.edu/1wayindx.htm>



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